R/C modeler

NOVEMBER, 1963

40 CENTS

U.S. Wins Victory At Genk

THE WHITE HOUSE

WASHINGTON

August 29, 1963

R/C Modeler Magazine
Post Office Box 487
Sierra Madre, California

Thank you for your
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most exciting and success-
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Sincerely,

Ralph A. Dungan

Ralph A. Dungan
Special Assistant
to the President

the WINNER

1st PLACE 1963 NATIONALS

Proportional Control takes 1963 Nationals with "404"
Leading the Pack in First Place RC Multi

WORLD'S ALTITUDE RECORD

"404" System Chosen for Extreme Range and Positive Control Required in Setting the New World Altitude Record

Complete Proportional System, Prewired, Ready for Flight with all Batteries and Chargers:

6 Meter Model **$548.00**

Super-het Model **$571.00**

JIM KIRKLAND

Flying his famous Beachcomber, equipped with "Sampey 404" proportional, captured with a high point lead 1st place in RC Multi at the Nationals. Jim, flying with "404" has taken 1st place in every contest entered this year, including the Florida State Championships and the Air Force World Wide Nationals.

In less than one year of production "Sampey 404" has climbed the ladder to rank as a leader in Remote Control equipment. There must be a reason for this success. We contend that it is teamwork backed by an organization with talent devoted to one field and one goal. The "404" idea was conceived three years ago. It took vision to develop it into the top leader that it is today.

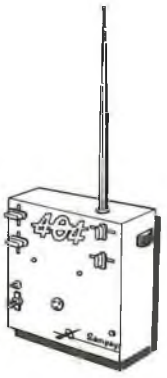
MAYNARD HILL

Flew his "Sampey 404" equipped model, controlled from the ground, to a new altitude record of 13,320 ft. Flying a 7½ ft. Span original design built from Sig balsa, weighing 8 lbs., and powered with a "Fox 59". Maynard broke the record on three successive flights, the first being to 11,940 ft., and the second to 12,960 ft.

AVAILABLE SOON

Multi-Stick Proportional Transmitter

To satisfy the needs of the old time reed pilots we are going into full production on a multi-stick proportional transmitter. All the features of the standard single stick 404 will be incorporated in the multi-stick version, Model 404-MS. Same price as single stick model. Place your order early.



NOW IN OUR NEW HOME

Sampey & Company

1607 FORSYTHE ROAD ORLANDO, FLORIDA

"404" Instruction Manual Price: $2.50

TECHNICAL BROCHURES Send 25¢ in coin

FIRST TIME EVER!
NO ADDITIONAL MONEY CHARGES FOR ORDERS OF ANY SIZE!
We Welcome Your Patronage.

LEES HOBBY SUPPLIES INC.

FREE! FREE! FREE!

GLUE DISPENSER — ORDERS OVER $ 3.00
1" SHED RESIST. BRUSH — ORDERS OVER 5.00
1 YR SUBSCRIPTION TO "GRID LEAKS" — ORDERS OVER 10.00

MAGAZINES AND BOOKS

NO. 33A6—R/C PRIMER by Howard G. McEntee — $2.00
NO. 33A8—R/C HANDBOOK by Howard G. McEntee — $4.95
NO. 33A4—MODEL RADIO CONTROL by E. L. Safford — $2.95
NO. 33A6—FUN WITH R/C MODELS by E. L. Safford — $3.20
NO. 33A5—HINTS AND KINKS FOR RADIO, TV and AUDIO — $2.35
NO. 33A3—R/C FOR MODEL BUILDERS by Bill Winter — $4.25
NO. 33A7—GRID LEAKS PROPORTIONAL CONTROL FOR RUDDER ONLY — $2.00

ENGINES

TORPEDO .18RC — 19.95
Only engines with multi-speed carburetor
TORPEDO .35RC — 22.95
Includes built-in adjustment for idle setting
TORPEDO .45RC — 27.85
Most advanced .45 ever developed. Smoothest running, greatest bearing life, outstanding H.P.
TORNADO .049 — 3.95
Ideal for beginners, integral fuel tank.
TORPEDO .09 — 9.95
Light weight, easy start, all model types.
TORPEDO .19 — 13.95
TORPEDO .35 — 19.95
Ideal engine, easy starting and long life.
TORPEDO .45 — 19.85
1961 Nats stunt champion engine.
TORPEDO .15R — 19.95
Features Meehanite Liner and "Electrolizing".
TORPEDO .29R — 21.95
Includes spinner and collet type needle valve.
TORPEDO .35 — 19.95
Features new shut-off type spray bar.

K.B. "Stallion Series"
Stallion .049 (with tank) — 3.95
Stallion .049 (less tank) — 3.49
Stallion .35 (new and hot) — 9.95

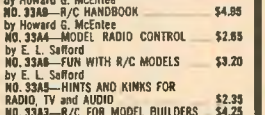
R/C MODEL KITS

No. 13A1—NOMAD (Ecktronics) — 5.95
48" span, .010-.024 eng., Single Ch., Glider
NO. 13A3—FREEDOM 7 (Ecktronics) — 7.95
40" span, .049-.099 eng., Single Ch., Shoulder Wing
NO. 13A2—FREEDOM 15 (Ecktronics) — 14.95
52" span, .15-.19 eng., Multi Trainer, Shoulder Wing
NO. 13A14—CONCORD (Ecktronics) — 8.95
46" span .07-.10 eng., Single Ch., Cabin type
NO. 13A19—SCHOOLMASTER (TOP FLITE) — 5.95
39" span, .049 eng., Single Ch., Cabin type
NO. 13A4—LIBERTY 7 (Ectronics) — 7.95
40" span, .049-.099 eng., Single Ch., Low Wing
NO. 13A5—LIBERTY 15 (Ectronics) — 14.95
52" span, .15-.19 eng., Multi, Low Wing
NO. 13A22—B)-HAWK (Ectronics) — 6.95
½ A Bi-plane, Single Ch.
NO. 13A18—TAURUS (Top Flite) — 29.95
70" span, .45 eng., Multi, Low Wing
NO. 13A12—TAURI (Top Flite) — 19.95
57" span, .15-.25 eng., Multi, Shoulder Wing
NO. 13A9—RASCAL (Top Flite) — 2.95
27" span, .010-.020 eng., Single Ch., Cabin type
NO. 13A8—SCHOOLBOY (Top Flite) — 3.50
29" span, .010-.020 eng., Single Ch., Cabin type
NO. 13A10—ROARING 20 (Top Flite) — 2.95
20" span, .010-.020 eng., Single Ch., Shoulder Wing
NO. 13A11—CESSNA (Top Flite) — 3.95
30" span, .020-.024 eng., Single Ch., semi-scale
NO. 13A16—JR. FALCON (C.G.) — 3.95
37" span, .049 eng., Single Ch., Shoulder Wing
NO. 13A13—FALCON (C.G.) — 8.95
56" span, .09-.19 eng., multi, Shoulder Wing
NO. 13A23—Viscount (DMECO) — $26.95
60" span, .29-.49 eng., Multi, low wing.
NO. 13A24—Perigee (DMECO) — $28.95
61" span, .19 to .40 engines, Multi, low wing.
NO. 13A25—Yankee (DMECO) — $ 7.95
42" span, .07-.09 eng., single ch., cabin type.
NO. 13A26—Sonic Cruiser — $19.95
66" span, .19-.49 eng., Multi, cabin type.
NO. 13A17—TAURUS WING (Top Flite) — 11.95
NO. 13A15—ORION WING (Top Flite) — 10.95
NO. 13B6—R/C RACER FUSELAGE (Hartman) — 17.95
Moulded fiberglass fuselage, weight 9 oz.

MARCYTONE PRM-1 SYSTEM

NO. 10A5—MARCYTONE PRM-1 SYSTEM $105.95
First Proportional Rudder only system with positionable engine control. Recommended for .15 engine or larger. Uses no relays. Combo kit includes transmitter, pulser, receiver rudder and motor control servo kits.
NO. 10A8—MARCYTONE PRM-1 SYSTEM $165.95
Completely built, all units assembled, ready to install.

TRANSMITTERS AND KITS



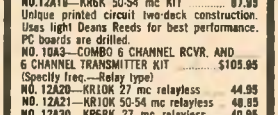
NO. 11A3—KT1K KIT, 26-28 mc (Kraft tone) — 24.95
NO. 11A4—KT1K KIT, 50-54 mc (Kraft tone) — 26.95
Both kits include ASP 211 telescoping antenna, transistor, tube, crystal, hardware, case, PC board and revised instructions.
NO. 11A18—ELECTRONICS KRAFT TRANSMITTER — 34.95
Same as above, but assembled, tuned and certified.

NO. 11A1—CS-502 (Falcon) — 29.95
Single Chan Tone, matches C. & S. receivers and others.
NO. 11A5—CS-502 KIT (Falcon) — 24.50
Same as above, but in kit form. Easy instructions.
NO. 11A16—TTX TRANSMITTER (Citizenship) — 29.95
Transistorized Tone Transmitter, 27.255 mc operation.
NO. 11A2—PACESETTER TRANSMITTER (Electronics) — 24.95
Single Channel Tone Transmitter, Meon-transistor modulation.
NO. 11A7Y—MC 250T TRANSMITTER — 22.95
Tone Transmitter designed for MC100T Receiver
NO. 11A12—KT6K KIT 27 mc 6 channel — 49.95
NO. 11A13—KT6K KIT 52 or 52.75 mc — 51.95
Kraft 6 Channel kits. Complete with all required parts.
NO. 11A8—KT10K-D KIT (Specify crystal freq.) 10 channel — 87.50
NO. 11A9—KT10K-M KIT (Specify crystal freq.) 10 channel — 87.50
Kraft Triple Ten Transmitter kits. Complete kit features highest grade components, use of two henry toroids, 10% capacitors, epoxy glass PC boards.

RECEIVERS AND KITS

C & S SUPERHETS
NO. 12A37—CSS07S Oriole (Single Ch.) — $54.50
NO. 12A36—CS-508S (Single Ch.) — 54.50
NO. 12A39—CS-507M (Multi) — 74.50
NO. 12A40—CS-508M (Multi) — 74.50
The single channel series is designed for operation with the C & S Falcon transmitter.
The multi channel is designed for use with the new C & S Eagle Transmitter.
NO. 12A7—KR1K KIT 26-28 mc — 18.95
NO. 12A8—KR1K KIT 50-54 mc — 21.95
Most highly recommended single channel superregen receiver available to kit builders.
NO. 12A9—ECTRONICS KRAFT RECEIVER — 28.95
Same as above, only completely assembled; avail. 26-28 mc.
NO. 12A5—COURIER RELAYLESS RECEIVER — 21.85
Ectronics relayless single channel, all-transistorized.
NO. 12A10—K3VK KIT — 13.95
Kraft 3 volt—all transistor relayless, 26-28 mc.
NO. 12A6—OTARION O-21 — 24.95
CB relayless tone receiver, weight ½ oz., temperature stabilized.
NO. 12A27—OTARION O-22 — 27.50
Proportional relayless receiver, temperature stabilized 0°-140°F.
NO. 12A28—ECTRONIC RELAYER — 24.95
3 V. Relay Tone Receiver! All transistor, 1½ oz.
NO. 12A25—CITIZENSHIP LT-3 COMBO — 29.95
Super-regen relayless tone receiver with SE-2 escapement.
NO. 12A28—CITIZENSHIP R/C PAK — 32.95
Single channel 27 mc unit with SE-2 escapement, no soldering or wiring.
NO. 12A12Y—MC 100T — 20.95
Tube and transistor tone receiver, use with MC250T transmitter.
NO. 12A1—CS-501 HUMMING BIRD — 22.50
Weight ¾ oz. Uses SE-2 or Bobcock Mark II escapement, simple wiring.
NO.12A2—CS-503 LARK RECEIVER — 29.50
Weight 1⅝ oz. Less than 4 ma idle, 35 ma on signal.
NO. 12A3—CS-505 FINCH RECEIVER — 27.50
All transistor dual output relayless receiver. Weight 1 oz.
NO. 12A4—CS-505 FINCH RECEIVER — 29.50
Same as above, but with metal case.
NO. 12A15—NIKE SUPERHET CONVERTER 39.95
Convert from broad-tuning super regen receiver to nice sharp superhet.
NO. 12A16—KR6K 27mc KIT — 85.95
NO.12A18—KR6K 50-54 mc KIT — 87.95
Unique printed circuit two-deck construction. Uses light Deans Reeds for best performance. PC boards are drilled.
NO. 10A3—COMBO 6 CHANNEL RCVR. AND 6 CHANNEL TRANSMITTER KIT — $105.95
(Specify freq.—Relay type)
NO. 12A20—KR1DK 27 mc relayless — 44.95
NO. 12A21—KR1DK 50-54 mc relayless — 48.85
NO. 12A30—KR6RK 27 mc relayless — 40.95
NO. 12A29—KR6RK 50-54 mc relayless — 42.95
The kraft multi-fil super regen relayless receiver kits are available with a 6 or 10 channel reed bank. Use with transmitte servos.
NO. 10A7—KT6RK 6 channel relayless — 87.95
with 6 channel transmitter kit (specify frequency).

ESCAPEMENTS



NO. 14A14—ARISTO MOTOR or RUDDER CONTROL — 3.95
NO. 14A13—ARISTO SELECTIVE COMPOUND — 6.95
Light weight, instant responsive escapement.
NO. 14A48—ARISTO CODE-A-MATIC CONTROL BOX — 10.95
Features "Flight-feel" control stick and separate throttle button.
NO. 14A48—ARISTO QUAD-TROL — 12.95
Actually two compound units, pre-mounted on "Uni-Panel".
No. 14A8—BABCOCK MOTOR MINDER — 4.95
Motor-minder motor control escapement. Perfect in-flight control.
NO. 14A8—BABCOCK MARK II
Most popular of all model aircraft servos.
NO. 14A10—BABCOCK MARK V — 8.49
Easy, callable stick-box or manual control.
NO. 14A23—BABCOCK DOUBLE DECKER 8DC-6 — 5.95
Features 3 transistor switching network for positive actuation of Mark II or Mark V escapements.
NO. 14A4—BONNER SN — 5.95
NO. 14A5—BONNER VARICOMP — 8.95
A versatile and powerful compound escapement.
NO. 14A6—BONNER VARICOMP COMBO — 18.95
NO. 14A7—BONNER R. E. VARICOMP — 9.75
NO. 14A3—CITIZENSHIP SE2 — 7.95
NO. 14A15—ECTRONIC TRANSLATOR — 9.95
Super-light weight escapement with built-in memory.
NO. 14A16—ECTRONIC ENGINAC — 5.95
Provides high, low and cruising engine speeds when used with translator. Easily adjustable.
NO.14A1—G. & M. MINICOMBO I — 6.95
NO. 14A2—G. & M. MINICOMBO II — 7.95
Compact, light weight single channel rudder actuators.

KRAFT CUSTOM R/C

NO. 12A22—Kraft Superhet 10 channel — 89.95
NO. 12A32—Kraft Superhet 12 channel — 99.95
Smallest, lightest multi-channel superheterodyne receivers available. Weight is 3½ oz.
NO. 12A33Z—Kraft Single Superhet (Convertible) — 54.95
NO. 12A23—Kraft Hybrid 10 Channel Receiver — 89.95
NO. 12A34—Kraft Single Convertible Hybrid 10 channel kit — 47.95
NO. 12A24—Kraft Hybrid Front End kit only — 41.95
NO. 11A11Z—KT10 Kraft Transistor Transmitter — 119.95
NO. 11A172—KT12 Kraft Transistor Transmitter — 129.95
Smallest practical physical size. Light weight.

SERVOS

NO. 14A12—G. & M. BOTOMATIC — 12.95
Single channel boat servo. Provides forward, stop, reverse motor and intantaneous rudder action.
NO. 14A11—BABCOCK No. 897 SERVO — 9.95
Electric compound servo for even the largest boats.
NO. 14A24—CITIZENSHIP ACTUATOR KIT 11.95
NO. 14A50—TMA SERVO — 25.95
Transistorized for direct operation from any standard reed bank.
NO. 14A51—RNA SERVO ASSEMBLED — 9.95
NO. 14A52—RNA SERVO KIT — 7.95
NO. 14A18—HILLCREST MOTOR CONTROL — 5.95
Throttle control servo designed for multi channel.
NO. 14A17—BABCOCK No. 887 SERVO — 10.95
For battery-powered R/C boats, cars and trucks.
NO. 14A19—BONNER DURAMITE — 12.95
NO. 14A20—BONNER TRANSMITE NEUTRALIZING — 29.95
NO. 14A21—BONNER TRANSMITE TRIM ONLY — 27.85
NO. 14A22—BONNER TRANSMITE AMPLIFIER WIRED — 19.95
Relayless transmite servos especially designed for Bramco, Apollo, Kraft relayless 10, orbit and CC.

BONNER COMPONENTS

NO. 14A36—Cam followers — .15
No. 14A37—SN Rotor wheel — .55
No. 14A38—Varicomp cam wheel — 1.35
No. 14A39—R. E. Varicomp cam wheel — 1.50
NO. 14A40—Duramite servo sector — 1.50
NO. 14A41—Duramite crown gear — .50
NO. 14A42—Duramite combination gear — .35
NO. 14A43—Duramite pinion gear — .20
NO. 14A44—Duramite cans, bottom half — 2.00
NO. 14A45—Duramite can, top half less P.C. board — 1.00
NO. 14A46—Duramite adjusting screw — .15
NO. 23A1—BONNER MOTOR — 3.95
NO. 14A34—KRAFT SERVO AMPLIFIER KIT — 13.95
NO. 14A54—KRAFT 10 CHANNEL SERVO SWITCHER KIT — 49.95
NO. 14A47—CUSTOM BUILT KRAFT 10 SERVO SWITCHER — 89.95

ACTUATORS

NO. 14A80—GO-AC KIT (Strawder) — 11.95
GO-AC ASSEMBLED (Strawder) — 14.85
DU-AC ASSEMBLED (Strawder) — 14.85
NO. 14A25—GM PROPOMATIC — 15.95
NO. 14A27—SEPTALLETTE MARK III — 6.95
NO. 14A28—SEPTALLETTE MARK V — 6.95
NO. 14A53—SOUTHWESTERN — 5.95
NO. 14A33—POU-VOIR — 6.50
Has double coil with only 30 ohms—plenty of power—low drain.
NO. 14A30—MARCY FEED BACK KIT — 27.50
NO. 14A31—MARCY FEED BACK CUSTOM BUILT — 32.50

PULSERS, P.O.D. KITS

NO. 15A4—CS PULSI-TRAN 504 ASSEMBLED — 24.50
NO. 15A5—SHOWS RC PULSER KIT — 17.95
NO. 15A3—BAISDEN GG PULSER KIT — 17.95
NO. 15A8—WORTH SIMPL SIMUL PULSER KIT — 21.95
NO. 15AB—SHOWS POD KIT — 12.95
NO. 15A7—BROADHURST POD KIT — 7.95

TEST INSTRUMENTS

NO. 22A1—BASIC FSM KIT — 1.50
NO. 22A2—BASIC TRANSISTORIZED FSM KIT — 2.85
NO. 22A3—SUBMINI 0-1 MA METER — 3.45
NO. 22A4—0-500 MA METER — 3.95
NO. 22A5—SPACE CONTROL 0-1 MA METER — 5.95
NO. 22A6—SPACE CONTROL 0-5 MA METER — 5.95
NO. 22A7—SPACE CONTROL 0-50 MA METER — 5.95
NO. 22A8—MT 2000 MULTITEST (Imported) — 9.95
Low cost pocket multimeter with features found in higher priced units.
NO. 22A9—VOM 102F FUSED KIT — 16.95
American made volt ohm milliameter, larger than above unit.
NO. 22A10—METER TEST LEADS — .50
40" red and black standard.

BATTERIES

NO. 38A35—NICKEL CADMIUM 4AH — 1.95
NO. 38A3—EVEREADY N46 — 2.95
NO. 38A4—WILLARD BB 210 LEAD ACID — 5.95
NO. 38A34—ARISTO 54 LEAD ACID — 4.75
NO. 38A5—MALLORY ALKALINES MN 9100 — .35
NO. 38A6—MALLORY ALKALINES MN 1500 — .50
NO. 38A38—MALLORY 2400B (AAA pen cell size) — .45
NO. 38A37—MALLORY 1400B (Medium cell size) — .75
NO. 38A1—MEDCO KM5 POWER PAK AND KIT — 4.95
NO. 38A2—MEDCO PM5 (as above but with nicads) — 18.95

BATTERY CHARGERS

NO. 34A8—NICKEL CADMIUM CHARGER KIT — 11.95
NO. 34A6—TOWER VARI-VOLT CHARGER — 7.95
NO. 34A11—TOWER HYDOMETER TESTER — 1.25
NO. 34A7—TOWER BATTERY BOOKLET — .25
VINCO CHARGER — 19.95
KLEINTRONICS CHARGER — 19.95
NO. 34A9—ARISTO 2-4-6 CHARGER — 7.95
NO. 34A1—MEDCO CHARGER — 6.95
NO. 34A2Y—MC 2 VOLT CHARGER — 6.95
NO. 34A3Y—MC 2-6 CHARGER — $11.95
NO. 34A4—MC NICAD No. 1 CHARGER — 8.95
NO. 34A10—ACE NICAD CHARGER PARTS PACKAGE — 3.75

TRANSMITTER CONVERTERS

NO. 26A5—ACE TC 3.6 K KIT — 10.95
Convert from 3.6V to 135V
NO. 26A1Y—MC 135Y-20 — 11.95
NO. 26A2Y—MC 135T-40 — 14.95

RECEIVER CONVERTERS

NO. 25A3—KP/CK COMPLETE KIT — 10.95
NO. 28A4—KP/C PARTS FOR BUILDING INTO KRAFT RECEIVERS — 9.25
NO. 17A26—CUP CORE FOR ABOVE WOUND — 3.95
NO. 23A2—MIGHTY MIDGET MOTOR — 2.85
NO. 23A4—EXTRA BRUSH SETS — .35

ACRYJEL KITS

NO. 37A3—TUFLITE FIBERGLASS — 1.25
NO. 37A4—SUPERFLITE FIBERGLASS — 1.25
NO. 37A1—ACRYJEL REPAIR PLASTIC KIT No. 1 — 1.20
NO. 37A2—ACRYJEL MOULDING PLASTIC KIT No. 1 — 3.75
NO. 37A16—ACRYJEL PHOTO PC KIT — 3.95
NO. 28A30—ACE PRINTED CIRCUIT KIT — 3.95

CAPACITORS

NPO DISC 1, 2.2, 5, 6.8, 10, 15, 33, 47, 50, or 68 mmf. — .25 each
Subminl Disc
NO. 18A8—1, 2.2, 6.8, 10, 15, 22, 33, 47, 50, 100, 120, 220, 470 or 680 mmf., Each — .15
NO. 18A9—.007, .002, .005, .01, .02, .03 mf., Each — .20
NO. 18A10—.04, .05 mf., Each — .25

ANTENNAS

NO. 37A67—CLA ANTENNA (Center loading Antenna) — 5.95
49" long, collapsed 18", increased output.
NO. 37A7—TCU 54 — 4.25
Heavy duty, 54" 3 section telescoping antenna. Collapses to 24"
NO. 37A8—ASP 211 — 2.45
42" 5 section telescopes to 9¾"
NO. 37AX—TCU 112 — 4.95
Deluxe ground based type antenna. Full 112" for effective radiation.

TRANSFORMERS-TOROIDS

NO. 17A23—ST11 — 1.25
NO. 17A24—IEIQ2T — 2.50
NO. 17A25—Zebra — 1.25
NO. 17A28—Receiver cup core tx — 3.95
NO. 17A27—Transmitter cup core tx — 3.95
SUPERHET IF Transformers
NO. 17A28—455-B1—Input — 1.80
NO. 17A29—455-B2—Interstage — 1.80
NO. 17A30—455-B3—Output — 1.80
NO. 17A31—Iron core tapped Oscillator coil — .95
NO. 17A32—TOROID, 1 henry — 6.95
NO. 17A33—TOROID, 2 henry — 7.95

METAL CASES

NO. 21A8—#01, 1⅞ x 2¼ x 4" — $1.40
NO. 21A9—#1, 2 x 3 x 4" — 1.45
NO. 21A10—#1A, 2 x 3 x 4" — 1.85
NO. 21A11—#1B, 2 x 4 x 4" — 1.85
NO. 21A12—#2, 3 x 4 x 5" — 1.95
NO. 21A13—#3, 3 x 5½ x 8" — 3.45
NO. 21A14—#5, 7 x 8 x 10" — 4.95
NO. 21A15—#6, 8 x 10 x 10" — 5.95
NO. 21A16—#7, 3 x 8 x 9¾" — 5.85
NO. 21A17—#8, NEW! Sloping front design. Used in new Ace Nicard Charger kit. Measures 3 x 4 x 6¼". — 3.50

PLASTIC CASES

NO. 21A1—PB #1a, 1 x 1 x ¾ — .05
NO. 21A2—PB #1, 1⅝ x 2¼ x 1 — .10
NO. 21A3—PB #2, 2 x 2¾ x 1 — .15
NO. 21A4—PB #3, 3½ x 4½ x 1½ — .25
NO. 21A5—PB #4, 1¾ x 5½ x 1¼ — .15
NO. 21A6—PB #5, 2½ x 3¾ x 2 — .25

DIODES TRANSISTORS - TUBES

DIODES — TRANSISTORS		T2361 (replaces 2N224 in switching use)	2.20
1N34	.45		
1N81	1.10	T 6058 RF	1.90
1N295	.45	TUBES	
1N457	.97	XFG1	3.50
#1215 Federal	.90	XFY34	2.95
#1TI International	.90	CK526AX	3.95
2N214	1.98	CK535	1.25
2N217	1.20	CK1054 (RK61)	4.25
2N224 Type plain	1.50	CK5872	3.50
2N224 Type blue	2.00	1S4	1.10
2N224 Type Red	1.80	1S5	1.10
2N228 Type NPN	.97	1U4	.75
2N406	.90	1V6	2.50
2N1265 Type	.80	1X84	3.95
2N1302 Type NPN	.80	CK5678	3.45
2N1303	.90	3A4	1.50
TD037	1.50	3A5	2.50
T1324 RF	1.90	3B7	.95
T2518 (replaces 2N224 in audio use)	1.50	3D6	.95
T 6059 IF	1.90	3E4	.75
		3S4	1.40

CRYSTALS

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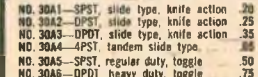

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NO. 30A4—4PST, tandem slide type — .85
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VOL. 1, NO. 2 NOVEMBER, 1963

R/C modeler

DEVOTED EXCLUSIVELY TO RADIO CONTROL

CONSTRUCTION

FEATURES

DEPARTMENTS

EDITOR'S MEMO

by Don Dewey

It seems as if the excitement of the Nationals had no sooner quieted down to a dull roar, when we were caught up in the whirlpool of activity surrounding the 1963 Internats. Unfortunately, the closest your editor got to Genk, Belgium was to glare at the travel posters maliciously sent back by Cliff Rausin, our Foreign Editor. One consolation, though—with the RC jet-set over on the continent, we had the Southern California smog and 95 degree heat all to ourselves!

•

Speaking of heat, Flight Lt. Noel Falconer, R. A. F., Changi, Singapore reports the results of a test he ran at high noon on a coral aircraft park at Gan — 40 miles from the Equator in Southeast Asia. After an hour's exposure in direct sunlight, a black box, the size, shape, and color of an Orbit transmitter had a temperature of 155 degrees F! A similar box in high-gloss white was 40 degrees — we repeat, 40 degrees — cooler! Might be a good idea if all you black-box owners planning on competing in the Dallas Nationals next year got out the old paint brush and slapped on a coat of "cooler." Incidentally, Noel and the boys in the Singapore area have been flying Orbit and Space Control rigs for a couple of years in temperatures that commonly reach 115 degrees!

•

While on the subject of "hot," the Veco 45 continues to gather well-deserved acclaim among the RC fraternity. The following break-in procedure for this mill, recommended by Clarence Lee and Monte Malherbe, is well worth following:

Look at the engine from the rear and remove the top left screw from the back plate. Drill the smallest possible hole right through this screw, and after cleaning it, replace in the engine. Obtain some Jeweler's Rouge, mix with light machine oil into a thin paste, and place this mixture into a fuel bulb. Attach a suitable length of fuel tubing to the bulb. Start the Veco 45 with full-open throttle, then set the needle valve to allow the mill to just barely break into two-cycle. Force the fuel tubing from the bulb over the drilled screw in the back plate. Squeeze the bulb to force the jeweler's rouge mixture into the engine. Watch the exhaust port and when red shows, stop squeezing the bulb. Do this three or four times, but remember to stop squeezing the bulb when red shows at the exhaust. Replace the drilled screw with a new undrilled one after the third "shot" of rouge.

Using this method, you do not get the abrasive into the bearings, but rather, is injected right into the bypass of the engine and thus goes exactly where it is needed. This method must not be used to break the engine in completely — it merely eliminates the necessity for prolonged running-in on the bench. The engine will still have to be flown rich for quite some time. One additional hint: if you add another 10% of oil to your fuel mixture, you do not need nitromethane for this engine.

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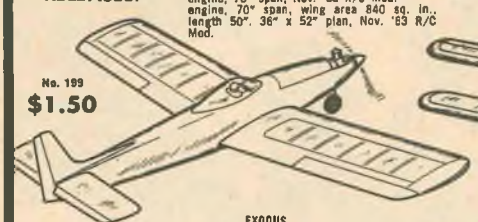

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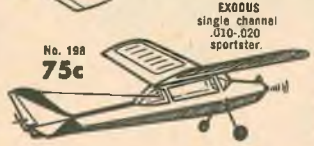

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36" LENGTHS

1/32 x 2	10c
1/16 x 2	12c
3/32 x 2	14c
1/8 x 2	17c
3/16 x 2	21c
1/4 x 2	26c
3/8 x 2	32c
1/32 x 3	18c
1/16 x 3	18c
3/32 x 3	21c
1/8 x 3	25c
3/16 x 3	31c
1/4 x 3	38c
3/8 x 3	50c
1/32 x 4	28c
1/16 x 4	28c
3/32 x 4	30c
1/8 x 4	35c
3/16 x 4	40c
1/4 x 4	47c
3/8 x 4	62c

48" LENGTHS

1/32 x 3	27c
1/16 x 3	27c
3/32 x 3	32c
1/8 x 3	37c
3/16 x 3	45c
1/4 x 3	55c
3/8 x 3	70c
1/16 x 4	39c
3/32 x 4	40c
1/8 x 4	47c
3/16 x 4	55c
1/4 x 4	62c
3/8 x 4	77c

STRIPS

36" LENGTHS

■1/16 SQ.	1c
1/16 x 1/8	4/5c
1/16 x 3/16	3/5c
1/16 x 1/4	2/5c
1/16 x 3/8	3c
1/16 x 1/2	4c
1/16 x 3/4	6c
1/16 x 1	7c
■3/32 SQ.	4/5c
3/32 x 3/16	2/5c
3/32 x 1/4	3c
3/32 x 3/8	4c
3/32 x 1/2	5c
3/32 x 3/4	7c
3/32 x 1	9c
■1/8 SQ.	3/5c
1/8 x 3/16	2/5c
1/8 x 1/4	3c
1/8 x 3/8	5c
1/8 x 1/2	6c
1/8 x 3/4	8c
1/8 x 1	11c
■3/16 SQ.	4c
3/16 x 1/4	4c
3/16 x 3/8	6c
3/16 x 1/2	8c
3/16 x 3/4	10c
3/16 x 1	14c
■1/4 SQ.	6c
1/4 x 3/8	8c
1/4 x 1/2	10c
1/4 x 3/4	14c
1/4 x 1	17c
■5/16 SQ.	8c
5/16 x 3/8	10c
5/16 x 1/2	12c
5/16 x 5/8	15c
5/16 x 1	19c
■3/8 SQ.	11c
3/8 x 1/2	14c
3/8 x 3/4	18c
3/8 x 1	23c
■1/2 SQ.	17c
1/2 x 3/4	23c
1/2 x 1	28c
■5/8 SQ.	20c
5/8 x 1	33c
■3/4 SQ.	30c
3/4 x 1	37c

48" LENGTHS

■1/8 SQ.	2c
1/8 x 1/4	5c
1/8 x 1/2	8c
■3/16 SQ.	6c
3/16 x 1/2	11c
3/16 x 3/4	14c
■1/4 SQ.	8c
1/4 x 1/2	14c
1/4 x 3/4	18c
■5/16 SQ.	11c
5/16 x 3/8	14c
5/16 x 1/2	18c
5/16 x 3/4	23c
5/16 x 1	28c
3/8 x 1/2	20c
3/8 x 3/4	26c
3/8 x 1	32c
1/2 x 3/4	34c

BLOCKS

12" LENGTHS

■1 SQ.	15c
1/2 x 2	15c
3/4 x 2	20c
1 x 2	25c
1-1/2 x 2	33c
2 x 2	42c
1/2 x 3	24c
3/4 x 3	31c
1 x 3	40c
1-1/2 x 3	49c
2 x 3	60c
3 x 3	90c
1/2 x 4	30c
3/4 x 4	40c
1 x 4	50c
1-1/2 x 4	65c
2 x 4	80c
3 x 4	1.15

18" LENGTHS

■1 SQ.	20c
1 x 2	38c
2 x 2	64c
3 x 3	59c
2 x 3	89c
3 x 3	1.34
1 x 4	75c
2 x 4	1.19
3 x 4	1.74

PLANKS

36" LENGTHS

■1 SQ.	40c
1/2 x 2	42c
3/4 x 2	54c
1 x 2	72c
1-1/2 x 2	97c
2 x 2	1.25
1/2 x 3	68c
3/4 x 3	90c
1 x 3	1.15
1-1/2 x 3	1.45
2 x 3	1.75
3 x 3	2.65
1/2 x 4	88c
3/4 x 4	1.19
1 x 4	1.49
1-1/2 x 4	1.93
2 x 4	2.36
3 x 4	3.42

SHAPED BALSA TRAILING EDGES

36" LONG

3/8 x 3/32	8c
1/2 x 1/8	10c
5/8 x 5/32	11c
3/4 x 3/16	12c
7/8 x 7/32	15c
1 x 1/4	18c
1-1/4 x 5/16	20c
1-1/2 x 3/8	25c

24" LONG

3/8 x 3/32	6c
1/2 x 1/8	7c
5/8 x 5/32	8c
3/4 x 3/16	9c
7/8 x 7/32	11c
1 x 1/4	13c
1-1/4 x 5/16	14c
1-1/2 x 3/8	18c

48" LONG

3/8 x 3/32	12c
1/2 x 1/8	14c
5/8 x 5/32	15c
3/4 x 3/16	16c
7/8 x 7/32	20c
1 x 1/4	24c
1-1/4 x 5/16	27c
1-1/2 x 3/8	33c

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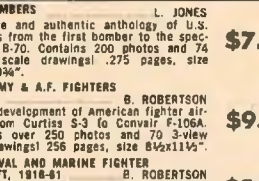

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R/C Single channel authentic scale design for .06 to .09 engine, 35" span biplane, Jan. '58 FM, 30" x 42" plans. **$1.25**

"NIEUPORT" ..... P. PALANEK — No. 124
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Authentic scale multi-channel R/C Biplane for .45 engine or up to .60 size. 68" top wingspan, 7 to 8 lbs., three 28" x 40" plans, Apr.-May '62 FM. **$2.75**

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An exictingly different type of scale biplane model, authentically reproduced. Ideal for .020 to .049 engines for sport F.F. or radio control. 41" span, 29" length, 30" x 42" plan complete with scale detail, Aug. '58 FM. **$1.25**

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Greatest R/C authentic scale multi ever offered. Powered by two veco .35's. Placed first at '62 Nats. Span is 8 feet! Four 30"x 42" plans. Feb.-Mar. '63 FM. **$3.50**

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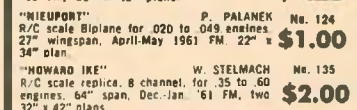
Authentic scale winner at U.S.A.F. meet in Germany. Details shown for R/C or F/F. Takes .020 to .049 engines. 36" span. 34"x 44" plan. **$1.25**
COMPLETE JETCO KIT AVAIL. **$4.95**

RADIO CONTROL BOATS

No. 181
SUNGA MARATHAM



"SLO-MO-SHUN" ..... N. VANDERSCHEL — No. 104
27" length R/C scale speedboat, .15 to .25 engines. **75c**

"ANNIE" ..... P. PLECAN — No. 106
Authentically scaled electric tugboat. Aug. 53. FM. 22" x 34" plans. **50c**

"SHEEPSHEAD BAY FISHERMAN" ..... H. LOZIER — No. 129
Authentically scaled electric powered boat. 17" length, suitable for small R C units. 17" x 22" plan, separate parts sheet. Feb. 57 FM. **50c**

"DONNA I" ..... P. PALANEK — No. 175
An authentic scale replica of a Rescue Boat suitable for R/C. Powered by a Pittman electric motor. 27" length Easy to build. 30" x42" plan. Dec. '56 FM. **$1.25**

SUNGA MARATHAM ..... V. SMEED — No. 181
An authentic scale Patrol Boat which is designed for R/C installation. Takes any power up to .19. Two Pittman Super Panther suggested for electric power. 35" length, 8" beam. July '57 FM. 26" x 36" plan, 12" x 15" parts sheet. **$1.25**

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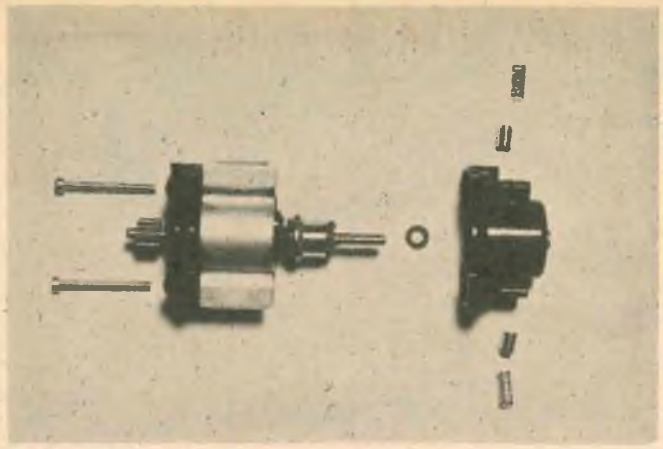


Exploded view of motor. Further disassembly not required.

Proper removal of cover. Note dishpan hands!

Probing The Transmite Servo

BENCH BITS

By Hank Giunta, WA6QE X

EDITOR'S NOTE: *The following maintenance and repair procedures for the Bonner Transmite servo are in answer to numerous requists by RC modelers for such a feature. The methods listed have been designed and thoroughly tested by our Technical Editor for use by those modelers wishing to service their own units, and who have little or no access to test equipment. These are not necessarily the steps used, or recommended, by Bonner Specialties or their service department, and may void the manufacturer's guarantee accompanying the individual servo.*

Probably the most widely used single piece of R/C equipment, and yet the least understood, is the Bonner Transmite servo. How many of us take that little box for granted, seldom, if ever, bothering to inspect and clean it, or to provide the normal maintenance it deserves?

In most cases the Transmite will give excellent performance without such care, but it is certain that it was not intended to be used in this manner. With a little effort on our parts, the life of the servo can be greatly extended, and at $30 each, the savings can be very rewarding.

It might be mentioned here that those of you whose talents **do not** include a gentle approach to electromechanica ldevices should stop reading right now. A servo cannot withstand the "hammer-and-chisel" approach! If you have a reasonable amount of patience, a satisfactory job can be done with no fear of damage.

The first consideration is the mechanical condition of the servo. If there is excessive bind, caused by improper gear mesh, bent cases, etc., the amplifier is forced to work much harder than necessary in order to make the servo move. This results in higher battery drain, greater power dissipation in the output transistors, and a general loss of power at the control surface, where it is needed the most.

The maintenance procedure can be broken down into five steps:

1. Disassembly and cleaning.
2. Visual inspection of gears, case, and amplifier.
3. Repair of amplifier, if necessary.
4. Reassembly and mechanical adjustment.
5. Operational checkout.

Disassembly and Cleaning

After removing the servo from your individual installation, remove the grommets from the case. This makes the subsequent removal of the amplifier and case cover much easier. Take out the two sheet-metal screws which hold the cover on the servo, and carefully remove the cover by first sliding in an upward direction, the end opposite the motor. This enables the cover to move enough so that it can be removed from the motor side. Be careful not to exert too much force at this point in order to avoid breaking the wires from the amplifier board which are connected to the switch plate in the cover.

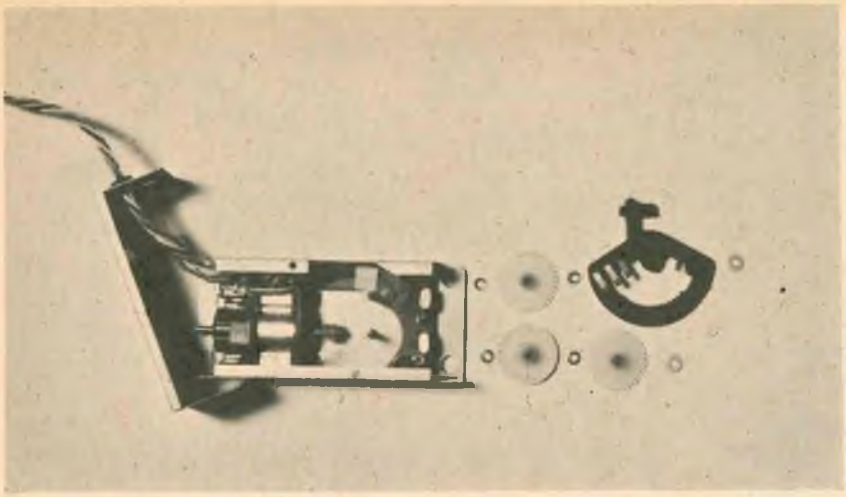
The next step is to remove the sector gear, being sure **not** to lose the two washers which ride against the switcher board in the cover. If you only see one of them, you will find the other stuck to the switcher board. This may be an indication of mechanical bind, so, keep this in mind during reassembly. Remove the other two gears and spacer washers. It is a good idea to keep all parts in a suitable container as they are removed. If you wish to risk matirmonial warfare, (single men take note), you may do as I do and steal a shallow dish from the kitchen.

For a quick inspection and cleaning, you need go no further than this in the disassembly. Usually, however, the toughtest part of the job is getting the servo out of the airplane, so you may as well go all the way on the disassembly and maintenance.

Remove the three screws holding the motor and amplifier to the bottom of the case, and carefully slide them out of the case. The motor will have to be lifted slightly upwards, and partially rotated, to clear the two gear posts. Once this operation is carried out, you have completed abotu one-third of the job, and is a good time to take a break.

Disassembly of the motor is the next step, and although it may be omitted if you don't care to tackle it, it is, nevertheless, well worth the time and effort involved.

Remove the two brush retaining clips by **gently** twisting a screwdriver blade between the edge of the clip and the motor body. Make note of the wire color code (green and white). It may be helpful to make an identifying mark on the motor housing to facilitate correct replacement of the brush caps.



Exploded view showing assembly sequence.

You will not want to replace the caps more than once, so be sure of the correct orientation the first time.

When the caps are removed, the springs and brushes will likely fall from the motor housing, so exercise due caution to prevent loss of these vital parts. The motor case screws can now be removed and the brush end of the housing pulled away. Now look for the thrust washer. If it is not on the shaft close to the armature, it will be inside the housing which you have just removed. This is a very easy part to lose, so consider yourself forewarned! If the motor has been in service for some time, the inside of the brush end of the motor housing will have quite a bit of finely ground brush material adhering to the nylon housing.

Carefully clean the motor housing inside and out with a small artist's brush and a lintless cloth. Isopropyl alcohol (available at your local drugstore) is a suitable solvent for cleaning the brush end of the housing. (If you use anything else, you are on your own.) Once the housing has been cleaned, inspect the brushes, looking for burrs at the edges. Remove any burrs in evidence with a fine sharpening stone or a very fine file, being certain that they are removed, and not just rolled to the inside edge. Place the thrust washer in the armature shaft, then slide the housings together, being sure that the pole pieces fit into the slots in the housing. Now replace the two screws which hold the two halves together. (Yes, it can be done!). Do not tighten these screws excessively, or you will bind up the motor. Wipe off the brushes with a clean, lintless cloth, and drop one of the brushes into its socket, ascertaining that the end mates properly with the armature, and that it is not cocked 90 degrees. Drop the spring into the socket, centering it over the end of the brush. Then slide one end of the retaining clip over the boss on the housing. Slide a needle under the clip and depress the spring, simultaneously pressing the clip downward on the boss. A little practice will enable you to do this rather quickly. I have tried several approaches to this assembly, and this method appears to be the easiest. If you have your own technique, so much the better.

Assemble the other brush components in the same manner.

Although the oilite bearings are permanently lubricated, a very small drop of watch oil or its equivalent will smooth out the motor considerably. **Do not apply more oil than this, or it will seep into the motor and make a mess of the commutator and everything else.**

At this time you should have a very smooth running motor, and a pair of very shaky hands! Take another break.

Assuming that the servo was operating satisfactorily before the cleaning and service, you are now ready for the reassembly of the unit. A small brush and a cloth moistened in alcohol will enable you to thoroughly clean the inside and outside of the servo case. Be exceptionally meticulous about cleaning the gear posts, as grit on these parts will wear down the nylon gears.

Place a light film of oil on both gear posts, then place a small washer on the crown gear post, followed by the crown gear itself. Slide the amplifier and motor into the case (don't forget the insulating board under the amplifier), and replace the two screws which hold the motor. Do not tighten these screws yet. Line the motor up so that its shaft is in line with the crown gear post, then tighten the motor screws. Check for smooth mesh between the pinion and crown gear. There must not be so much clearance that the pinion can slip on the crown gear. Differential tightening of the motor hold-down screws will enable you to make slight adjustments in gear mesh. Mount the amplifier securely with the small screws.

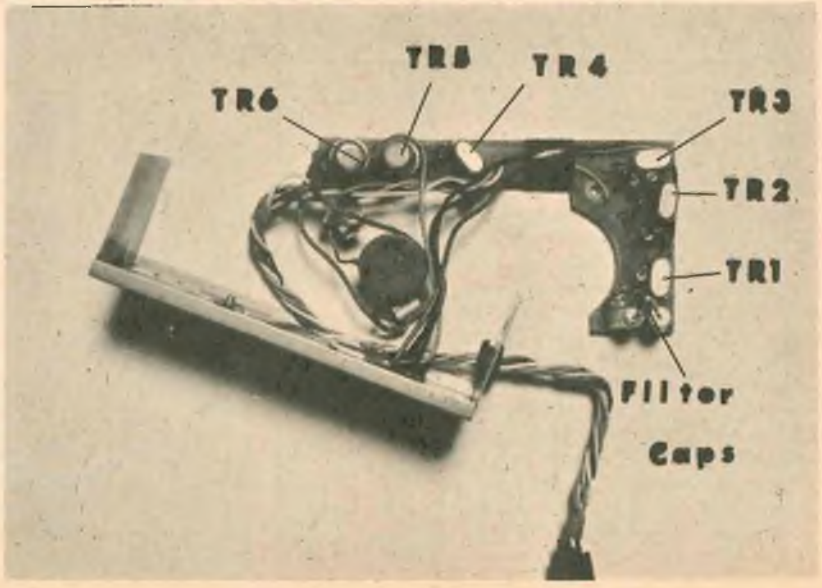
Reassemble the spur gears on their respective posts (see photo for exploded view of servo parts), then slide the cover in place. If the method used for disassembly is reversed, the cover will go on with no trouble. Be certain that the two large washers do not get knocked off the gear posts while installing the cover. Gently pull the slack in the wires through the grommet, and secure the cover with the two sheet-metal screws.

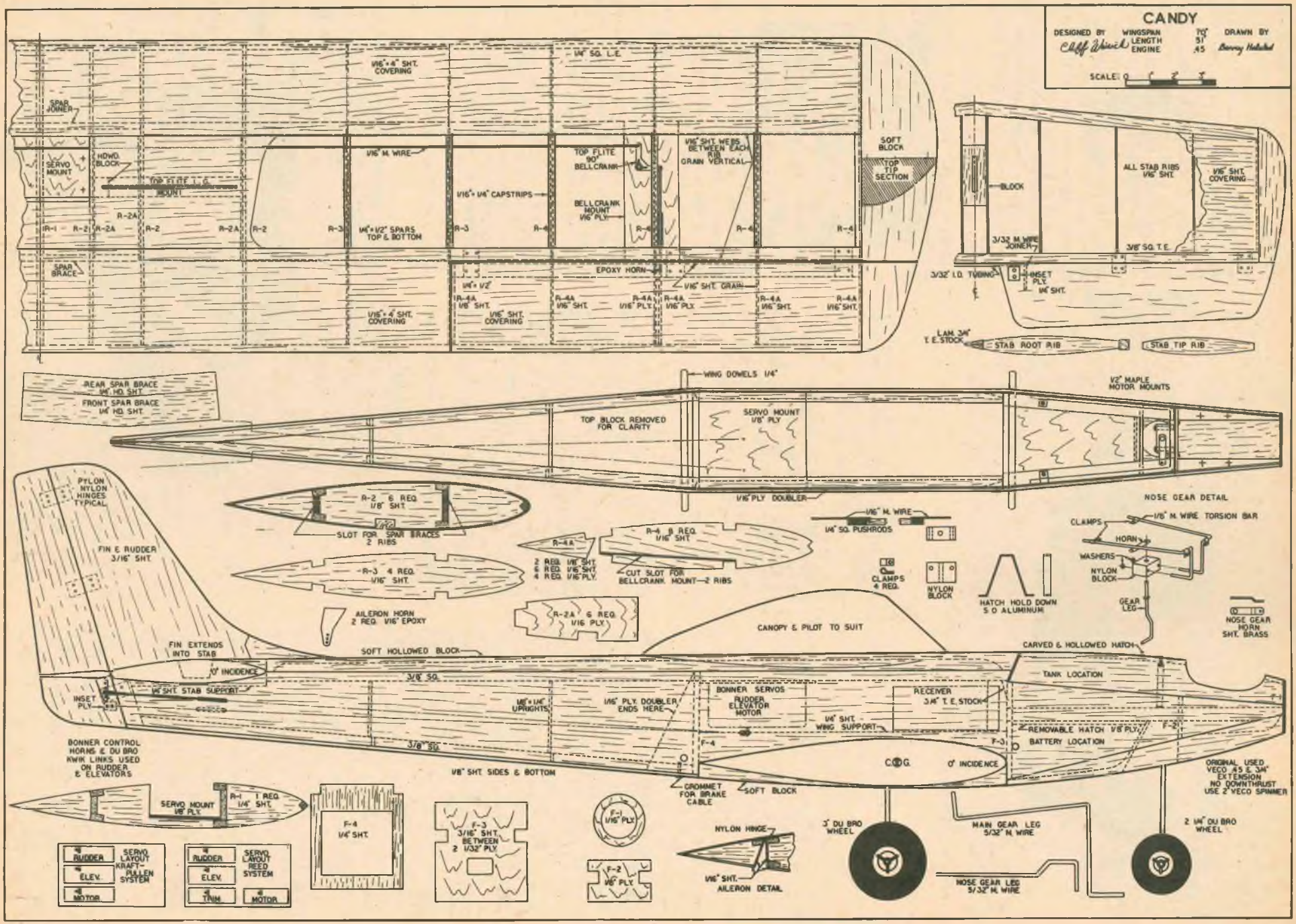
If you have done everything correctly, the servo is ready for service. Check the operation on the bench thoroughly before re-installing the servo in the airplane.

The remainder of Bench Bits will be helpful to those who have servos with inoperative amplifiers. If the servo was inoperative at the onset of the general maintenance and cleaning, and the trouble did not reveal itslef during the preceding service (broken wire, etc.), the amplifier will have to be checked. Many R/C'ers wisely stop at this point and send the servo to a reputable service center; however, if time is important, or no service center is locally available, many troubles can be spotted and cured if a systematic approach is made.

(Continued on page 28)

Transmite component identification




CANDY
DESIGNED BY Cliff Wieck
WINGSPAN 70"
LENGTH 51"
ENGINE .45
DRAWN BY Barry Hobbs
SCALE: 0 1 2 3
SPAR JOINER
SERVO MOUNT
HDWD. BLOCK
1/16" + 4" SHT. COVERING
1/4" SQ. L.E.
1/16" M. WIRE
1/16" + 1/4" CAPSTRIPS
1/4" + 1/2" SPARS TOP & BOTTOM
TOP FLITE 90° BELLCRANK
BELLCRANK MOUNT 1/16" PLY
1/16" SHT. WEBS BETWEEN EACH RIB GRAIN VERTICAL
SOFT BLOCK
TOP TIP SECTION
R-1
R-2
R-2A
R-3
R-4
SPAR BRACE
EPOXY HORN
1/4" + 1/2"
1/16" SHT. GRAIN
R-4A 1/8" SHT.
R-4A 1/16" SHT.
R-4A 1/16" PLY.
1/16" SHT. COVERING
BLOCK
ALL STAB RIBS 1/16" SHT.
1/16" SHT. COVERING
3/32" M. WIRE JOINER
3/8" SQ. T.E.
3/32" I.D. TUBING
INSET PLY 1/4" SHT.
LAM. 3/4" T.E. STOCK
STAB ROOT RIB
STAB TIP RIB
REAR SPAR BRACE 1/4" HD. SHT.
FRONT SPAR BRACE 1/4" HD. SHT.
WING DOWELS 1/4"
TOP BLOCK REMOVED FOR CLARITY
SERVO MOUNT 1/8" PLY
1/2" MAPLE MOTOR MOUNTS
1/16" PLY DOUBLER
NOSE GEAR DETAIL
1/16" M. WIRE
1/4" SQ. PUSHRODS
1/16" M. WIRE TORSION BAR
CLAMPS
HORN
WASHERS
NYLON BLOCK
GEAR LEG
NOSE GEAR HORN SHT. BRASS
PYLON NYLON HINGES TYPICAL
FIN & RUDDER 3/16" SHT.
R-2 6 REQ. 1/8" SHT.
SLOT FOR SPAR BRACES 2 RIBS
R-4A 2 REQ. 1/8" SHT. 6 REQ. 1/16" SHT. 4 REQ. 1/16" PLY.
R-4 8 REQ. 1/16" SHT.
CUT SLOT FOR BELLCRANK MOUNT—2 RIBS
R-3 4 REQ. 1/16" SHT.
AILERON HORN 2 REQ. 1/16" EPOXY
R-2A 6 REQ. 1/16 PLY.
18 CLAMPS 4 REQ.
NYLON BLOCK
HATCH HOLD DOWN S.O. ALUMINUM
CANOPY & PILOT TO SUIT
FIN EXTENDS INTO STAB
SOFT HOLLOWED BLOCK
CARVED & HOLLOWED HATCH
0° INCIDENCE
3/8" SQ.
1/4" SHT. STAB SUPPORT
INSET PLY
1/4" + 1/4" UPRIGHTS
1/16" PLY. DOUBLER ENDS HERE
BONNER SERVOS RUDDER ELEVATOR MOTOR
RECEIVER 3/4" T.E. STOCK
TANK LOCATION
1/4" SHT. WING SUPPORT
REMOVABLE HATCH 1/8" PLY.
BATTERY LOCATION
F-4
F-3
F-2
C.G.
0° INCIDENCE
BONNER CONTROL HORNS & DU BRO KWIK LINKS USED ON RUDDER & ELEVATORS
1/8" SHT. SIDES & BOTTOM
GROMMET FOR BRAKE CABLE
SOFT BLOCK
ORIGINAL USED VECO .45 & 3/4" EXTENSION NO DOWNTHRUST USE 2" VECO SPINNER
SERVO MOUNT 1/8" PLY.
R-1 1 REQ. 1/4" SHT.
F-4 1/4" SHT.
F-3 3/16" SHT. BETWEEN 2 1/32" PLY.
F-1 1/16" PLY
F-2 1/16" PLY
NYLON HINGE
1/16" SHT. AILERON DETAIL
3" DU BRO WHEEL
MAIN GEAR LEG 5/32" M. WIRE
2 1/4" DU BRO WHEEL
NOSE GEAR LEG 5/32" M. WIRE
RUDDER
ELEV.
MOTOR
SERVO LAYOUT KRAFT-FULLEN SYSTEM
RUDDER
ELEV.
TRIM
MOTOR
SERVO LAYOUT REED SYSTEM

Cliff Weirick's

candy

70" Span for proportional or reeds

Full Size Timely Plan Available

Cliff and prototype at '63 Nat's. Patch on wing from woman's shirt at Mexican Nationals!

Candy was conceived shortly after the Larks annual contest in October 1962. Up until two weeks before this event, I had been flying a Stormer, when, as sometimes happens, I suddenly found myself without an airplane! In talking with Jerry Pullen, designer of the proportional system I am using, it was suggested that I use a Viscount kit which he had won at a local event. The Viscount was easy to build, and a week later was in the air, going on to place third in the Larks Annual.

Two things were very impressive about the Viscount — one was its ground-handling characteristics, and tne other was its smooth inverted flight. At this point I took a good look at the symmetrical airfoil, and decided to design a ship around this section. This new plane was created in order to take advantage of the full potential of the Kraft proportional system which would be used with it. In addition, certain other design criteria would have to be met, including excellent ground-handling characteristics (even in high winds), ala Viscount, plus completely smooth inverted flight and outside loops. Add to this the requirements of a good-looking ship that would be easy to construct, and you have the formula which evolved for Candy.

I might explain at this point that the name "Candy" was brought about by being bankrupted by Aero Gloss Candy Apple red dope. Pactra had just released their line of candy colored dopes and I scouted all of the Los Angeles area for enough of the little three-ounce cans to finish the prototype. Believe it or not, it took 32 of these three-ounce cans to get three coats of color! That just about broke me up — in more ways than one! Uncle Sam's sailors don't get wealthy at their jobs!

The first Candy had full-span ailerons and two degrees of incidence in the wing and stab. This left something to be desired, however, so the present configuration was tested and proved to be more than satisfactory. This can be attested to by the fact that three of the four existing Candy's qualified for the finals at the 1963 Los Alamitos Nats. The fourth model was not flown.

Before getting into the construction of the model, it might be worthwhile to bring up a few points for the beginner who is thinking about building this ship. First of all, Candy is not a beginners airplane — the construction alone dictates this fact. The wing, as you will notice, is imbedded in the fuselage and will not take any hard knocks without severe fuselage and wing damage. If Joe Tyro insists on building this ship, it is suggested that he devise some method of allowing the wing to slide fairly easily off the fuselage, so that in the event of a wingtip digging in on a rough landing, damage is held to a minimum. Experienced fliers can construct Candy according to the plans, for everyone knows that experienced fliers don't have rough landings.(?)

Fuselage

Start the fuselage construction by first cutting out the motor mounts, using rock-hard maple stock, then the two forward bulkheads A & B. Assemble the mounts and bulkheads with white glue and let dry, making sure the bulkheads are perpendicular to the mounts, and that you have an equal taper on each side. Drill the motor mounting holes and install 4-40 blind nuts. Drill the holes for nose gear mounting and for the two push rods (nose wheel steering and throttle). Next, cut the fuselage sides from 1/8" x 4" x 48" medium hard balsa, making sure that the wing and stab cutouts are 0 degrees to the thrust line. Make a template of the sides and mark the location of the bulkheads, wing dowels, motor mounts, and doublers. Glue the 1/16" plywood doublers in place on the sides, then the 1/4" balsa wing mounts, followed by the 3/8" square stiffeners that serve as corner supports. Glue the sides to the motor mount assembly, making sure that they are properly aligned. When dry, pull the tail end together and glue in the tail block. Again, be sure of proper alignment, then glue in the stab support block.

The top of the fuselage is carved from a soft piece of 3/4" x 4" x 36"

balsa. It is cut to proper length, then tapered from 3/4" at the front to 1/2" at the front of the stab. Lay it on the fuselage and draw lines along the outside and inside of the fuselage sides. Hollow out the block to the point shown and then carve to the outside shape. When complete, secure the block to the top of the fuselage.

A couple of cross pieces are installed on the bottom of the sides and then the 1/8" sheet bottom is added. The top and bottom nose blocks are pretty straightforward in construction. The top one must be hollowed to fit your own particular tank and engine. Install the plywood insert for the cowl hold-down screw. Back up the cowl and the front of the fuselage top block with 1/32" plywood. The bottom block should be hollowed out to accept your battery pack and the slot cut for the nose gear strut. The inside of this slot should be faced with 1/32" plywood to take the side loads of the strut. Carve the entire nose assembly to fit a Veco 2" spinner and blend in with the rest of the fuselage.

Make the tank support out of 1/8" plywood. The wing dowels will be added after covering with silk. Make the servo platform and install 4-40 blind nuts. Glue servo mount into position shown. Make the cut-outs in the rear of the fuselage for elevator and rudder push rod clearance. Set the fuselage aside until the stab and elevator assembly is completed.

Stab and Rudder

Cut the stabilizer ribs from 1/16" balsa sheet. Butt glue two pieces of 1/16" x 3" balsa sheet stock and let dry. Two of these will be needed for the top and bottom. Cut them to the shape of the stab and mark all rib locations. Use contact cement to glue the ribs in place, automatically forming the lower airfoil shape. Mark the rib locations on the top sheet. Again, use contact cement to hold the top sheet in place. Make absolutely sure it is located properly, as once it is in place you can't relocate it.

When dry, sand the leading and trailing edges smooth and straight. The leading edge is formed from two pieces of 3/4" trailing edge stock contact cemented together. The trailing edge is formed from 3/8" square stock. The tips are soft balsa, carved and sanded to shape. Attach both the leading and trailing edges and the tips with model cement. When dry, sand to airfoil shape and cut out the notch for the fin support.

The elevators, fin and rudder, are self-explanatory and are hinged with mylar or nylon hinge material. Attach the stab and elevator assembly to the fuselage with white glue, making sure it is at 0 degrees incidence with the thrust line and 90 degrees to the fuselage sides. A crooked stab can render the best airplane almost useless.

When dry, install the fin and rudder assembly, making sure of proper alignment. Let dry, then fair in the top of the fuselage to the stab and fin with soft balsa block. For nice, smooth contours, I use thin leather strips to fillet the tail assembly.

Wing

Cut wing ribs from 1/16" and 1/8" sheet as shown on the plans. I cut them all at once on a band saw so that all ribs are identical. Use whatever method is easiest for you. Cut the spar stock to proper length and join together with the 1/4" dihedral braces. Now you should have two spar assemblies — front and rear. Slide the ribs on these assemblies, and glue in place with white glue. Lay a piece of 1/16" x 4" x 36" on a flat surface, applying glue to the lower rear spar of one panel and also to the ribs at the rear of the spars. Lay this on the piece of 1/16" to form the lower half of the trailing edge and pin in place. Now install the 1/16" plywood false rib for the aileron horn support, along with the 1/8" balsa aileron root rib. Let dry.

Taper the rear edge of the lower sheet and glue the upper sheet in place. While this is drying, glue the 1/4" square leading edge in place. Install all webbing. Let dry and glue the top leading edge sheeting in place. Apply this procedure to the other half of the wing.

We now have a wing with no lower leading edge sheeting. Turn the wing over and install the lower leading edges. Install 1/16" plywood doublers and landing gear mount. Make sure the wing is in perfect alignment (no warps, etc.) because once this last piece is installed, the wing cannot be straightened.

Install the tips, bellcrank supports, servo mount, and also the aileron linkage. Sheet the center section and glue on cap strips. Box in the servo compartment. Cut out ailerons. Taper the leading edge. Install hinge support blocks, then sheet with 1/16" balsa. Cut the aileron horn from 1/16" fibreglass and use epoxy to secure to the aileron. Cut a slot in the lower cap strip for aileron push rod clearance. Sand the wing and aileron smooth and cut slits for the nylon hinges. Place the ailerons in place, then drill 1/16" holes through the upper rear spars for round toothpicks which will secure the hinges.

The wing is now ready for covering. Fit the wing and fuselage together making sure it is properly aligned (0 degrees incidence and square with the fuselage). Hold in place with pins and install the lower fairing on the wing so that the fuselage flows smoothly into the wing. When dry, sand smooth. Be sure to allow about 1/32" for a seal between the wing and fuselage.

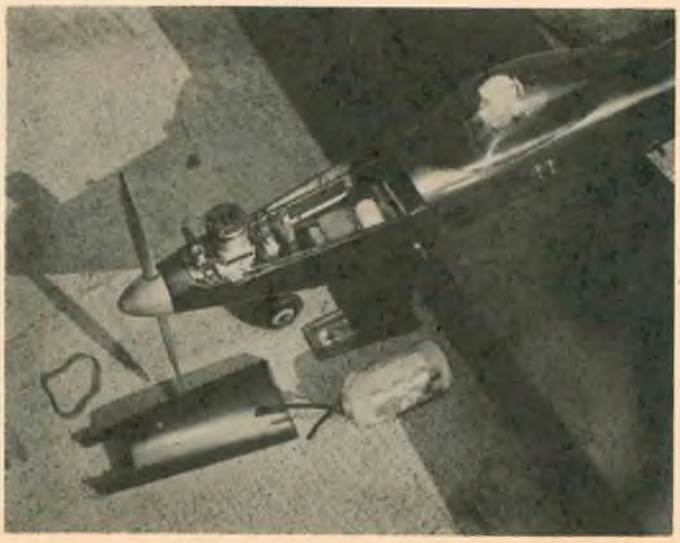
Covering

Dope all wood surfaces which come in contact with the covering material. Use 3 coats of clear dope, sanding between each coat. Apply the silk by your own method, wet or dry, then

(Continued on page 28)

Candy interior showing equipment installation.

Cowl removed. Neat, serviceable compartment.



1963 INTERNAT'S

3RD WORLD RADIO CONTROL CHAMPIONSHIPS

Below and right: Crucial moments of final flyoff. Dr. Ralph Brook with Captain Bob Dunham.

Above: Dr. Ralph Brook, World Champion, with F. Bosch (Germany), runner-up, during official announcement of victory.

GENK, BELGIUM, AUGUST 26 . . . RALPH BROOKS F.A.I. WORLD CHAMP STOP . . . U.S. TEAM FIRSTPLACE ST

South African team. L. to R.: Malherbe, Culverwell, Connacher.

P. Stephanson (Norway), 12th. Original design, Dee Bee proportional.

Frank Vandenbergh (England), 7th, and #2 model. Orbit gear.

Ch. Teuwen (Belgium) and wife. Taurus, Orbit. 8th.

Airdrome at Genk. 22 flags

Winning U.S. team. L. to R.: Nelson, Brock, Kazmirski. Center: Bob Dunham, team captain.

Ed Kazmirski, third.

Jerry Nelson, fifth.

2nd place winner by F. Bosch. Original design, Telecont gear. Note extreme rudder area.

Monty Malherbe. Sultan, Orbit 10. 16th.

represent participating countries.

H. Schumacher (Germany). Original with Telecont radio. 15th.

Warren Hitchcock (Canada) and Taurus. 17th.

Harry Brooks (England), 28th, taking the easy way to the aerodrome.

V. Tonnesen (Norway), 23rd. Original, Orbit.

G. Hormann (Austria), 31st. Original with OMV radio.

A. Matthey (Switzerland).

J. Levanstam (Sweden).

Claude Sauthier (Switzerland). Original design, F & M equipment.

P. Eliasson (Sweden) and Mustfire.

1963 WORLD RADIO CONTROL CHAMPIONSHIPS

Official Team Standings

U.S.A.	10,516
Belgium	9,459
South Africa	9,019
Canada	8,756
Germany	8,574
France	7,869
Great Britain	6,751
Sweden	5,906
Netherlands	5,715
Italy	5,072
Switzerland	4,007

Internat's Coverage

By Jerry Nelson

The 1963 Internationals are over. Bob Dunham and I are on a beach on the French Riviera, looking around--I mean, reminiscing about the 3rd World Championships. Ed Kazmirski had to leave for home and Mr. and Mrs. Ralph Brook are touring Europe.

It seems that this trip to Belgium started in a cocktail lounge at O'Hara Airport in Chicago. After lounging for a while we managed to get on the correct flight to Philadelphia. We had made prior arrangements with Don Brown to meet us at the airport to provide us with transportation. New Jersey was our destination, where we and the boxes of models were to depart for Paris. Things went according to plan and we were met by Don Brown's secretary. Don may have been there also.

After an overnight stay with Don, we left for New Jersey. At this point, a long line of mishaps made its humble beginning—there was a mixup in the arrangements for shipping the models to Paris, and they were sent to Frankfurt, Germany instead. As a result, we were shipped to Frankfurt. As it turned out, we had a week of extra time before the contest. Since a flying field had been available to us, we had planned to do some test flying in Paris. Due to the mixup, our models were now in Germany, and transporting them from there to France and then to Belgium would present quite a customs problem. As a result, we made arrangements to ship them direct to Brussels. This meant we had nothing to do with model airplanes for an entire week. This was really a let down—what could we possibly do for a whole week in Europe?

After three days in Frankfurt, we decided we should move along to some quaint European town a little more quiet. Frankfurt turned out to be a wild place—especially the area called Kiserstrassa. Since we needed a rest before the meet the only logical place to go was Paris.

Everything you have heard about this city is true. Travelers checks are spent like they were going out of style. The hotel where we stayed was quite a place —$2.50 a day and no bath. I don't think it was recommended by the AAA! Our last night in Paris we all got together for a sight seeing tour and late dinner. Plessier, a top RC'er from Paris, was our host.

The next morning we left for Brussels. The train departed at 7:30 a.m. This normally wouldn't have been a problem, but we just were not used to getting up early in the morning. Bob, Ed, and I made it to the station in plenty of time. Our only problem now was that we couldn't locate Ralph Brook and his crew. We looked for him until the last minute. Finally, after we were on the train, Bob saw Ralph getting on the car behind us. We couldn't contact

(Continued on page 39)

Former Navy test pilot develops flight proven reliability from unique single channel system

THE TRIED SQUIRE

By Cdr. Dud Billett, Jr., USN, Ret.

EDITOR'S NOTE: *Since this article deals with modifications to a commercially available kit, it is a departure from the usual construction feature. Cdr. Dud Billett, Jr., USN, Ret., author of the article, is a former Navy test pilot, and a model builder since 1927. The unique control system described herein has been thoroughly tested and flight proven on a number of prototypes, with highly impressive results. This feature is being presented as an aid to the newcomer to radio control, and as a complete 'package' for the sport flier who wants reliable, consistent performance from his model. RCM is proud to present this article as another "first" in the field of radio control features.*

If you have built a Midwest Tri-Squire, you know that it is as good, or better, than most rudder-only kits, both in appearance and performance. The kit, itself, if followed precisely, will result in a model weighing from 3.3 to 3 1/2 pounds. With the small tank and usual 15 size engine, you are limited to a climb to altitude, a loop or two, a pass at the runway, and then you start to sweat a power-off landing. In addition, with the customary two-position throttle, you have the all-too-frequent condition of either too much or too little power.

These modifications to the standard Tri-Squire kit will produce a "bird" which anyone with a little modeling experience can put together and enjoy some real trouble-free RC flying. The control system described utilizes the dependable Bonner VariComp, but without the usual torque rod! The entire system is easily removable, either for troubleshooting and servicing, or for quick installation in another ship. Also included are construction details for a modified Bonner SN which will provide three position throttle control—the Tri-Squire takes off with full power, cruises at half-speed, and comes in for a touch-and-go without going through mid-position. If you follow these recommendations step-by-step, you will find that you will have a completely reliable trainer or sport RC model, capable of ten or fifteen trouble-free flights a day.

Before commencing construction, we would suggest that a new Tri-Squire kit be purchased — not because we own stock in Midwest Products, but, as the necessary modifications involve part of the basic structure, it is far simpler to work with a new ship than attempt to drastically modify an existing, finished model. Follow the kit instructions except for the modifications and notes that follow.

WING:

There are no changes to be made in the wing—**but**, if you check, you will find that the plywood dihedral braces do not correspond with the amount of dihedral called out in the diredral sketch. Use the pre-cut dihedral braces — they are correct. The dihedral sketch in the upper right-hand corner of the plan is erroneous.

STABILIZER:

There is only one small change in the stabilizer. Follow the plans and instructions up to the point of sheeting the center section and gluing the cap strips to the ribs. Then, glue a 1/16" x 1/2" x 20" strip on the top and the bottom just behind the leading edge. (Fig. 1.) Now sheet the center section and put on the cap strips as usual. The cap strips will be 1/2" shorter than called out on the plans. Your covering job will turn out much better, the stabilizer will be improved aerodynamically, and the leading edge will be better able to withstand the rigors of flying in tall timber or landing in the rough.

FUSELAGE:

The rest of our modifications are confined to the fuselage, but before proceeding, there are a few **don'ts** to observe :

(Continued on page 15)

STABILIZER MODIFICATION

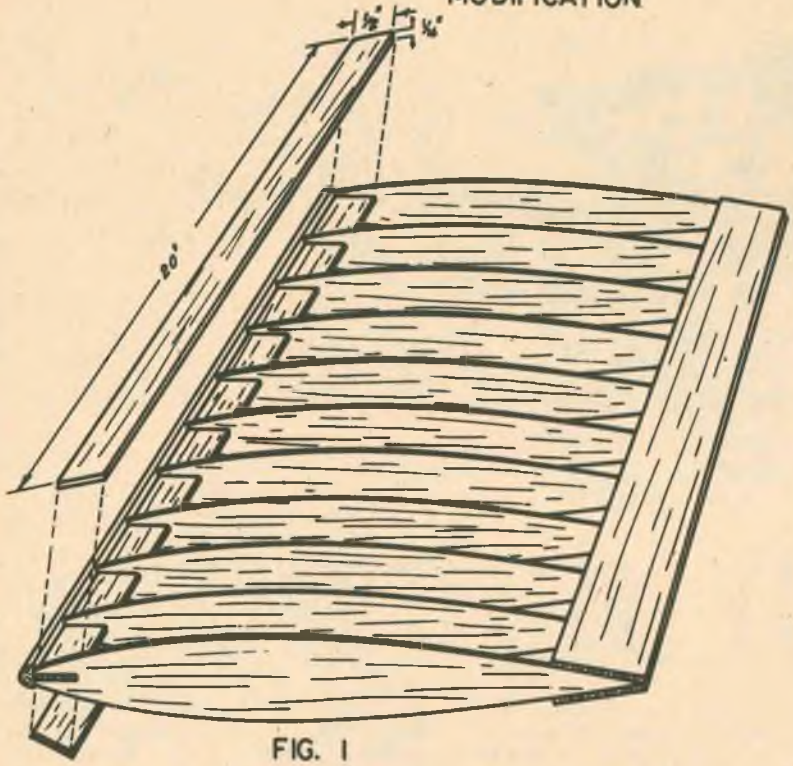


FIG. 1

PULLEYS FROM PERFECT #239 BLIND NUTS

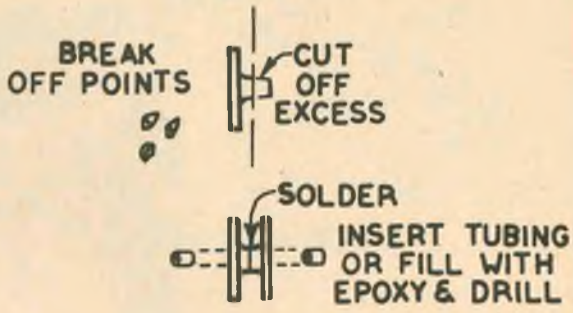


FIG. 2A

SN ENGINE CONTROL ESCAPEMENT MODIFICATION

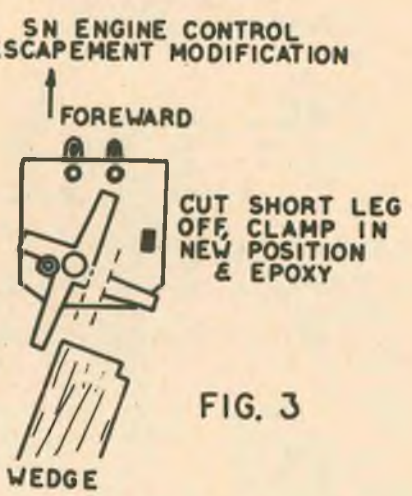


FIG. 3

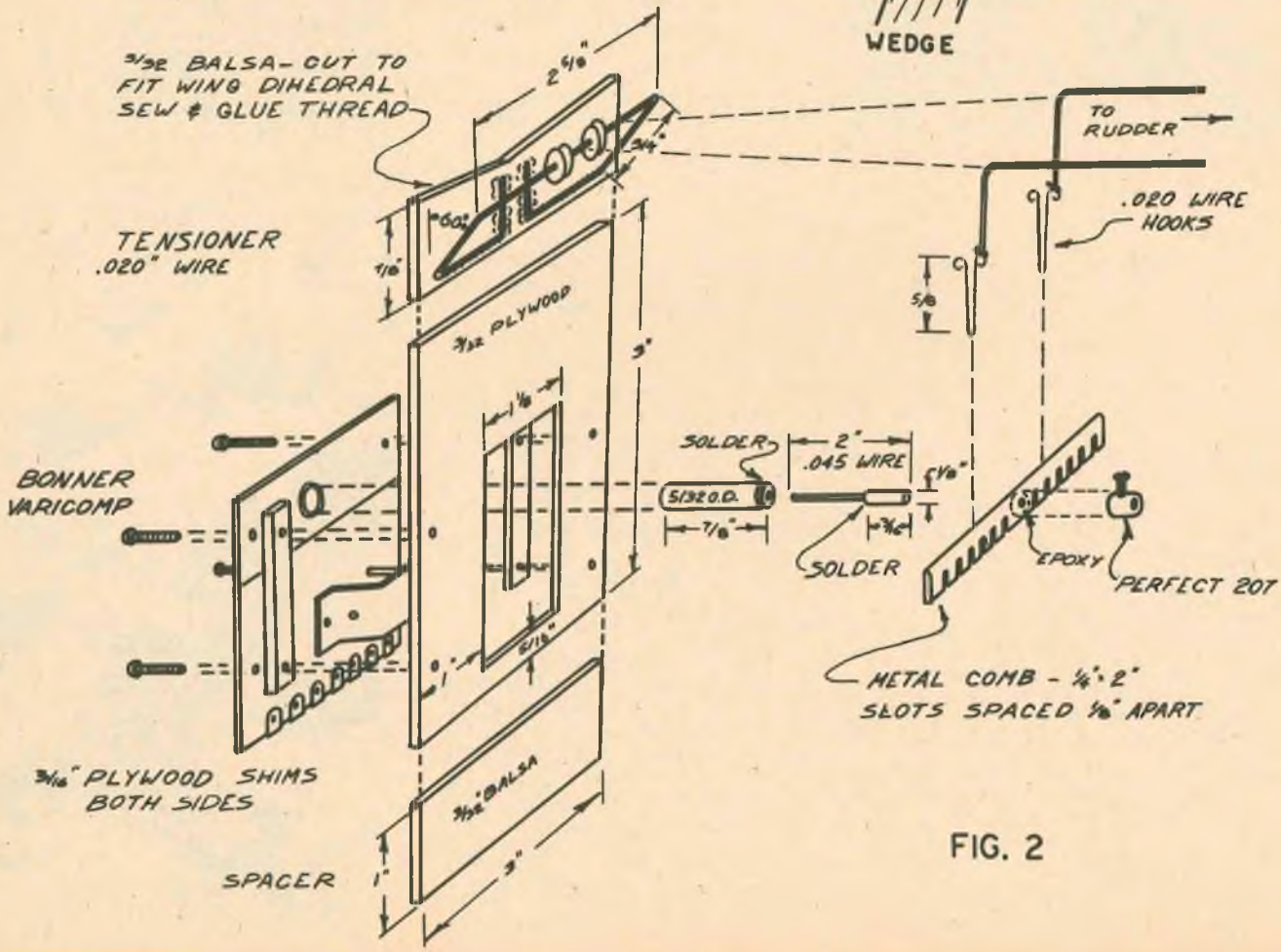
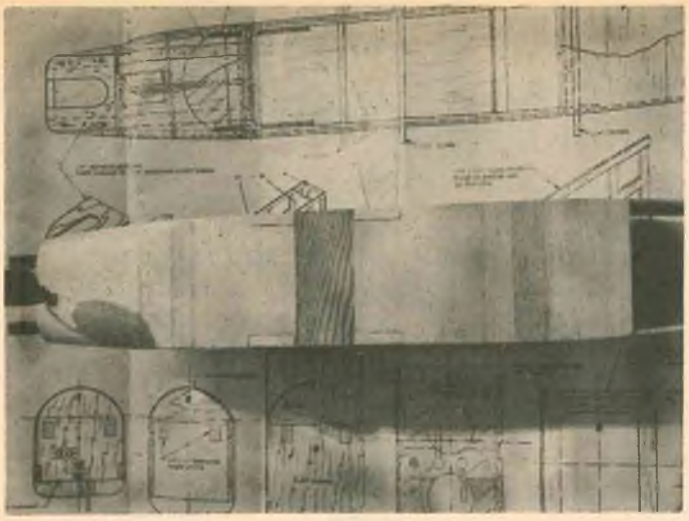


FIG. 2



Fuselage bottom, showing strips fore and aft of L. G. mount.

Forward view, illustrating "gear shift" button and removable cowl.

Tried-Squire

(Continued from page 13)

Do not glue the front plywood wing hold-down hooks to the fuselage until **after** the windshield is secured in place.

Do not glue the rear stabilizer dowel in the tail post until you have decided whether or not to use the combination rubber winder and tail dowel described herein.

Do not make the cut-outs for the side windows in the fuselage. If you want the benefits from the extended rubber for the three-speed engine control escapement, your aesthetic senses will have to suffer for lack of windows!

The Tri-Squire needs a little right thrust and down thrust. The latter can best be accomplished by a slight tapering of the hardwood engine bearers **before** inserting in formers 1 and 3. A taper from the firewall forward, resulting in the removal of no more than 1/16" of wood at the front, is about right. You can always take out down thrust after a flight, but that first test hop will give you shivering fits if you didn't have any and needed it!

The right thrust can be achieved by cocking the engine 2 degrees right while drilling the motor mount holes, or by sanding the back of the engine board provided in the kit, or by fabricating a new one. The side thrust is a definite aid during ROG takeoffs.

The next four jobs should be completed early enough so that epoxy glue can set overnight and be ready for finishing the next day. First, take a strip of .020" brass or aluminum and cut it 1/4" wide by 2" long. If you only have .010" brass shim stock, use a 1/2" strip and bend it over double. Drill 1/8" hole in the middle of the strip and then enlarge it slightly with a round file or ream. Place the strip between two pieces of plywood and put it in a vise with the sandwich sticking up half the width of the strip. Take a worn hacksaw blade without too much set to the teeth and saw slots on both sides of the hole, and as close together (1/8") as you can without weakening the strip. Saw slots all the way to both ends. Use epoxy glue and install a Perfect #207 wheel collar over the hole with the set screw pointing away from the slots. (Fig. 2.)

The next epoxy job is a little more complicated, but it can always be done over. Obtain a Bonner SN escapement and put a new #11 blade in your X-Acto knife. The black plastic arms of the SN are tough, but you can get the short leg opposite the metal pin off if you work at it. Start cutting it where the leg meets tthe heavy center section of the "X", or claw. As you make each cut, push down gently on the end of the leg you are cutting off. This will open up the cut and the leg can be removed more rapidly. Lay the short leg aside and move one of the long legs around to the armature catch. (Fig. 3.)

When we finish, we want the cut-off leg to exactly duplicate the other two longer legs. Cut a wedge of pine, or other hardwood, so that it will just slide under one of the long legs and just touch the inside of the foot. It will be about 1/2" wide and 1/8" thick. Place the short sawed-off leg on the pine wedge and clamp in position on the escapement. Slip a small strip of waxed paper under and up the sides of the open space. Put enough epoxy in the waxed paper trough to fill up the space left when you cut off the leg. Lay the escapement aside where it won't be disturbed, being certain to keep it right side up so that the epoxy will not run out. When dry, be sure the new "long" leg works just like the other two.

Now your throttle sequence will be high, cruise, idle, high. Many flights have been made with takeoff and climb at full power—the major part of the flight being conducted at cruise, and the landing made at idle, using only 1/2 turn of the escapement rubber for the entire flight! The best feature is that whenever a wave-off is necessary on landing or touch-and-go's, the throttle goes directly from idle to high.

The rudder horn is made in one piece from thin brass or aluminum. Drill two or more #60 or #61 holes in the ends. (Fig. 4.) Glue it in a slot in the rudder 3/16" up from the bottom. It is worthwhile to use epoxy for this operation. When dry, use nylon thread figure eight hinges just below the counterbalance area and just above the horn.

For the fourth item, drill your landing gear blank for a tight fit on the 1-1/4" axles. Slip the wheel and Perfect #208 collar on the axle, and push them up tight against the blank. Then push the axle back out to a point where the wheel turns freely. Take the wheel and collar off, and put plenty of epoxy on the inside part of the axle which protrudes through the blank. Don't get any epoxy on the wheel side! If the epoxy runs, do one axle at a time and stand it up in the vise. Keep the blank handy, adding a couple of more coats whenever you mix up too much epoxy during other operations.

The tensioner/direction-changer is the heart of our control system and an exploded view is shown in Fig. 2. In order to eliminate the torque rod, twin control lines are used. If you are willing to have these lines go back to the rudder slightly off-center, attach the Bonner VariComp to a piece of 3/32" plywood in the conventional manner (straight across) using 3/16" spacers under the bolts. The spacers can be two layers of 3/32" plywood and are necessary in order to permit the VariComp board to slide into slots in the fuselage. If you simply must have the lines run back to the rudder exactly the same distance on each side of the center line of the fuselage, then mount the VariComp at an angle on the plywood board.

At station #4, glue 1/8" sq. strips to the inside of the 1/8" x 1/2" verti-

(Continued on page 33)

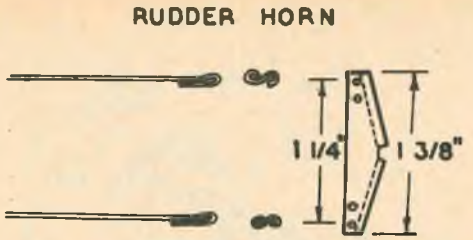


FIG. 4

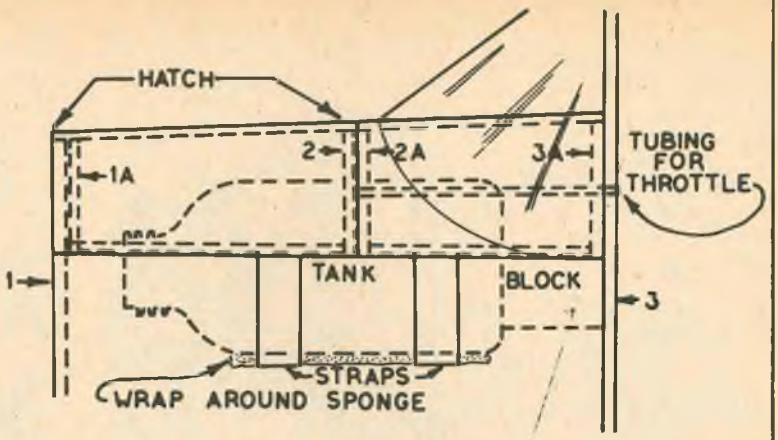


FIG. 5

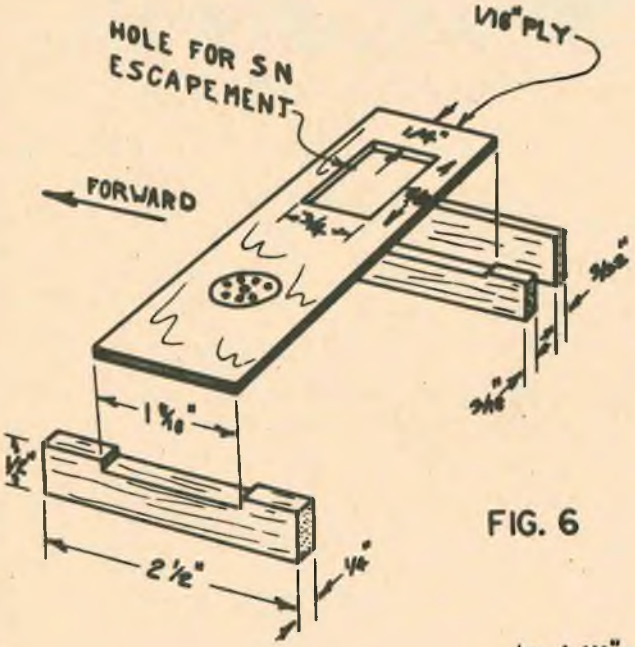


FIG. 6

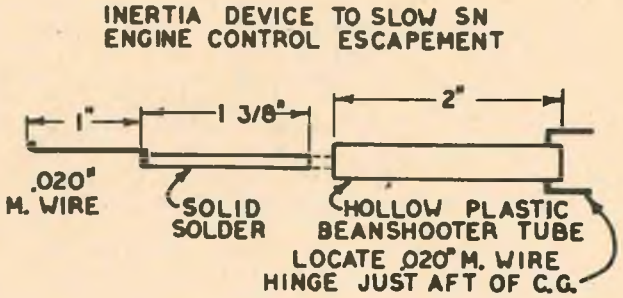


FIG. 9

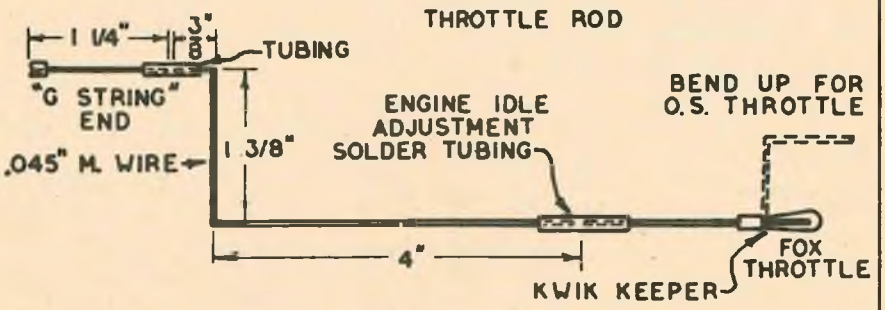


FIG. 7A

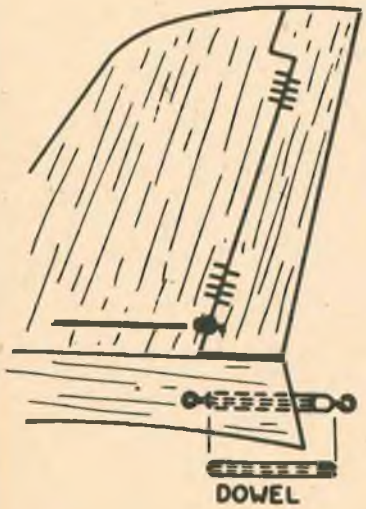


FIG. 8

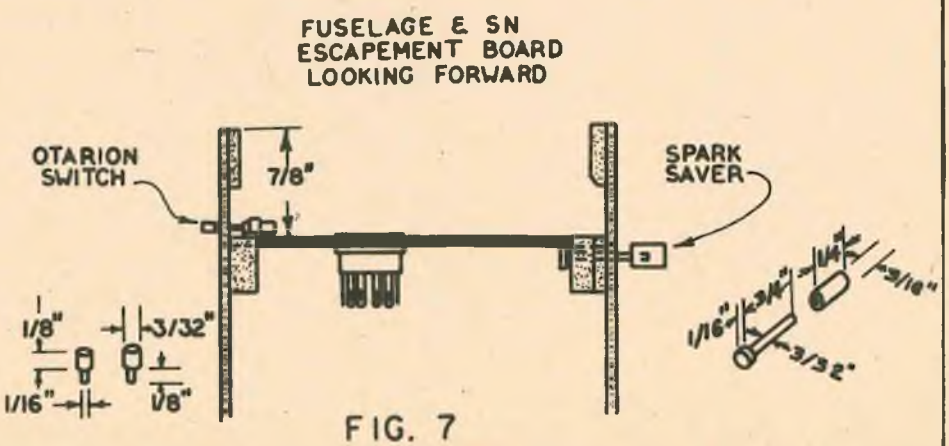
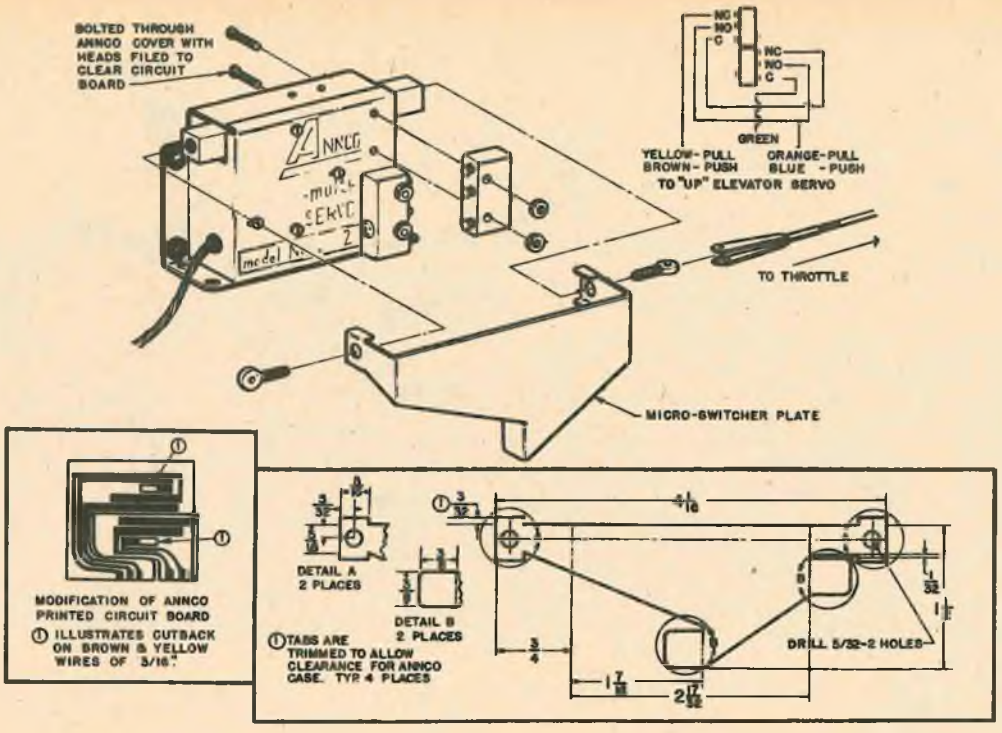


FIG. 7



Need another channel? Try Al Thompson's . . .

POOR MAN'S ULTRA MULTI

Many years ago, Ken Willard perfected a system (Poor Man's Multi), which would give the single channel flier a reliable method of obtaining rudder, elevator, and throttle from a single escapement. Since many modelers have progressed to Class II, there has evolved a need for a reliable method of obtaining up-elevator with a four-channel system, while retaining a fully trimmable motor. With thanks to Ken for the many hours of flying derived from his single channel method, I would like to present an easily duplicated system that has given me well over a hundred trouble-free flights.

One day last spring, while flying my conventional four channel plane with rudder and trimmable throttle, another flier arrived at the field with a four channel rig. I watched him start his engine, throttle back, taxi out, give it the gun down the runway, and then (to my surprise), he gave up elevator and was in the air! He would roll into a turn with rudder, then use the up elevator to rack around in a tight turn (without the nose of the plane dropping), then roll out with opposite rudder. When he came in for a landing, it seemed that his glide path was a little steep for a safe landing, but, there came that up elevator again, and a perfect flare-out to a feather-light landing.

The method he used to obtain the extra channel of control was to remove a portion of the two neutralizing strips on the printed circuit board of his throttle servo. This allowed the servo to remain about 90% trimmable. The remaining 5% of travel at high speed and the other 5% at idle would over-travel the trimmable area, tripping micro-switches at either end. These two micro switches were wired to one-half of an auxiliary elevator servo to produce the desired up-elevator.

I have found that with this system, I can add a tail wheel brake to up-elevator. Since many modelers, due to geographical location, do not have a wide choice of materials, I have tried to use components which should be readily available. The only item which you might have difficulty in finding is the pair of sub-miniature micro switches.

Insofar as the servos are concerned, I have used both the Bonner and the Annco, and both work quite well. I feel, personally, that the new Annco with the redesigned motor, has excellent reliability plus the advantages of size, weight, and linear motion. The sub-miniature micro switches fit the Annco perfectly and the aluminum switcher plate in easier to make.

The Bonner conversion is made from either 1/16" micarta, or 1/16" 5-ply plywood; two "Perfect" brand eyelets, two 1/16" I.D. brass washers, 1/16" I.D. brass tubing, two sub-minature micro switches, and miscellaneous nuts, bolts, and lock washers.

The Annco conversion is made from 1/32" aluminum chassis stock (available from all radio supply stores), two sub-miniature micro switches, and miscellaneous bolts, nuts, and lock washers.

In general, when removing the portion of the two neutralizing strips on the throttle servo printed circuit board, be sure to allow just sufficient neutralizing travel of the servos to let the micro switch buttons snap back out, thus neutralizing your elevator servo. You can make a fine adjustment on the Bonner system by pivoting the micro switches, and on the Annco by bending the two aluminum tabs which actuate the switches.

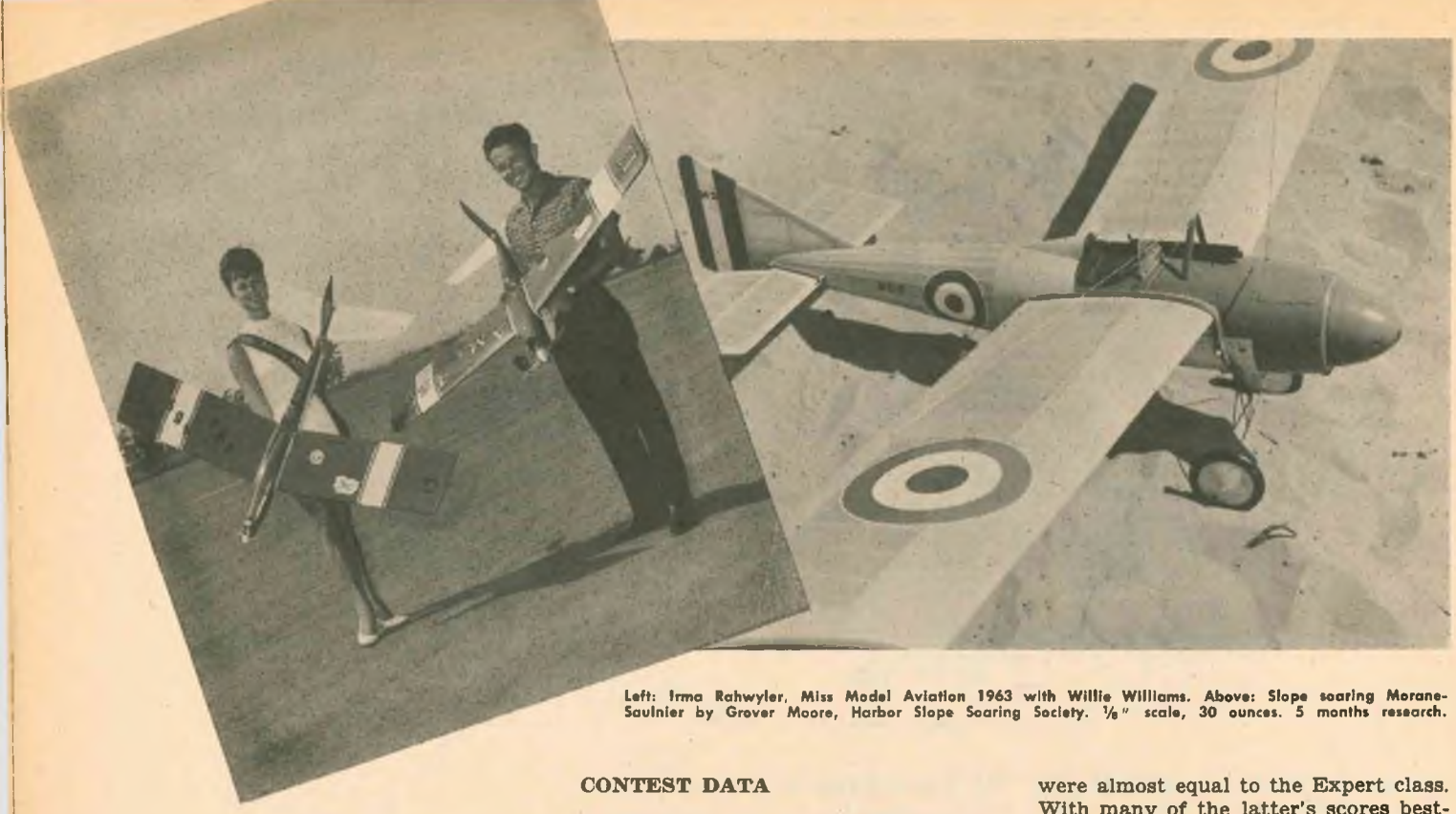
A typical flight with this system is as follows: Your plane is sitting on the strip with the engine idling. Beep a little throttle and start your proto taxi for takeoff. When you get to takeoff position, **hold** low throttle on your transmitter, causing your engine to return to idle and the tail wheel brake to stop the plane. Ready for takeoff? **Hold** high throttle just long enough for you to see the elevator start to come up, then let off the transmitter throttle lever. When your plane has developed sufficient speed, momentarily hold high throttle again, and the elevator will lift the plane off the ground.

For clean, sharp turns, give a rudder signal, and as the nose starts to drop, let off the rudder switch and simultaneously give high speed (up elevator) which will bring the plane on around. As you release the throttle, give momentary opposite rudder for clean roll-out.

In landing, hold low throttle just long enough to see the nose start to rise. You now know your engine is idling. Just before touch down, hold low throttle (up elevator) just long enough for a smooth flare-out, then let off until you have touched down and lost enough speed to re-apply your tail wheel brake.

If you had found it necessary to interrupt your landing during the final

(Continued on page 48)



Left: Irma Rahwyler, Miss Model Aviation 1963 with Willie Williams. Above: Slope soaring Morane-Saulnier by Grover Moore, Harbor Slope Soaring Society. 1/6" scale, 30 ounces. 5 months research.

FLY IN

Contest Data

Club News

Tech Tips

CONTEST DATA

This year, the Annual Midwestern Championships, held at Wichita, Kansas, had the largest and best attendance in its three-year history. A total of 27 contestants vied for the hardware in Class I, III, Scale, and Pylon events.

Class I and III events were divided into two classes, Novice and Expert. Contestants signing statements to the effect that they had not won a first, second, or third place in an AMA sanctioned contest, were eligible for the Novice event, and to compete against others of equal experience.

The Expert Multi event was well represented by pilots like **Jerry Krause** and **Ralph Moore** of Tulsa, Oklahoma, and **Loren Tregallas** of Wichita, Kansas, competing for first place honors. Jerry emerged victorious, with Ralph and Loren finishing second and third respectively.

Flights in the Novice Multi event were almost equal to the Expert class. With many of the latter's scores bested by the Novice winners, the untrained observer would find it difficult to differentiate between the two classes. Captain **Jack Price** was victorious in the novice fly-offs.

Although Class I was held, interest was lacking, with only a few contestants entering. As usual, the flying was top caliber, but the over-all event lacked the sharp competition evidenced in the multi events.

With interest in pylon on the upswing throughout the country, competition was wide open at this contest, with no restrictions as to airplane or engine. Flying starts were permitted, due to wind direction and velocity relative to the position of the pylon markers.

RC Scale was won by **Loren Tregallas** with a P-63. **Bud Atkinson's** Mooney was second, and a P-51 by **R. D. Weathers** took third.

. Bud Atkinson and Sultan at 3rd Midwestern meet.

Loren Tregallas and Taurus at take-off.

Predicated upon the poor registration the previous year, Class II was not included in the Third Annual meet. According to **Bob Hess**, RC Event Director, however, the new rules may provide the adrenalin necessary to stimulate renewed interest in Intermediate for next year's competition.

We received a note from **Sam Stone**, Secretary of the RC Club of Detroit, concerning the Great Lakes Multi RC Contest. **Tom Brett**, 1962 Internats champion, put together some excellent flights to steal first from among the twenty-eight contestants. As evidenced by this meet, the up-and-coming one to watch is **Jim Grier** of Chicago—he gave Tom a match all the way. This boy is going places—he's cool, confident, and has that "something extra" that makes a champion. Don't say we didn't warn you!

The two-day event was plagued by 25-35 m.p.h. winds and intermittent light rain, holding the number of spectators down from the usual 1500-2000 to about 400. This was another contest that utilized the increasingly popular split Multi class, with an event for both Expert and Novice. The former was won by **Tom Kelly** of Lansing, Michigan, with second place going to **Gil Parker** of Kalamazoo. Pylon was taken by **John Kraver**, with **Ed Barbier** winning the Scale award. Twelve contest officials were used to insure a well-coordinated meet.

While on the subject of contests, the 7th Annual Mideastern Region RC Championships was an overwhelming success. With over 2500 spectators present, and a vast majority of manufacturers as sponsors, this Triple A event could appropriately be called the Mideastern Nats! The smoothness and coordination of the operation was something you'd have to see to appreciate. Judging was by the 911th Troop Carrier Wing, while parking and running was accomplished by Boy Scout Troop 135. Arrangements were made for local radio and TV stations to provide live coverage of the entire event.

Our congratulations to **Ralph Pennetti** and the other members of the ARCS, who not only made this a fine meet, but for their outstanding contribution in promoting better public relations for RC modeling in general.

And if that isn't enough, there was a seemingly endless supply of free coffee!

From **Fred Gregg**, a brief note concerning the Richmond Area Radio Controllers two-day, Third Annual Invitational meet, with nineteen out-of-town contestants, five out-of-state boys, and twenty-four members of the RARC entering the fly-for-fun competition. **Bob Smith**, of the RCNC, ran one-and-a-half gallons (!) of fuel through his Lee 45 powered Taurus, making fifteen touch-and-go's in one flight alone! **Blake Honeycutt**, RARC prexy, flew his Twin Stormer—this job, with two K & B 35's, really moves through the pattern!

CLUB NEWS

If you're building a Falcon (or planning to build one), here's a few modifications employed by **Bob Bates** Editor of the Clanking Armor: Enlarge the elevators and ventral fin, increase the rudder area, use wider-spaced gear for better tracking, add brakes, and use a K & B 45 up front. Flight tests showed a marked improvement in the roll-rate and spin characteristics. Also, says Bob, the 45 adds one-third more flying speed.

All we can say is, "Rots of ruck!"

As usual, there's quite a bit of activity from "way up North." **Bill** "Benedict Arnold" **Murray**, our Canadian editor, is all wound up over Pappy DeBolt's Twin Viscount, featured in a recent issue of MAN. The thing we're happy about is that he may retire the dog-eared, moth-eaten Taurus he's been flying since the Year One. Try reading RCM once in a while, Bill . . . we feature construction articles, too.

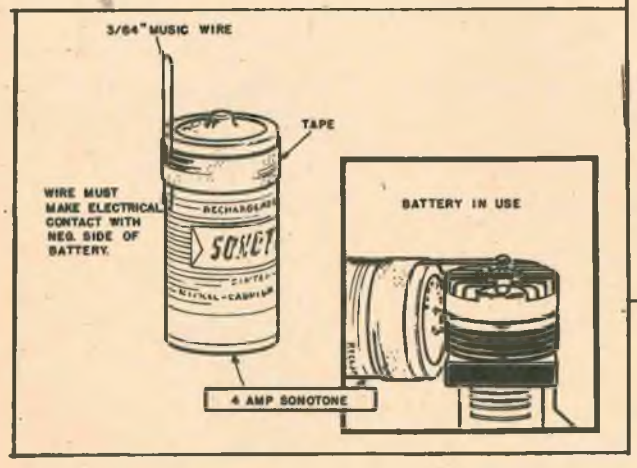
Chicago's Jim Grier. An up-and-coming boy to watch!

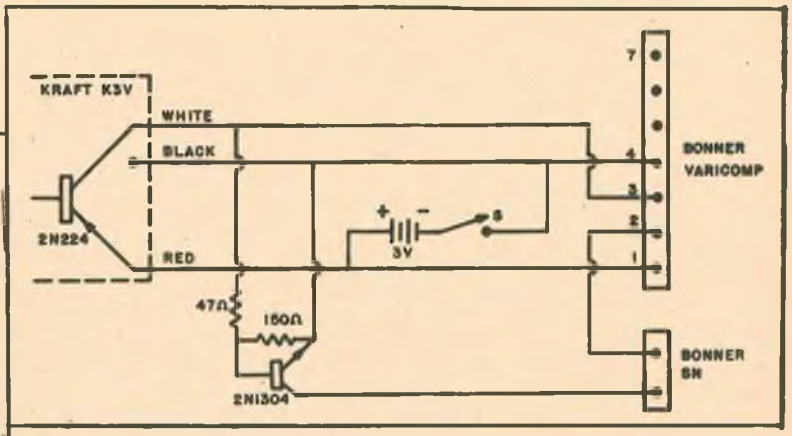
Ron Chapman made quite an impression at the 1963 Nationals with his beautiful Norseman. If Ron will stop modifying it long enough to finish a set of plans, we'll present it as a monthly feature. You'll like it!

Ken MacKenzie of Quebec City, folded the wings on his four-year-old Rebel — he's building a new set of wings and is planning on another four years! Some guys just won't let a manufacturer sell them kits! This ship may turn out to be the "Model A" of model aviation.

With a predominance of Taurus's, Stormer's, etc., at every flying field it's always a welcome change to see a fresh, new design. This one, from the MARS Pulse takes the prize, though. A Cub fuselage, Champion tail, and mind you—Waco wings (plural)! **Ray Kirkland** of Montreal created (?) it —weird but fast with a .19!

(Continued on page 37).





Above: Solution to overloading output transistor on relayless receivers when using third position motor control.

Left: Jim Jensen's solution to bulky starter batteries and dangling ignition wires. It works.

RANDOM NOTES
ON THE '63 NAT'S

There's only one thing you can say about the 1963 RC Championships without getting into an argument, and that is "It was no place for a beginner." Then, right after you've said that, you'll get into an argument as to whether there should be a "beginners event!". You think I'm kidding? I talked with several contestants, officials, sponsors, and spectators, and the net result was complete—and sincere—disagreement. Many of them have modeling experience going back to the first Nats in 1928; a few of them are among the leading industry figures in the radio and kit business. Yet the question of whether some form of "beginners event" is a good idea remains unanswered.

Some say that Class I is for newcomers, Class II for experienced fliers, and Class III for experts. A look at the winners in these events would indicate otherwise.

To sum it up, then, it is apparent that there's no place at the Nats for a really simple RC event, and it's also apparent that there is disagreement and considerable dissatisfaction with the present classes.

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The classes were not the only point of dissension. As always, the judging got its share of roasting. And when a good flier, who knows when he's performed well, gets 93 points on one flight, and on a subsequent flight, during which he is sincerely convinced that he performed the maneuvers as well or better than on the first flight, the score comes out at 76 with a different set of judges, you have to admit he has reason to question the consistency of the judging. The argument that over the span of the contest each flier will "average" his flights between the tough and the lenient judges does not alter the fact that we still haven't solved the problem of educating Nats judges to a consistent level of awarding points.

•

The idea of inserting RC Scale into the flight line didn't set too well with the scale buffs—either the fliers or the spectators. Scale, like pylon, is completely different from pattern. Many people were more interested in seeing the scale event, yet they had to wait through a long parade of pattern flights if they wanted to see all of the scale jobs fly. Pylon had its own time—and I got the distinct impression that a lot of people think that scale RC deserves the same consideration. I agree—both from the standpoint of the flier and the spectator.

•

It is still obvious that in spite of all the new developments, radio trouble is still a number one headache. Although superhet receivers have helped, there still is no assurance you won't get clobbered. Numerous crashes, both at Los Alamitos and Mile Square—mostly on the "green flag" frequency—indicated something was getting through. Also, some of the new proportional transmitters required "black flag", or individual air time, because they'd hit the neighboring frequency. This will undoubtedly be licked, but the unexplained interference at certain locations—"dead spots"—is still a hazard.

•

The Navy did their usual superb job. Handling the Nat's is one of the Navy's best recruiting devices—but I'll also bet it's one of the toughest!

•

The long wait between flights still

(Continued on page 32)

1963 NATS DATA

Flyer RIC Club City, State	Age	Yrs. in Modeling	Yrs. in RC	Event Place	Plane	Span Area	Weight Lbs.-Oz.	Finish	Control System	Receiver	Transmitter	Freq.	Engine Prop	Fuel	Notes
Allen, Richard C. Aeroguidance Society Apalachin, N. Y.	-34	19	10	Cl3 10th	Stark Shark III	60' 708	6-2	Epoxy	REMAT Space Control	Space Control	Space Control	27.095	Merco 49 Torn 11/6	Neotane	Highest and lowest single flight score
Angus, Robert C. Tuscon, Arizona	34	10	5	Cl1	LW Trainer	48 432	3-8	Butyrate	RM VariComp	F&M Mercury	F&M Hercules	27.095	KB 19 TF 9/5	KB 100	Mod. design Reworked esc.
Atkinson, Bud KCRC Blue Springs, Mo.	38	30	12	Cl2 4th	Astro-Cat	62 860	5-0	Butyrate	REMT Bonner servos	Orbit	Orbit	27.195	Veco 45 TF 11/6	KB 100	
Atkinson, Bud KCRC Blue Springs, Mo.	38	30	12	Scale 2nd	Mooney Mite	72 730	9-0	Butyrate	REMAT Bonner servos	Orbit	Orbit	27.195	KB 45 TF 11/6	KB 100	Lights, ret. gear
Austin, Richard M. Napa, California	40	30	17	Cl3	Orion	71 744	6-8	Butyrate	REMAT Bonner servos	Orbit	Orbit	27.145	KB 45 TF 11/6	Blue Blazer	Full span ail, inc. fin & rud.
Barnett, Richard M. Camarillo, Calif.	29	22	6	Cl3	Taurus	70 720	6-8	Epoxy Butyrate	REMAT Bonner prop.	Kraft Proportional	Kraft Proportional	27.145	Veco 45 Torn 11/6	KB 100	R&L fibreglass fuselage
Barr, Franklin W. LARKS Santa Monica, Cal.	28	8	5	Cl2 5th	Original	58 522	4-8	Butyrate	REMT Annco servos	Orbit	Orbit	27.045	Fox 35 RU 10/6	KB 100 KB 1000	Tauri wing
Beason, Larry RCLOC Prattville, Alabama	33	20	8	Cl3	Flat Top Stormer	72 720	6-8	Butyrate	REMAT Bonner servos	Orbit	Orbit	27.095	Veco 45 TF 11/6	KB 100 KB HiLo	
Black, Paul LARKS Torrance, Calif.	33	8	8	Cl2 2nd	Buttercup	50 500	5-0	Butyrate	REMT Bonner servos	Orbit	Orbit	52.2	KB 35 TF 10/6	KB 100	Mod Smog Hog
Boone, Milton S. Huntington Beach, Cal.	43			Cl3	Original				REMA Space Control	Space Control	Space Control	27.195			Own design
Bosshard, R. E. Hayward, California	48			Cl3	Astro Hog					Orbit	Orbit	26.995	Veco 45		
Bowers, David A. BIRDS Downey, California	17	9	5	Cl1	Esquire	50 500	4-8	Butyrate.	RM Bonner servos	Orbit	Orbit	26.995	OS 35 TF 10/6	KB 100	
Boyer, Chuck LARKS Palos Verdes, Calif.	30			Cl3	Super Spad				REMATF	Orbit	Orbit	26.995	Veco 45		Own design
Brook, Dr. Ralph C. SRAC Seattle, Washington	32	20	7	Cl3	Centurion	72 740	6-2	Butyrate	REMAT Space Control	Space Control	Space Control	27.145	Lee 45 TF 11/6	KB 100	Own design
Brown, Chuck LARKS-DRONES San Diego, California	31	10	5	Cl3	Original	67 804	6-12	Butyrate	REMAT Bonner servos	Orbit	Orbit	27.145	Veco 45 TF 11/6	KB 100	
Brown, Don WJRC-SCRC Woodbury, N. J.	37	22	10	Cl3	Ambassador	63 693	6-7	Butyrate	REMAT DB servos	DeeBee Proportional	DeeBee Proportional	53.8	Merco 49 Torn 12/6	KB 100	'62 Internats entry

Flyer RIC Club City, State	Age	Yrs. in Modelling	Yrs. in RC	Event Place	Plane	Span Area	Weight Lbs.-Oz.	Finish	Control System	Receiver	Transmitter	Freq.	Engine Prop	Fuel	Notes
Capan, Frank Van Nuys, Calif.	40			Scale	SE5				REMAT Space Control	Space Control	Space Control	53.2	Fox 59		
Capan, Frank Van Nuys, Calif.	40			Pylon	Delta	636			EA Space Control	Space Control	Space Control	26.995	Cox 15		
Carter, Glenn EBRC Orinda, Calif.	35	25	8	Pylon 5th	Delta	30 580	2-8	Butyrate	EA Bonner servos	Orbit	Orbit	51.0	Cox 15 Torn	KB 100	
Carter, Glenn EBRC Orinda, Calif.	35	25	8	C13	Apollo	72 800	6-12	Butyrate	REMAT Bonner servos	Orbit	Orbit	27.095	Veco 45 Torn. 11/6	Blue Blazer	
Carter, Steven EBRC Orinda, Calif.	13	4	3	C11Jr 2nd	Charger	300	3-8	Butyrate	RM Bonner servos	Orbit	Orbit	51.0	ST 15 TF 8-3	Blue Blazer	
Chapin, Ernest E. Indio, California	37			Pylon					EA Bonner servos	F&M	F&M	27.195	Cox 15		
Chapman, Ron Toronto RC Club Toronto, Canada	32	24	6	C13	Norseman	590	6-4	Epoxy	REMAT Bonner servos	Orbit	Orbit	53.387	Veco 45 RU 11/6	KB 100	Own design
Chidgey, Ron Pensacola RFC Pensacola, Fla.	31	20	10	C13	Goshawk	64 808	6-8	Butyrate	REMAT Sampey	Sampey Proportional	Sampey Proportional	53.0	ST 56 TF 12/6	Own	
Chisolm, Alex Fresno Radio Mod. Fresno, California	43	33	5	Scale 6th	PT-19	72 820	9-6	Butyrate	REMAT Space Control	Space Control	Space Control	27.095	KB 45 TF 12/5	Hi Thrust	Fuller dope & silver powder
Clark, Hubert SCRC Covina, Calif.	37	25	8	C12	Torero	60 780	6-0	Butyrate	REMT Bonner servos	Orbit	Orbit	27.195	KB 45 RU 11/6	Supersonic 100	
Clark, William M. Omaha, Nebraska	40			C13	Taurus	70 720				F&M	F&M	26.995	Veco 45		
Coffman, James NVRC Fairfax, Virginia	16	3	1	C11Jr 4th	Over The Rainbow	56 480	3-5	Butyrate	RM Babcock esc.	Kraft	Orbit	27.255	Veco 19 Grish 10/4	SuperFuel	
Coffman, Roger NVRC Fairfax, Virginia	15	4	1	C12	Tauri	57 530	4-0	Epoxy	REM Citizenship servos	Citizenship	Citizenship	27.255	KB 19 Grish 9/4	Cox	
Comerinsky, Ted LARKS Hawthorne, Calif.	30	15	10	Pylon	Hustler Delta	580	3-0	Butyrate	Elevon, Trim Bonner servos	Orbit	Orbit	53.8	Cox 15 Torn	KB 1000	
Comerinsky, Ted LARKS Hawthorne, Calif.	30	15	10	C13	Flat Top Stormer	65 720	7-0	Butyrate	REMA Bonner servos	Orbit	Orbit	53.8	Merco 49 Torn 11/6	KB 100	
Crandell, Barry Pacific Palisades, Cal.	15	4	2	C11Jr	Lil Esquire	40 160	2-12	Butyrate	RM Babcock esc.	Pioneer	Venus	27.095	OS 09 Testor 8/4	KB 100	
Crow, Don LARKS-RCLOC San Clemente, Cal.	29	20	5	C12 3rd	Miss Witchkraft	58 638	6-0	Butyrate	REMT Bonner servos	Kraft	Kraft	52.220	KB 45 TF 11/6	KB HiLo	Own design. Simul EM. Rudder trim.
Davis, Malcom R. Woodland Hills, Cal.	41			C13	Stormer					F&M	F&M	53.0			
DeBolt, Hal Flying Bisons Cheektowaga, N.Y.	44	33	11	C13	Interceptor	68 750	6-2	Epoxy	REMAT Space Control	Space Control	Space Control	26.995	Merco 49 RU 11/6	KB 100	Own design.

Flyer RIC Club City, State	Age	Yrs. in Modeling	Yrs. in RC	Event Place	Plane	Span Area	Weight Lbs.-Oz.	Finish	Control System	Receiver	Transmitter	Freq.	Engine Prop	Fuel	Notes
Deden, John T. Woodland Hills, Cal.	38			C13	Original				REMA	F&M	F&M	27.095	KB 45		
Diem, Al Los Altos, Calif.	40			C13	Qualifier					Superregen Proportional	Proportional	53.5	Veco 45		Jerry Nelson design.
Doell, Robert LARKS Carpenteria, Calif.	38	5	5	C13	Candy	70 840	7-0	Butyrate	REMAT Bonner prop.	Kraft Proportional	Kraft Proportional	27.195	Veco 45 TF 11/6	KB 100	RCM feature.
Doig, Al Jr. LARKS Palos Verdes, Calif.	44	15	8	C11	White Cloud	574	4-8	Epoxy	RM Bonner servos	Orbit	Orbit	53.4	KB 45 Grish	KB 100	
Downs, Ray LARKS Los Angeles, Calif.	45	30	15	C13	Sultan	70 820	6-6	Butyrate	REMAT Bonner servos	F&M	F&M	27.195	Lee 45 Tom 3/blade	KB 100	
Dyck, Gene Fullerton, Calif.	34			C13	Original					Orbit	Orbit	27.095	ST 56		
Edwards, Bruce PVRC Torrance, Calif.	38	10	8	C11	Revolt	48 540	2-6	Butyrate	RM VariComp	F&M	F&M	51.0	OS 15 TF 9/4	KB HiLo	Own design.
Eich, William J. Mile Hi RC Golden, Colorado	33	5	2	C13	Taurus	70 720	6-6	Epoxy	REMAT Bonner servos	F&M	F&M	27.045	Veco 45 RU 11/6	Own	
Evett, Colby W. Santa Monica, Calif.	43			C13	Original				REMA Bonner servos	F&M	F&M	53.5	Fox 59		
Foster, Joseph W. San Jose, California	36	25	1	C13	T-Bird	60 650	5-5	Butyrate	REMAT Bonner servos	Orbit	Orbit	27.045	KB 45 Tom 11/6	KB 100	
Fruh, Les Chicagoland RCM Evanston, Illinois	38	8	8	C13	Taurus II		5-4	Butyrate	REMAT Annco servos	Orbit	Orbit	27.095	Veco 45 TF 11/6	Own	Mod Taurus; swept LE, 25% section.
Gallegos, Francisco Mexico City, Mexico	38				Taurus	70 760				Orbit	Orbit				
Gardner, Jackie Jackson, Mississippi	35			C11	LW Champion				RM Bonner servos				KB 35		
Gates, Robert Summit Aero Modelers Akron, Ohio	38	10	4	C13	Taurus	70 760	5-12	Butyrate	REMAT Bonner servos	F&M	F&M	26.995	Merco 49 RU 11/6	Piston Power	
Gebhardt, Dean B. Bear Paw Model Club Havre, Montana	33	12	5	C13	Orion	68 714	6-0	Butyrate	REMAT Bonner servos	Orbit	Orbit	27.195	KB 45 TF 12/6	Fox	Modified
Gettman, Gerald F. Pioneer RC Club Redwood City, Calif.	23	8	5	C13	Apollo	64 832	7-0	Butyrate	REMAT Bonner servos	Orbit	Orbit	27.145	Veco 45 Tom 11/6	Blue Blazer	
Gettman, James C. Pioneer RC Club Redwood City, Calif.	30	12	8	C13	Apollo	64 832	7-0	Butyrate	REMAT Bonner servos	Orbit	Orbit	27.095	Veco 45 Tom 11/6	Blue Blazer	
Green, Bobby R. Mile Hi RC Club Aurora, Colorado	34	28	10	C13	Taurus	72 740	6-0	Butyrate	REMAT Bonner servos	Controlaire	Controlaire	27.195	KB 45 RU 11/6	KB 100	
Grier, James Chicago, Illinois	32			C13	Taurus	72 740			REMAT Bonner servos	Orbit	Orbit	27.195	Veco 45		

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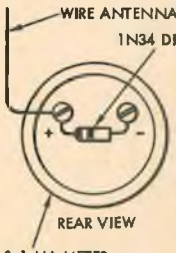

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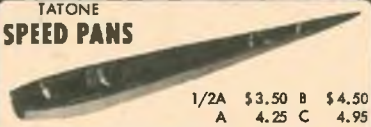

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5½-10 ... 45¢ 8- 9 ... 35¢	11-6 ... 40¢	7-4 ... 30¢ 9-7 (COMBAT) 35¢
5½-11 ... 45¢ 9-12 ... 65¢	11-7 ... 40¢	7-6 ... 30¢ 9-8 (COMBAT) 35¢
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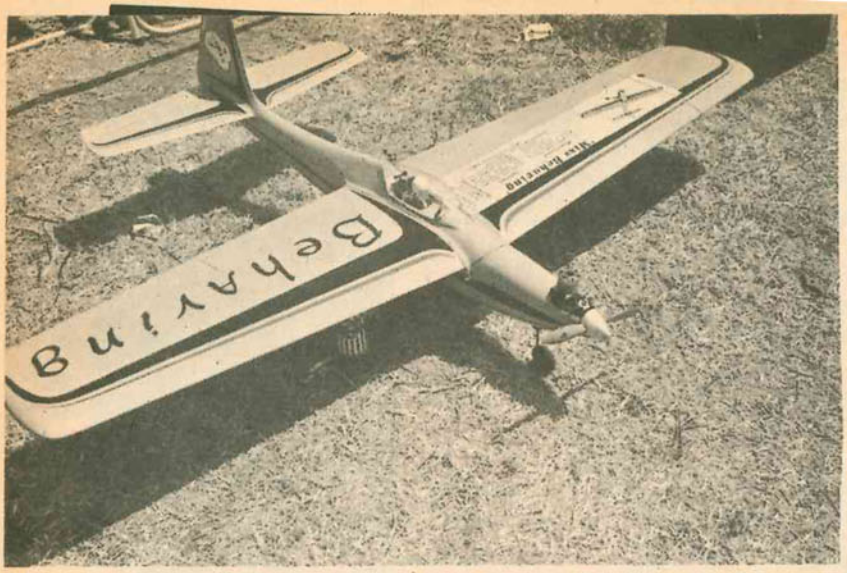


Miss Behaving at '63 Nat's. Pico Model Products.

SHOWCASE '63

New Products on Review

If the radio control field is lacking in any aspect, it certainly isn't in the realm of new products! This month we have an exciting array of new items currently available, most of which have been examined and tested by our consumer test department.

The first item on the agenda is a new nose and main **wheel brake** from **Royal Products Company.** This unit is the exact prototype used by Harry Brooks, co-winner of the 1962 Internats. The hub and drum are completely machined from one piece of aluminum, with a nylon insert in the hub, drilled for 5/32" axles, and designed to provide proper fit and minimum wear. The brake mechanism itself is completely machined to assure fast stopping action with minimum servo bind. A stop pin and set screws prevent slippage when the brake is applied and also assure proper centering. Available in two sizes: Small (fits 2¼" to 2½" tires), and Large (fits 2¾" to 3½" tires). This unit evidences the highest craftsmanship and is well worth the price of $4.95 per unit.

The **Skylark** appears to be the first RC kit ever produced for twin engine operation. Kitted by **Carl Goldberg Models,** the first public showing of the new model took place at the 1963 Nationals. Placed on display in the flight line, it attracted continuous attention and questions concerning its specifications and performance. When demonstration flights were permitted, the Skylark, powered by two Cox. .09's, did inside and outside loops, flew inverted, and performed barrel rolls. Shortly after coming out of a maneuver, it was noticed that only one of the engines was running. Nevertheless, the ship continued in straight flight without appreciable loss of speed. This continued for about a minute and a half, with the model showing its ability to maintain altitude and to fly without difficulty on only one engine. Span of the Skylark is 56". Weight with two Cox. .09's, 10 channel operation with 5 Annco servos is 4 lbs. 5 ounces. An excellent kit with "built-in" performance!

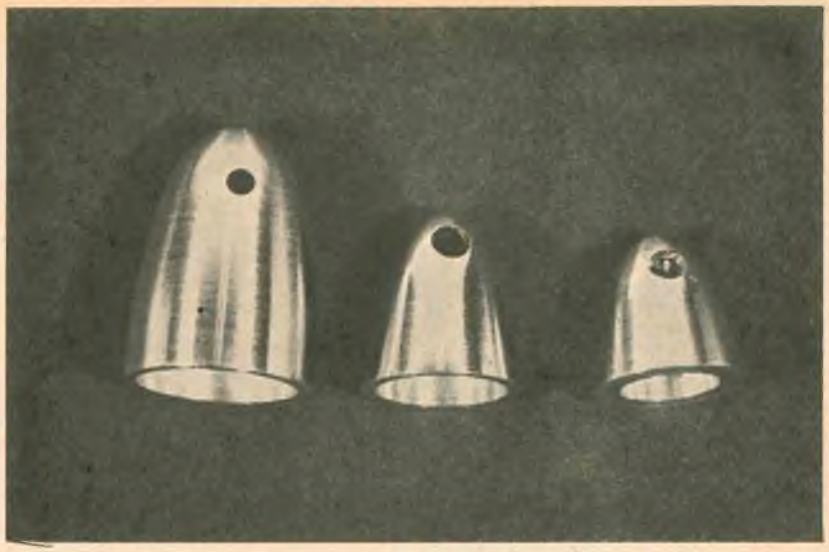
Another addition to the line of new multi kits is the **Miss Behaving** from **Jack Stafford Models,** a 74" span model for 45 to 60 mills. The photo shows the prototype at the 1963 Nat's, flown with proportional gear, although everything from six channels to the "kitchen sink" has been used with equal success. This is one of the most extensively pre-fabricated, hand-made kits we have seen, complete with all hardware, etc., and falls in the "labor-of-love" category—a kit you have to see to believe. $29.95, cash or C.O.D. direct from Jack Stafford, 12111 Beatrice St., Culver City, California. They're backordered, so allow two weeks for delivery.

Got a match? You can solder in the field with **Willoughby's Super Solder!** Take two pieces of wire, light a match and hold the flame so that the hottest part meets at the junction of the wires and the solder and before the match goes out you will have a very strong solder joint that will always stay bright. It is a silver bearing and has no lead, zinc, antimony, or cadminum

A fine product from Precision Industries.

Carl Goldberg's Skylark, twin or single.

Sonotone NiCad's.



Tee-Q spinners for new AMA rules.

content. Although designed for permanent field repairs, it also does an excellent job with a low temperature iron on stainless steel, for landing gear wires, and other hard-to-solder items. 15,000 psi tensile strength. Not recommended as a general purpose solder because of cost. #36B51, available from Ace Radio Control. 50c per package.

Tee-Q Research and Manufacturing Company announces a series of three **spinners** designed to meet the new AMA rules soon to be instituted. Turned from hard aluminum, then polished, these are the neatest appearing spinners available on the market. The spinners are simply screwed on the prop shaft and act as an additional stop nut for the prop nut. Available in three sizes for most RC engines, prices range from 89c to $1.29. Also from Tee-Q is in **instrument sheet** which contains photo reproductions of the most common aircaft instuments in sizes most demanded by scale fans. A total of 27 instruments including altimeters, airspeed indicators, and other gauges to fit almost every application. 89c to $1.29. Both items are available from Ace Radio Control.

A new way to carry and protect your latest RC creation is the **Model Tote** by **Magna-Jig** division of Norquist Products. Made of tough flakeboard, the Model Tote is an adjustable cradle for carrying and holding the largest RC model. The fuselage of the model is cradled snugly and securely in the unit, resting on soft foam rubber to avoid surface damage. Complete, ready to assemble. We used it, and we liked it. $4.95.

The **Precision Fuel Pump,** from **Precision Industries,** Box 7258, Oklahoma City, Oklahoma, is another time-saving device. This pump carries a quart of fuel, and with a few squeezes on the bulb, creates enough pressure within the unit to cause the fuel to force feed the model tank. Eliminates the need for carrying both fuel can and pump. Sold direct.

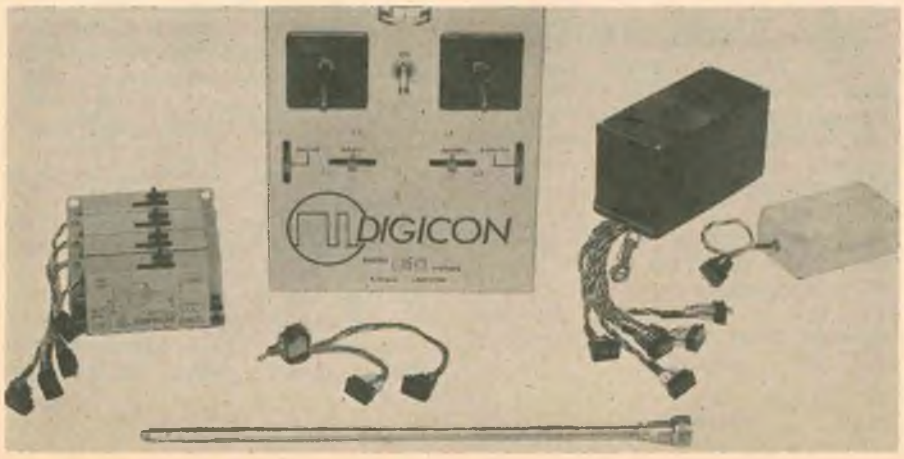
For powered glider or slope soaring fans, the Aviomodelli **"Pelican" RC Glider** kit is an excellent choice. This RC glider is a well-engineered design, conforming to the A/2 formula, with a 68" span and an area of about 445 square inches. Although designed for single channel use, it has been flown with a Kraft 10, single Transmite servo, and NiCad pack. Total weight with the latter equipment is 30 ounces, providing matchless performance on any slope soaring hill. An .049 engine may be added for non-critical powered flights. Kit is prefabricated, and plans are in four languages including English. $16.95 plus shipping charges from **Willoughby Enterprises,** 14695 Candeda Place, Tustin, Calif.

From our good friend Frank Garcher at **Midwest Products,** a high speed matching **tap and drill set,** including one tap each 2-56, 3-48, 4-40, and one drill each #50, #47, #43, and complete with a firm grip tap wrench and case. $4.95 a set, and well worth it when you compare the individual tap prices at local hardware stores! Also from Midwest, several carded items that we found to be of excellent quality. A **builder's accessory kit** which includes three control horns, two bell cranks, two landing gear clips, and four general clips. 60c per package. Other items included their **foamseal** stripping for wing and stab mounts, **nylon clevises, motor mount bolts,** and **separate landing gear clips** in the most popular sizes. All from Midwest, and all good.

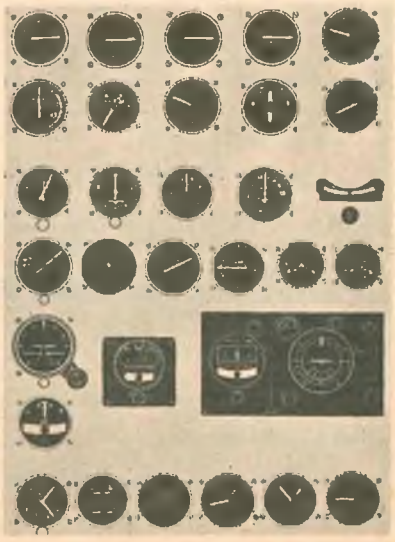
Another popular kit, the **Dominator** from **Bill Williams Specialties,** 2011 South Broadway, Santa Ana, California. With over three years of competitive flying to its credit, this design has won numerous West Coast contests and was among the top winners in the last three Nationals. Kit features hi-impact styrene molded ribs, steerable

(Continued on page 39)

The Digicon proportional system, ready-to-fly.



Scale buffs take more!



Candy

(Continued from page 8)

install wing dowels. Apply approximately 5 coats of clear dope over the entire plane. Fuelproof the inside of the nose compartment with clear epoxy. Finish to suit yourself, but it is suggested that you use spray cans larger than three ounces!

Radio Equipment

As mentioned, this ship was designed around the Kraft-Pullen proportional system; however, any radio equipment should work equally as well. It has never been flown on reeds, but I believe it would be just as suitable although not as smooth in the maneuvers. The reed installation is shown on the plans, along with the proportional data. There are so many different systems available, the final details will be left to the discretion of the builder. One of the prototypes of Candy has had over 600 successful flights using the first production model of the Kraft-Pullen system. All of these flights have been made without any failure of the system itself. I have suffered minor mechanical difficulties with a couple of the components, plus battery failure during one flight, however this in no way throws a bad reflection on the system itself. The Kraft system as used in the Candy is a triple proportional unit with trimmable throttle. For those of you intending to order this system, a quadruple proportional unit is almost ready for the market. I have flown this unit and it works as well if not better than the triple proportional system, and should prove to be an excellent system for use in the Candy.

The all-up weight of the finished model should not exceed 7 pounds. The prototype weights 6½ pounds. Make sure all control surfaces are neutral and that there are no warps, and Candy should fly right off the board. It does not have any particular quirks except that it does demand plenty of speed for the rolling maneuvers, and does land fairly fast. It should track perfectly on the inside and outside loops. One note about the attitude of the plane while sitting on the ground: It should have a negative angle of attack of about 1 degree, or as it is called, a "rake." The idea here is to dump all left as soon as the nose wheel touches down. If this is done properly, Candy will glue herself to the ground on landing.

I hope you will enjoy building and flying Candy. If anyone has any questions or suggestions on the plane, drop me a line in care of R/C Modeler Magazine. Good luck with your new ship—she's a winner!

Bench Bits

(Continued from page 5)

No claims will be made here that the following procedure is the standard approach, or that normally accepted techniques are used. In fact, those are familiar with electronics may find this approach rather crude. This method was devised in order to alow those who do not possless test equipment to check the amplifier satisfactorily. If you do not know the difference between a transistor and a capacitor, either find someone who does, or **don't** attempt the amplifier repair. There will undoubtedly be cases where this procedure is not sufficient to locate the malfunction, and further trouble shooting with suitable test equipment will be necessary.

Test procedures are listed A, B, C, D, etc. A chart listing the failure symptoms and the probable causes is furnished for your convenience. The chart should be used as follows:

1. Locate the trouble you are experiencing in the "Symptom" collumn.
2. Under the column, "Probable Causes," read the information given, and make whatever visual checks you can.
3. Under the "Vertification" column, you will see groups of letters — these letters designate the procedure to be used, and in what order to use them. Be sure to follow the order given.

In order to complete the circuits for these tests, the sector gear switch fingers must be making contact with the switcher board in the cover. A simple way to accomplish this is to place the shank of a #42 drill through the hole in the sector gear and the servo cover, using a clothespin to hold the gear against the switcher board. It is recommended that a separate sector gear be purchased for use in this manner, in order that the original sector gear switch fingers will retain the proper factory tension adjustment. Neutral positioning of the sector gear may be ascertainde by visually locating the sector gear at center, and checking the position of the switch fingers on the switcher board.

This about covers the amplifier service. It was felt that going much further with the service information would only confuse those who art not familiar with circuitry of this type .As it stands now, the information given is adequate for a very high percentage of servo amplifier malfunctions.

I hope that the information will be of value to you, even if you don't think you can handle the repair at the present time. As for me, I'm so tired of writing and looking at Transmites that I am going to take a couple of hours off and do some flying! See you next month.

SYMPTOM	PROBABLE CAUSES	VERTIFICATION
Servo drives in one direction only. Does not neutralize.	(1) Broken orange or yellow wire. (2) Defective TR1 or TR2. (3) Broken orange or blue wire from TR5 or TR6 to switcher board.	A, B, C, E, F
Servo drives in one direction only and neutralizes.	(1) Broken orange or yellow wire. (2) Filter capacitor open or broken loose from board. (3) TR1 or TR2 defective.	A, B, E, G
Servo drives in both directions, but will not neutralize.	(1) You may be attempting to obtain neutralizing action from a trim servo. (2) Outermost contact fingers on sector gear not making contact with switcher board. (3) Brown wire to board broken. (4) Defective Flip-Flop.	
Servo drives in both directions, but is much faster in one direction.	(1) Batteries not charged, or one cell weak. (2) Low gain in driver or output transistors. (3) Leaky output transistor (opposite side).	A, B, D
Servo does not drive ,and heavy load is placed on batteries.	(1) Orange and yellow wires shorted together. (2) Two reeds driving at once, attempting to drive servo both ways at once. (3) Shorted output transistors. (4) Shorted driver transistors.	A, B, D, E
Servo drives when orange or yellow wire is touched directly to +6V supply (red wire) but will not drive from vibrating reed.	(1) Filter capacitor open. (2) Reed contacts dirty.	Clean reed contacts A, B, G
Servo drives in one direction without a command, and stays at full throw.	(1) Shorted filter capacitor. (2) Shorted driver transistor.	A, D, E, H
Servo drives hard in one direction and does not stop at full throw. (Usually results in a bent case).	(1) Shorted output transistor.	D

TRANSMITE SERVICE CHART	VERIFICATION PROCEDURES (FOLLOW CHART ORDER)
A.	Set sector gear to neutral (no rotation of motor).
B.	Apply power.
C.	Temporarily connect a 47 ohm resistor from the base of TR5 to the —6V supply (green wire). If the transistor is okay, the motor will run as long as the resistor is connected. If the motor does not run, replace TR5. Repeat this test on TR6. The motor should run in the opposite direction as long as the resistor is connected. If the motor does not run, replace TR6. After replacement, verify proper operation by making the test once more.
D.	Short the base of the conducting output transistor (TR5 or TR6) to its emitter. If the trouble is in a *previous* stage, the motor will stop. If the motor does not stop, replace the output transistor.
E.	Connect the base of TR1 to its collector with a temporary jumper. The motor should run. If it does not, replace TR1. Repeat the test on TR2. After replacement, if any, repeat the test. The motor should *stop* when the jumper is removed. If not, replace TR1 or TR2.
F.	Check Flip-Flop circuit by manually rotating the sector gear slightly off neutral. If the flip-flop circuitry is okay, the motor will run. Check both sides of neutral, ascertaining that the motor changes its direction of rotation when the sector gear is moved from one side of neutral to the other. If the motor does *not* run when the above test is done, proceed with the following tests: (1) Disconnect batteries. (2) Rotate the sector gear to either side of neutral. (3) Unsolder TR3 (see photo) and remove from board. (4) Reconnect power: The motor should run. If it does, replace TR3. If it does not, replace TR4. If the motor still doesn't run when TR4 is replaced, the 1.5K resistor which connects the base of TR4 to the —4.8V supply (long black wire) is probably open. (5) As a final check, temporarily connect a 4.7K resistor from the base of TR3 to the +6V supply (red wire). The motor should stop. If it does, the flip-flop is okay.
G.	If the filter capacitor is open, the servo will operate for all these tests, but will *not* operate when it is driven from a vibrating reed. Temporarily connect another capacitor (15 uf) across the unit on the board and check for proper operation. Observe polarity.
H.	Disconnect power and remove one filter capacitor. Reconnect power. If the motor does not run, the capacitor you have just removed is shorted and should be replaced. If the motor still runs, repeat the test with the other capacitor. If the motor still runs, the trouble is most likely a defective driver transistor.

RCM TEST REPORT

Eagle Transmitter
Cardinal Receiver

New multi-reed receiver and transmitter from C & S.

A considerable amount of interest followed the announcement by C & S Electronics of the addition of the Eagle CS-510 transistorized multi-transmitter to their line of radio control equipment. For our test report we obtained one of the first production models of the new transmitter, matched on 27.145 mc to the CS-508 Cardinal receiver. The latter was equipped with Medco reed bank. Servos used were five of the new Annco 2RL relayless units. Battery pack was a Space Control NiCad pack #5500A. A Justin Micro-Tie servo connector board was used to simplify the installation and eliminate the usual flexing soldered leads and numerous connector plugs.

Transmitter circuitry in the "Eagle" is basically a crystal-controlled transistor oscillator feeding a one-watt silicon epitaxial mesa power output transistor stage. Connection to the antenna circuit is made through a "pi" filter network to eliminate harmonics and provide correct antenna matching. Components have been carefully selected, and together with the MOPA circuit, provide minimum drift with maximum output and frequency stability. It was found that placing a hand on the antenna reduced the transmitter output by absorption without affecting frequency.

Two separate Hartley audio oscillators are employed for dual simultaneous operation. In checking the simultaneous feature, a few simple reed adjustments and minor tuning of the audio pots was all that was necessary to obtain a "solid" simul. Frequency stability under all conditions of temperature, humidity, and battery voltage is assured by the use of toroid transformers and Mylar capacitors. A slight interaction in the reed bank was noticed, but was easily tuned out due to sine wave audio tones which reduce the possibility of interaction.

Although completely transistorized, and operating from a single 9V battery (Eveready 276), we found that the "Eagle" transmitter has a power output that equals or exceeds that of most tube transmitters currently available. The efficient circuit and antenna design takes full advantage of the power available from the 9-volt supply. Use of collector modulation further increases the output when the audio is keyed. Output is continually monitored by an "output" meter on the front of the transmitter. Relative battery condition can be determined by these meter readings. Although designed for a single 9V battery, the "Eagle" will operate efficiently from a NiCad pack of seven 1.25 volt, 500mah cells, providing approximately 8.75 volts.

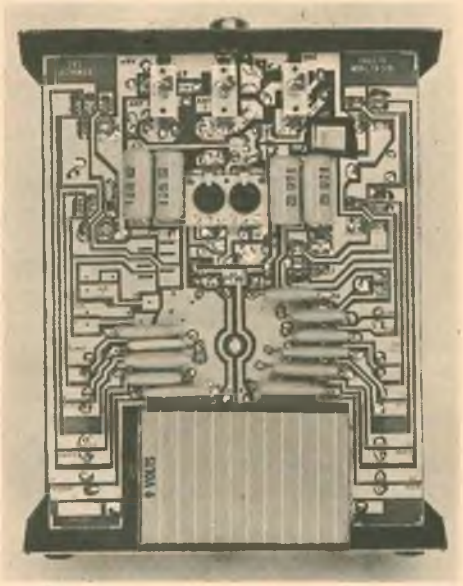
The "Eagle" is available in 6, 10, or 12 channels, with the 6 and 10 channel models convertible upwards when extra channels are desired. Packaging is attractive, with the standard C & S green case, yellow printing, and yellow toggle switches. For visual convenience, a brown toggle switch is used for the trim lever.

Specifications:

Operating Voltage	9 volts
Power Amplifier Input Current	40-45 milliamperes
Power	450 milliwatts
Transmitter Current Drain (total)	70-75 milliamperes
Power Output (nominal)	250 milliwatts
Audio Modulation Range	325-650 CPS
Modulation Percentage	80-85%
Tuning Range	26.995 to 27.255
Frequency Tolerance Decimal	.005%
Operating Temperature Range	0 to +130F
Dimensions	2⅞" x 6" x 7½"
Antenna length	15¼" to 55"
Price:	
6 Channel	$ 89.50
10 Channel	$109.50
12 Channel	$129.50

Cardinal Receiver:

The CS-508 "Cardinal" superheterodyne receiver is one of the most selective and sensitive RC units we have tested. The narrow bandwidth will reject undesired signals 5Kc or more away from operating frequency, while sensitivity is high enough to permit receiver operation on signals as low as two microvolts. The "Cardinal" has a highly efficient reverse AGC to prevent close range overloading. Solid state circuitry is employed throughout, including six transistors in the IF stages. The receiver cannot drift or vibrate out of alignment due to the fact that the usual adjustable transformers are replaced by the newer Clevite Transfilters. The only tuning required was to peak the antenna circuit for maximum sensitivity with the "Eagle" transmitter.



Specifications:

Sensitivity	2 microvolts

(Continued from page 31)

Bandwidth .....4 Kc at 6 db
Operating voltage:
4.8 minimum
6.0 nominal
6.5 maximum
Idle Current (at 70F)....9 ma nominal
Idle Current
(at 70F)....9 ma nominal (carrier off)
13 ma nominal (carrier on)
Modulation Percentage
Req'd. 80-100%
Recommended
Transmitter .....CS-510 "Eagle"
Available Frequencies .....All
Operating Temperature
Range .....0 to +140F
Dimensions .....1" x 1¾" x 3"
Weight .....3½ ounces
Price:
10 Channel $74.50
12 Channel $84.50

Our test conclusions indicate that both the C & S "Eagle" transmitter and "Cardinal" receiver, equal, and in most cases exceed, manufacturers specifications. Both units evidence careful design consideration, are well made, and operate under a wide range of conditions at maximum efficiency and reliability. RCM rates these units as excellent and recommended.

Ken Willard

(Continued from page 20)

rankles a lot of contestants. Either the time for qualifying flights will have to be shortened or the number of entrants reduced if we are ever to overcome this objection.

•

The flight of the scale B-24 was really something to see, what with four engines screaming away, and the beautiful touch-and-go landing. Only one thing came to mind though—if a full-size B-24 ever got up to the scale speed of that model, the wings would have been torn off!

•

Photographers, as usual, were everywhere, culminating in one announcement from the P.A. at the judges stand, "Will all those unnecessary photographers please get back from the flight line!". This led to quite a discussion of how necessary a photographer is.

•

Pre-planning paid off in the smoothness and speed with which the flight results were tabulated and posted. The planning was also followed by long hours of execution by both the AMA and Navy staff. It takes one helluva lot of hard work to run an RC Nats—and the pay is all spiritual!

•

Between cokes for the kiddies and stronger mix for the modelers, the ice machine at the Bahia Motel, where many of the out-of-town contestants stayed, was hard put to keep up with the demand. Speaking of strong mix, it is fully evident that the RC Nats is an adult affair. The socializing after the day's flying reminded me in many ways of aerospace industry meetings which I attend. And why not? The cocktail hour is an accepted social custom—and RC modelers are a sociable group of which the vast majority are over 21.

•

The Pylon event did little to answer the burning question on whether the delta jobs are the ultimate. Zel Ritchie's winning flight was as smooth a run as I've seen in a long time, but with Bill Williams and Keith Storey hot on his heels with their "conventional" designs, it was apparent that the real difference was in the way the course was flown. Not that Keith and Bill didn't do a good job; they did very well, but at the speeds which exist in pylon, it's almost impossible to make consistently smooth pylon turns with reed equipment. Maybe next year we'll see proportional equipment in both delta and conventional pylon racing designs, and then we'll have a better means of comparison.

•

As for the quality of flying this year, it was only natural that it would tend to improve in all three classes. With no limitation on radio gear, Class I and Class II couldn't help but improve. In Class III the improvement wasn't so apparent, and some observers even opined that the quality wasn't up to previous years, but in my opinion it was better — particularly the proportional jobs. Reed flying reached its peak with Dunham, Spreng and Kazmirski but proportional control is just beginning to realize its full potential. I'll even forecast that next year all place winners will be flying proportional.

AMA

Washington Briefs

The 1963 Nationals was a complete success in every respect. Nineteen national records were broken, largely due to excellent weather and flying conditions. Edward "Bud" Hartranft, CD (AMA 8054) did an excellent job in handling the competition end of the operation. Earl Witt, CD (AMA 584), as Nats Committee Chairman, had the difficult task of handling the administrative phase of the meet. Keith Storey, (AMA 9), past President and member of the Committee, did much to coordinate these two phases of running the "Big Meet." Karen Humer, Nats secretary and staff member, can be credited for the smooth pre-registration, plus the myriad details during the contest itself. Not enough praise can be given the Navy — never have we received such enthusiastic cooperation!

•

Recognizing the complexity of the problems confronting RC'ers, an AMA F.C.C. committee has been established, and consists of Ed Lorenz, Dr. Walter Good, and Paul Runge. One of the functions of this committee will be to raise the necessary funds to retain an attorney to represent the AMA before the F.C.C., representing the radio control modelers, and presenting their problems, to that governmental body.

•

A special Finance Committee was formed to study the financial status of the Academy, and to present its findings and recommendations to the Executive Council during the Nats period. Basically, the findings of this committee showed that the AMA had been accumulating a deficit, spending more to service the membership than was received from membership fees. By "robbing Peter to pay Paul," a break-even status can be maintained for 1963, although this would be impossible to carry through to the coming year. Recommendations made to the Council necessitated an increase in membership dues for the fiscal year 1964.

The Finance Committee specifically recommended that the membership fees should be increased to $3.00 for Juniors, $4.50 for Seniors, $6.00 for Open. Leader Memberships and Contest Directors to remain at $6.00, due to the fact that these members have always been in the unrealistic position of doing voluntary work for the Academy, yet having to pay more for their membership! This inequity deserves to be removed, particularly since the potential income from an increase involved would not be very great.

The Executive Council voted to accept the Finance Committee's recommendation and the dues increase for 1964. The Academy is well on the way to full recovery and needs only your support to complete the job that a number of dedicated officers have so boldly begun. This is not a time for retrenchment, but rather one of positive action. Your participation in AMA's future was never so needed nor so promising of increased returns. If in doubt, check with your District Vice-President—he will echo our sentiments; the AMA is in good hands and worthy of your continued support and increased investment.

(Continued from page 15)

cal fuselage frames on each side so that a piece of 3/32" plywood will slide between them. Your VariComp board will be 1/4" forward of the position shown on the plans.

A 1" x 3" balsa spacer, the same thickness as the plywood, drops into these slots first (to keep the Vari-Comp board at the right height for a straight run of rubber back to the tail), followed by the Vari-Comp board and the rudder control line tension/direction-changer for the control lines.

The tensioner/direction-changer is mounted on 3/32" balsa. Unless you have some suitable nylon pulleys, take four Perfect #239 blind nuts and remove the sharp tangs (Fig. 2A). One at a time, screw the nuts on a bolt clamped in the vise and file the blind nut until only the flange and about 1/32" of the shaft remains. Do this to all four nuts. Now screw two of them on the bolt, face to face, and get ready to solder. Don't screw them together tight or the pulley will be hard to get off the bolt after soldering. Heat this assembly with the iron and just touch them down the slot with the solder. Avoid an excessive amount of solder in the slot but be certain they will stay together. Remove the pulley from the bolt and make another one from the other two blind nuts. If you are worried about electrical noise, fill the holes with epoxy and drill them out later. Ours work very well with short pieces of 3/32" tubing slipped into each side of the pulley and touched with solder and a warm iron.

Start bending your tensioner from .020" wire, but slip the pulleys on before you get too many bends. Sew the wire to the balsa board and glue as shown. Do not glue the horizontal part or you will lose the torsion bar action. The pulleys should be left free to slide along the wire.

Using .020" wire, bend two control line wire hooks to which the lines will be tied. The shape is unimportant, but be sure they will go into the slots in the comb without binding and that they can be moved from notch to notch with the help of long-nosed pliers when the wing is removed.

Only one more item is needed to finish this part of the installation: the bearing and axle for the Vari-Comp cam follower. Take a piece of 5/32" brass tubing 7/8" long. When you first try, you may think that it will not slide into the hollow Vari-Comp bushing, but it will. You want a tight fit. If you don't succeed, try the other end, or squeeze the tubing a little out of shape and push it in as far as it will go. Take a small scrap of brass, drill a hole in it, and solder to the end of the tubing with the hole centered. Now take a piece of .045" wire 1-1/4" long and solder a 3/16" long piece of 1/8" tubing over the end. The set screw of the comb will tighten on this. Slide this shaft into the VariComp board, add a piece of paper, and solder the cam follower to the other end. If you do not have the right size of wire for the shaft, take one of those big 2" paper clips and use it for the wire for this operation.

Now is a good time to make the changes to the cowling between formers 1 and 3 so that they can be drying. We need two more balsa formers —one which will go right behind former 1 (the firewall), which we will call 1A, and another (2A), which will go right aft of former 2. In order to end up with as large a hatch as possible, former 2 can be moved aft 1/8". Use the top of the plywood firewall as a template to make 1A. 2A is identical to 2, but will be a little easier to install if you make it 1/8" deeper at the bottom. Then notch this unit to fit inside the fuselage sides. With all formers in place, glue the 1/8" sq. strip in the top middle notches, but don't glue to the firewall or bulkhead 3. Scraps of waxed paper will help here .Take pieces of 1/8" sq. balsa and glue between 1A and 2, and also between 2A and 3A on each side just above the fuselage sides. When dry, remove the whole assembly from the fuselage. For covering, you can wet 1/16" sheet balsa, wrap it over the formers, let dry, then glue in place. It is easier and stronger, however, to use two layers of 1/32" sheet laminated together. When you put on the sheet covering, let it extend over the front end of 1A at least 1/8". After the whole cowling is dry, place it back in the fuselage and sand the sheet covering off flush with the front of the firewall. This little overhang will reduce the amount of exhaust residue entering the tank compartment.

Slip a knife blade between formers 2 and 2A and cut through in several places. Turn the cowling over an finish separating the cowling from the portion which will be under the windshield. The cloth hinge should go on the same side as the exhahst port of your engine. Before gluing the hinges, cut out the formers to clear your fuel tank. Even former 3A will have to be altered if the 4 ounce tank is used. Figure 5 is self-explanatory, and will illustrate the tank and cowl installation.

After the bottom of the fuselage is all sheeted, take two pieces of 1/4" wide plywood 1" in length, and using these strips as patterns, rut notches for them in the 1/4" thick balsa right behind the hardwood landing gear mount, at the outer edge of the fuselage. Recess these strips flush with the bottom of the fuselage. These strips will be needed for the time when your landing gear gets knocked loose during a rough landing. During such a time the metal gear usually goes toward the tail and tries to chew up the balsa bottom sheeting. Similar strips to those mentioned above can be placed in front of the hardwood gear support to further reduce possible damage.

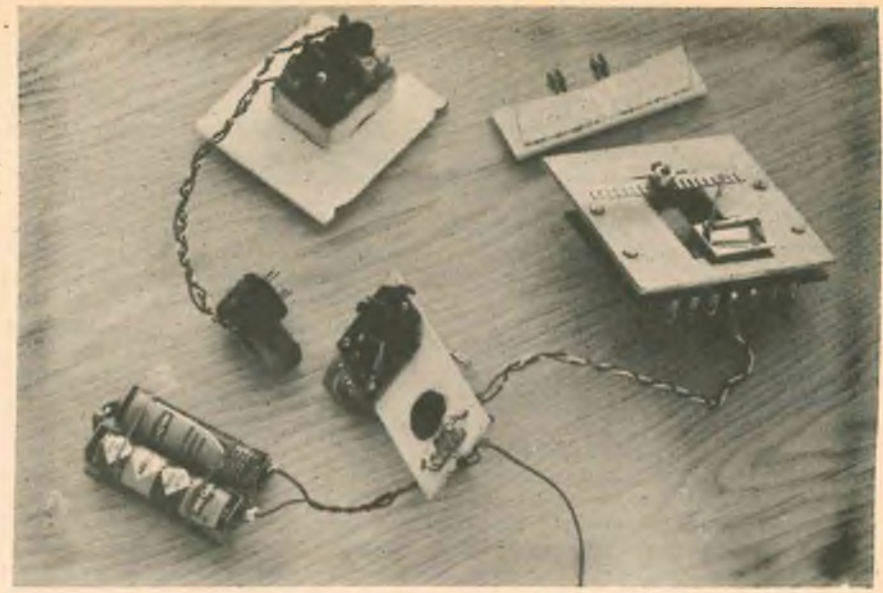
At this point, you can start on the throttle escapement board. (Figs. 6 and 7.) This board holds the SN escapement, the radio plug, and the switch. The tension of the escapement rubber keeps it in place in the notched blocks glued to the inside of the fuselage. The board itself is 1/16" plywood cut to the dimensions shown, with a hole fabricated for the SN and one for whatever plug you may use. The one shown is an Ecktronics 7-pin unit. Install in the board the side of the plug that takes the most room, either male or female. Epoxy glue is good for this operation also. Be sure to leave room for the Otarion microswitch.

Mount the modified Bonner SN in the board with the electrical contacts forward. It may be necessary to bend these contacts to provide adequate clearance for your throttle rod. You will need clearance holes through the firewall, cowling, and bulkhead , for your throttle rod, keeping in mind that some throttles have a little up or down motion when viewed from the front. Find a happy medium for your throttle movement and drill the holes through all formers from 1 through 3. Enlarge the holes in 2A, 3A, and 3 to take a piece of tubing which will slip loosely over your throttle control rod. Glue the tubing in place. Make one bend in the wire (.045") as shown, then slip it in place through the cabin with the throttle escapement board removed. Now replace the board and determine the proper distance for your last bend which will be at the escapement. Once this is completed, obtain a "G", or 3rd string from the electric guitar shop in your neighborhood. This string will have a small brass collar which will be a perfect fit for the pin on your SN. Cut off the end with collar, 1-1/4" over-all including the collar. Solder the end of the guitar string into a 1/2" piece of 3/32" tubing and solder both to the cabin end of your throttle rod. (Fig. 7A.)

Before making the bend at the engine, slide the throttle rod almost all the way out, and while opening your gas tank cowling a little bit at a time, push gently on the rod enough to make a mark in the balsa of former 2. Cut a curved slot following these marks. Do the same thing again for 1A. Your cowling will now open and close with the rod in place.

If you feel particularly lucky, slip a kwik-keeper on the engine end of the rod, close the throttle, move the escapement to the idle position, then mark and make your bend. Didn't come out right? Relax! Just snip the throttle rod inside the gas tank hatch, slip a piece of brass tubing over it and solder. A very slight tension on rod will not keep the SN from working, and will insure that the throttle

(Continued on page 34)



Tried-Squire

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is closed. The vertical part of the throttle rod takes the tension without any trouble. It is the verical part that takes care of the athwartships (sideways) oscillating action of the SN. The flexibility of the piece of guitar string takes care of the slight amount of rocking motion that would otherwise be imparted to the rod, and also lets you lift it off the SN pin for removal of the board from the plane. The little bit of angular movement of the rod up at the engine doesn't do, or hurt, a thing.

Now that you are through hammering and banging around in the front end of the cabin, get out your Otarion micro-switch. Locate and file a slot in the side of the fuselage which will permit passage of the knob and arm of the switch. In mounting the switch on the escapement board, do not put it all the way at the end until you practice getting the board in and out of the fuselage a few times. That is the reason the board is not as wide as the inside of the fuselage. As long as the radio can be turned on and off, the less switch arm sticking out of the side of the fuselage, the better. This way, it is not so likely to be damaged or accidentally left on overnight. Those tiny bolts and nuts are useful in so many other ways that pegs are used for mounting the switch. Place a piece of 1/8" or 5/32" dowel in your drill and hold a flat file on the rotating dowel until it is turned down to about half-size. Remove from the drill and cut the dowel off so as to leave 1/8" or 3/16" of the large part. Make two of these. After you drill two small holes in the motor escapement board to insure a tight fit, these pegs will hold your switch in place. (If you decide to use the standard mounting nuts and bolts, put them in from the bottom and cut out two recesses for them in the balsa board support.) Solder your red wires to the switch. Push the pegs down tight. A drop of glue underneath will hold them in place, but you can still remove them quite easily by twisting, should removal become necessary. From now on you will have to insert the switch end of the board first when putting the escapement mount in the fuselage.

For the fuel tank installation, you can either go for the two ounces or all the way with a four-ounce tank! After all, you don't have to fill it full every flight, but it is there if you want it. For the four-ounce installation, make some thin aluminum straps and "nail" them to the engine bearers with common pins cut off short. Squeeze the tank slightly to get it between the hardwood mounts. For the two-ounce installation, take up the excess space with sponge rubber. The larger tank can be installed later. If you decided on the smaller unit, spot glue a 1/2" thick block to bulkhead 3 between the engine mounts to prevent the tank from sliding aft.

There has been some criticism of the combination tail hook and winding dowel illustrated in Fig. 8. We like it ,and believe you will too. Since you have no torque rod to bother with, it can go anywhere in the tail post, but must be at least 1/4" higher than the dowel shown on the kit plans, so that the VariComp rubber can clear the top of the stabilizer inside the fuselage. Start drilling through the center of the dowel from each end. Sooner or later you'll get through! Run a larger drill through for your winding hook wire. Before you put the wire in the dowel, cut a slot in the end of the dowel that will be outside. Now, insert the hook in the dowel and bend another hook in the other end, about the same diameter as the dowel, or just slightly smaller. If you bend the loop almost closed, the rubber won't be so likely to fall off when it is unwound. The inside hook **must be far enough from the inside end of the dowel** so that you can pull the outside hook clear of the notch you made. Glue it in place in the tail post. To wind the escapement rubber, pull the hook clear of the notch. After winding, make sure the outside loop is seated in the notch—it will never slip. After each flight, pull the loop out of the notch with your fingers, turn slightly, and release. Everyone in the vicinity will look up to see what caused the noise, but the rubber will be unwound in a second and you can't hurt anything.

Meanwhile, back at the control system . . . one of the kibitzers in your work shop will undoubtedly suggest monofilament fishing line for the control cables. It will not run over the

pulleys properly. Instead, get some nylon thread that is hard to break (overcoat button thread will do). Make your cable outlet holes in the top of the fuselage 8" back from the trailing edge of the wing, and about 1/2" to 5/8" from the center on each side of the dorsal n. These will have to be long, trough-like holes, but can be smoothed up with a round Swiss pattern file. Run the thread through these holes and tie a hook on the cabin end of each thread. Put the hook in the comb slot about 1/4" from tthe center of the comb and on each side. Now, take the loose end back to the tail, through the "S" hook on the rudder horn and hold it to the taut part of the thread with a small piece of Scotch tape. Check your Vari-Comp comb to see that it is horizontal, then tighten the screw and adjust the cables until you have a fair bit of tension on them and the rudder is centered. Glue the thread to itself just in front of the rudder-horn "S" hook. Leave the tape in place until the glue is dry, then cut off the excess thread.

You may at some time consider placing the tensioner board below the VariComp to get the control lines down in the bottom of the fuselage. If you do this, you will have to cross the lines inside the fuselage to get proper rudder response, and they will cross just about where the rubber motor goes through. Have you ever tried to get a length of line untangled from a double row of knots? Inside the fuselage?

For best results, start with enough rudder throw to bring the rear edge of the rudder out even with sides of the fuselage. For more rudder, just move both hooks outboard another notch in the comb. Want to adjust neutral? Just loosen the set screw and move the comb in the proper direction, then retighten. Want more left rudder than right? Move the left hook out another notch but leave the right one in position. The tensioner will make up the difference in comb movement and cable run.

How about that electrical wiring? Hardly need to go into it. Three wires come forward from the VariComp. Braid these to make them look a little neater. Use enough wire to go over to the side and then forward. One goes to the SN and another 2" piece from there over to the plug in the board, but mounted underneath where it can't be seen. One of your battery wires goes to the plug in the board and the other through the switch. You can also drill two holes near the switch so these can be hidden beneath the board. Although not recommended practice, one of the pins in the plug was used for the antenna wire and there has been no trouble whatsoever. Since an Otarion 0-21 receiver was used, it was necessary to have a "quick blipper" in the circuit, so this was taped to the radio half of the plug and the wires cut as short as possible before soldering.

For the "piece de resistance," install the Super-Special Spark Saver. It will only take a few minutes. When your engine control escapement is finished and working, mark a spot on the inside right fuselage side about 1/8" under the board and right in the middle of the armature (the moving part of the escapement coil assembly). Force a pin through from inside the fuselage and leave it until you make a push button for our speed changer device.

Put a piece of 3/16" dowel in your electric drill and hold a file or sanding block on it until the diameter is reduced to about 3/32". Take another piece and drill a hole in it that will allow it to fit over the small part you just made. Cut both pieces down to the size shown in the drawing. (Fig. 7.) Remove the pin and drill a hole in the side of the fuselage slightly larger than the smaller part of the dowel you just fabricated. Put the dowel through from the inside and glue the button on the outside. Paint it red! All you have to do now to change engine speed is tap the button. This not only saves transmitter batteries, but saves two sparks from the batteries in the plane. In addition, you can start your engine, throttle it down while you walk over to the end of the runway with the model, then, after a quick check of radio operation, tap full throttle and launch.

Now finish your model according to your own tastes, using butyrate dope and/or epoxy paint for finishing. Install the windshield.

TRIM AND FLYING:

The finished fuselage with all equipment and the stabilizer, but without the wing, should balance at a point 5/8" forward of the balance point shown on the plans. This is why nothing has been said about battery placement up to this point. There are several places they can go, predicated upon the point at which your model may balance. They can be placed in back of the firewall, in front of bulkhead 3, or aft of bulkhead 3 (as shown in the plans). In the latter case, place the receiver above the battery pack and slightly to the left. Another good location is on top of the hardwood landing gear mount and between the dowels on the floor of the cabin, if your model should balance out this way. If you have to put the batteries under the fuel tank, the advantage of having a completely removable control system is lost. Since the model is so light anyway, you may be willing to locate the batteries in the cabin and then ballast the nose to obtain a proper center of gravity location.

If you have more than one model and are over 40, you may find it helpful to count the number of crank handle rotations of your winder that

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The next time you suffer through a visit to the dentist, ask him if he has any old dental picks—they come in handy for probing in tight places. A dentist's mirror is also valuable to the modeler.

Tried-Squire

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it takes to bind up your VariComp so it will not trip by radio command. When determined, back off a few turns, type this number on a scrap of paper, and paste it right above the winding dowel. As your rubber ages and relaxes, the number of turns will always be **at least** this number, and the little reminder will help you to look like you know what you're doing anyway. Do the same thing with the engine rubber winding plug. Change the numbers on both when you change rubber.

Mark the exact center of the wing and fuselage so that the wing will be in the same position for every flight.

With three speeds, you don't need elevator on this model. There is no reason why it can't be incorporated, but it unnecessarily complicates a simple, straightforward, trouble-free model.

If you use a Fox 15 engine, try the Tornado 8-4 prop. Fo rthe OS 15, try a 9-4. If you nick a blade on a rock, don't throw it away — even up both sides and smooth them off. They will work, and you will have fewer problems with engine torque. You'll know when they get too small.

If your engine escapement moves so fast that it skips through the cruise setting, try this: take a 2" piece of plastic bean shooter about 1/4" in diameter and hinge it to swing freely at the top, left side of the cabin, 1-5/8" back of; the escapement board. (Fig. 9). Cut a piece of 1/8" solid solder to a length of 1-3/8". Bend a piece of .021" wire so it will just slip over the escapement pin which has the "G" string collar on it. There should be 1" of wire from the loop to where you will attach it to the solder weight. Touch it with the iron so the weight and wire are rigid. Slip the weight in the plastic tubing and drop the loop over the escapement pin. Use a self-locking 1/2A wheel retainer (Perfect #235) on the pin to keep everything in place. The inertia of the piece of solder sliding in the tube will slow down the rotation of the escapement and permit the armature to catch the middle long leg when going from **high** power to **cruise**.

The pin in the SN escapement is almost 1/4" longer than is needed. With Fuseal around the top edge of the cabin, put your wing on **gently** the first time. If the leg touches the under side of the wing, cut off the pin and file it smooth.

For your first flights, stack two or three pieces of vinyl plastic electrical tape on top of the stablizer at the rear and directly; under the tail post. This will reduce any tendency to stall or zoom in the glide. If, after flying, you think the glide is too steep, take off one layer of tape. On the other hand, if there was any indication of a stall in the glide, add another piece.

If you get zooms on your first flight, key a turn at the **bottom** of the zoom. If it starts zooming again, cut your engine and key another turn at the bottom. This will sometimes save the model until you can get some washers under the back of the engine for added downthrust.

If you have a particularly wild engine, don't key any **right hand** turns with full throttle until you get some altitude. Under full power, certain models get in a tight vertical bank to the right and stay there. This was once known as "graveyard spiral" in these parts. We don't do it anymore. If it should happen to you, don't just stand there — cut the engine! If that doesn't help right away, key left rudder. You may think you have no response at first, but you are, and the model should recover nicely.

For touch-and-go's (and there isn't anything prettier), hit the **high throttle** while the Tri-Squire is still 3 or 4 feet off the ground. It usually takes the engine a second or more to increase the speed from glide to flying, during which the Squire will touch down. If you wait until the wheels are on the ground and rolling, it will take just that much longer to get airborne. And — anything can happen in the interim!

Flying this model may be a new experiences for you, so don't fly until you run out of fuel and have to make a dead-stick landing. Or worse yet, run out of gas just after a touch-and-go with 13 feet of altitude and zero knots airspeed! Bring it in after 5 or 6 minutes and notice how much fuel you had left. After a few flights you will know your praticular gas-gulper and can extend the flights.

With the largest tank, and if you hand-launch, you may experience a momentary sag of engine RPM due to all that fuel sloshing toward the back of the tank. If you hold the nose down while running and launch **smoothly** (letting it fly out of your hand), the model will get away nicely. Don't give it a last minute javelin toss. You will not have the aforementioned trouble when making ROG's, since the accelleration is sm-o-o-th. Be ready to correct any swerves with the box.

A final note which will probably; necessitate my leaving town. First, a fuel filter is a **fuel filter**, right? It is not a suds eliminator. It may do this also, but its primary purpose is keeping dirt out of your carburetor jet. So get the big 35c fuel filter from Sig and (hold your hat!), place it **inside** the fuel tank out of the way. Place it between the weight and the engine delivery tube using two short pieces of fuel hose. This will also help to keep the weight from flipping up into the front of the tank when your model comes to an abrupt halt upon landing. To eliminate bubbles and assist in quick starting, do this: when you have decided you have enough fuel

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Fly-In

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Ted Trevor, member of the Harbor Slope Soaring Society, set a new Society Endurance Record of 2 hours and 53 minutes, using a modified Super Sinbad. An Orbit experimental, all-transistorized receiver was used, driving an Aristo escapement that had 2,320 turns of ⅛"rubber at the launch! Ted had redesigned the Sinbad by adding 1½" to the fuselage, lengthening the wingspan to 70", and employing a "T" tail. A fine record, and on a single channel escapement!

GIZMICKS

Many of the small, single channel transistorized receivers such as the Kraft K3V have a 2N224 for the output to power an escapement. This transistor has a 300 ma, 0.7 volt, emitter to collector drop. If an escapement with a third position is used to energize a motor control escapement, then both escapements are drawing current from the same 2N224 transistor. This 500 or 600 ma drain will not damage the transistor, but with a strong transmitter signal, the emitter to collector voltage drop increases to about 1.2 volts. When the plane is 1000 feet or more away from the transmitter, motor control operation becomes impossible, even though good rudder control is maintained. This is due to the fact that the voltage drop across the output transistor has increased to about 2 volts under the doubled load.

Fig. 1 shows a simple circuit that has been used successfully in 200 flights over a year's period, and eliminates these problems. A second transistor (RCA 2N1304), operates the motor control escapement, reducing the load on the output transistor in the relayless receiver. Although the diagram shows a K3V, Varicomp, and SN, it is not difficult to substitute components. Thanks to **Hank Wehrll** in the ARCS Beep Sheet.

Those of you who want to experiment further along this line might try substituting a 2N670 for the 2N224. This transistor is rated for a collector current of 1 amp at a very low saturation voltage, and may serve to accept the double loading of the two escapements, without the necessity for a second transistor.

Figure 2 is a clever idea from Californian, **Jim Jensen.** Use of a 4 amp Sonotone "D" size NiCad eliminates bulky dry cells and dangling ignition wires. This pocket-sized starter battery is good for a couple of days flying, and can be recharged on a charging unit such as the popular Ace kit. Serves to eliminate that much more bulk to carry with you to the field.

TACH TOPICS

The following notes on tuning the Veco 45, from designer Clarence Lee, have been reprinted in several club papers, including the Windy City Newsletter, NJRCC Printed Circuit, and the MARS Pulse. Due to the extensive use of this mill, many requests have been received to pass on Clarence's suggestions for the benefit of new Veco 45 owners:

"Although many will find this hard to believe, the majority of the idle problems are not with the engine, but lie elsewhere. When an engine dies while taxiing, during a tailspin, etc., the first thing to do is naturally curse the engine. Just as with many crack-ups, it is always the radio, never the knothead at the switches! One of the biggest causes of idle trouble is having the fuel tank too high up in the ship. This is very important and only a few modelers pay attention to this. The tank should have its center line 1/2" below the needle valve, 3/8" being the highest, and 5/8" being the lowest. This is using a Veco 8 ounce clunk tank. If the tank is higher you have too much gravity feed which results in overloading the engine, causing it to spit upon acceleration, and often die completely. Notching the carburetor barrel a little more will help. However, notching leans the idle by reducing the fuel draw, so that the engine is more liable to die in a tail slide or spin. It is much better to lower the tank, which in turn, lessens the gravity feed, rather than have an excessive carburetor notch. This way you will have a higher fuel draw at idle. If you have the tank any lower than 5/8", it will start to affect the top end performance, richening up on dives and inverted flight, etc.

Veco engines are intended to be used with a trike gear setup. If the engine is used in a ship with the conventional two wheel gear, the raising of the nose will lean the idle too much in a majority of cases. This can be corrected by removing metal from the opposite lower edge of the carburetor barrel. This will richen the carb because it is, in effect, unnotching the upper edge. The engine comes from Veco set for general conditions, and cannot be expected to operate perfectly in every installation without a little adjustment. A good way to tell if the carburetor is notched about right is as follows: Stop the engine and drain the tank. Then add 1-1/2 to 2 ounces of fuel. Start the engine and cut to idle, leaving the needle valve unchanged from the full tank condition. Start lowering the tail of the ship.

With the tail on the ground the engine should slowly lean-in and die. Halfway between normal attitude and the ground it should remain running. If it dies as soon as you start lowering the tail it means that it is too lean, and the carburetor barrel should be unnotched as mentioned above. If, on the other hand, it will remain

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idling with the tail on the ground, it is too rich, and the barrel will have to have the top edge notched more. Only remove a few thousandths at a time. After adjusting the carburetor, make sure that the exhaust baffle is still straight up and down. Many modelers overlook this and it is very important. Be sure that you only do this test on a nearly empty tank. You are duplicating conditions at the end of a flight when the idle will be at its leanest.

Many fliers use a surgical tubing that has an inside diameter that is too large. If you were to place a soda straw and an equal length of 1/4" glass tubing in a glass of water and place your finger over the ends, upon lifting from the water it would remain in the straw but drain from the tubing. The same thing happens with too large a fuel line. The fuel runs away from the needle valve during idling, and especially during a tail slide. Use regular black neoprene, both in the tank and from the tank to the engine. Surgical tubing also allows the weight to flip forward and hesitate momentarily, which kills the engine. Regular neoprene will not do this. Use medium size and cut it to just clear the bottom of the tank when held in the vertical position.

The use of a fuel filter right next to the needle valve will also help in some cases. Acts as a small reservoir. The fuel itself must be kept absolutely clean—the most minute particle will kill the engine idle when the fuel draw is practically nil. Many modelers use gallon cans—by the time they get towards the end it contains dirt, rocks, grass, and everything else imaginable. I happen to fly as much as the next guy and am aware of what goes on at the flying field. If the above suggestions are followed, I am sure that many idle problems will be corrected, or at least helped. Veco's glow plug is a little hotter than the K & B, and usually idles a little better. There was a problem with the weld breaking loose in the early models which led fellows to believe they were burning out. This, however, was not the case. The weld problem has been corrected.

One last suggestion wtih regard to tank placement: If your tank is on the high side, try placing 1/8" shims under the engine mounts to raise it up. This is easy to do in an open nose ship like the Taurus. Can't do it if the nose cowls to a spinner ala Stormer."

We can't resist ending up this month's Fly-in section with a classic poem by Patricia Banker, reprinted from the AMPS Newsletter.

MODEL WIFE'S LAMENT

There is balsa on the carpet
And solder on the chair;
There is sawdust on the hi-fi,
And sawdust in my hair.

My lungs are filled with dope fumes
A gas mask I should buy;
The sanding sealer chokes me,
Till I think that I shall die.

He rushes home from work
To see his plane—not me;
I can never sit on his knee
For the airplanes there, not me!

When he takes time out to kiss me
It tastes like Ambroid glue,
But this is very seldom
For he can't kiss me and the airplane too.

After many weeks of labor
The plane is finally done.
He takes it out to Sunset Strip,
I go along to see the fun.

The tank is full, the engine primed,
He prays that it will fly.
He starts the engine, lets it go—
It flies—with pride I cry.

It loops, it dives, it dives, it dives,
I'm sure there's something stuck.
It hits the ground, the pieces fly,
Damn, what rotten luck.

The wing is here, the engine there,
and then the trouble's found;
He forgot to turn some switch on
Before it left the ground!

He picks up all the pieces
And in the car they go;
He stops to buy another kit,
Then home we go, in woe.

So then he starts all over,
With the balsa, dope, and glue.
I often think, would he put up,
With what I, a Model Wife do?

Showcase '63

(Continued from page 27)

gear, canopy, and many prefab parts. All accessories are included. 62" span, 5¾ lbs. for .45. Six channels to proportional. $34.95.

The **Hobby House Plans Service,** 12112 Ballantine Drive, Rossmoor, Calif., is stocking plans from all over the world, including some of the finest competition and scale RC designs. Send a 4c stamp for the latest list. Add 50c and you will receive a new listing each month for a year. Top British, German, and American designs, as well as from other countries.

The two 4 amp-hour **Sonotone "D" size NiCads** were obtained direct from Sonotone for use in a Marcy PRM-1 single channel proportional system. Four were used to drive a power converter for the transmitter. These large NiCads list for $8 each, but are well worth the price. Another use can be found in the Fly-In section of this issue—they make an excellent pocket-size, rechargeable starting battery!

Tensor Electrical Development Co., has an excellent sub-miniature lamp with numerous applications in the model field. Originally developed for missile work by military electronics engineers, these brilliant, high-intensity, glare-free lights are compact, fold-a-way units. Their sub-miniature unit, **Model 5979,** is the smallest reading lamp in the world, and designed for use where space is at a premium. 80 ft. candle intensity at 6". Arm and reflector each swivel 180 degrees and the arm extends to 10". Folds to a minute size of 6½" x 2" x 3½". Weighted magnetic base. $11.95 from **Canoga Electronics Corp.,** 15330 Oxnard Street, Van Nuys, California.

Digicon is an entirely new concept in the field of proportional control. Designed and manufactured by **Digital Control Sysems Co.,** this system is intended to eliminate the problems associated with earlier proportional equipment. Four independent, simulaneous fully proportional functions are provided. Receiver is a transistorized superhet furnished on any one of the available frequencies. The transmitter is an all transistorized unit delivering a full quarter-watt output. Two control sticks are used, both of which are self centering. All controls are trimmable by means of individual trim levers. Total airborne weight, 32 ounces. $495.00. Watch for a complete review in a forthcoming article on proportional systems.

1963 Internat's

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him because these crazy French trains are composed of individual self-contained driven units. Passage between cars is just not possible. But, at last, we were on our way to Brussels, as a team, and the mishaps were over.

Or so we thought. Just outside of Brussels the train made a stop, a sign indicating that this was an outer station. A few minutes later we were on our way and subsequently arrived at our destination. We rushed out to meet Ralph, and to our astonishment the car that Ralph had been in was gone. No Ralph.

Fortunately, our level-headed team captain Bob Dunham had made previous arrangements to meet at the Belgium Aero Club if there was a mix-up. So, obtaining a taxi, we proceeded to the Club. No arrangements had been made for the transportation of our models to the contest site in Genk. At the Aero Club we started checking on the best way to get ourselves and the boxes to Genk, which was a distance of some sixty miles.

During the confusion we met the Canadian RC team who was confronted with the same problem. (At least they didn't have a lost Ralph!) We finally conceived the idea of renting a van to carry both teams equipment, and ended up with a rented sightseeing bus and driver for $50. Now we not only had the transportation problem worked out, but we had a guided tour from Brussels to Genk.

And still no word from Ralph. The next stop was the airport where we picked up our model boxes from the customs officials. The bus was loaded with some difficulty—it just wasn't

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made for hauling six boxes 6' x 2' x 3" at 100 pounds a piece plus the two teams.

At the airport we finally received a phone call from Ralph. What he had done was to get off at the wrong station, and not having seen us, assumed that we had missed the train. Therefore, our soon-to-be World Champion had dutifully met every morning train from Paris! He informed us that he would come right out to the airport in a rented car. We waited for two hours and still no Ralph. Since the bus driver was getting fed up with the delay and muttering veiled foreign threats, we had to get on with the trip to Genk. Without Ralph.

Somehow we survived the trip — I think the driver assumed he was driving a sports car instead of a bus! *After* the hard work of unloading the equipment was over, one Ralph Brook arrived, safe and sound. He had gotten lost—on the way to the airport!

The first of many problems that faced us at Genk was the flying site. The flight circle was a 100 metre paved circle with a crown of approximately 5 feet! This meant you couldn't even see the other side from where you were flying! In addition, there were large rocks surrounding the paved area. The terrain beyond this was extremely rough. The end result was total disaster if you missed the landing area! As it turned out, however, there were only a few mishaps due to the flying site.

Since we had arrived two days before the official opening of the meet, lodging turned out to be a real problem. Ralph and Mrs. Brook found a place not far from Genk. The rest of us were farmed out to a coal miners camp hotel. The place was clean, but that was the sum total of its dubious attributes. There was no heat, no water, no bath, and only one wall socket for charging nicads! When we finally got to bed the first night, a couple of Turks from the coal mines stormed into our rooms thinking it was theirs. With some luck on our side we just barely got out of that situation!

Tuesday was going to be a serious, though unofficial, practice session for us. The weather didn't agree. It was raining and windy. The rain did stop in the afternoon and we managed one flight apiece. The only thing accomplished was to determine if everything worked.

Wednesday we were faced with the same inclement weather. Maybe worse. Practice flying wasn't beneficial in the least. Registration began in the afternoon. With the contest activities underway, we looked forward with eagerness to our official, and improved, lodging accommodations. When we found the new hotel it turned out to be an unfinished dormitory for a technical institute! Needless to say, we were not impressed. After checking around we found a suitable hotel in Holland, which was a half hour distant. Now we had to rent a car in order to get around!

Thursday was the official practice day. Each team was allotted ten minutes per man. Our schedule time was 4:00 to 4:30. When our turn arrived, the weather seemed to be on our side. We were ready to show the people of Europe how everything is supposed to be done. I was scheduled to fly first, and started cranking the engine. Nothing. Then Ed Kazmirski tried his. Again, nothing. Ralph tried his. Still nothing. All eyes were on the Great American Team frantically trying to start their motors while Coach Dunham ran back and forth giving bits of advice. There wasn't a sound anywhere for fifteen minutes—except the dull thud of props being cranked. Boy! Were we impressive! Finally we realized that our Ni-Cad booster battery just didn't have enough voltage for cold weather starts. A hotter battery was obtained, and the G.A.T. was underway!

Both Ralph and I had to decide which plane to fly, both of us having a reserve model. Ralph chose his fibreglass fuselage job because of its good wind penetration qualities. I chose my Cumulus, having encountered some difficulty with the stall turns on the Safari. Ed was flying his old reliable Taurus which he had at the 1962 Nationals.

Friday marked the start of the competition. Due to the uncertainty of the weather conditions, and with rain possible at any time, I was to fly the first rounds. If there was rain my glasses would get wet and I would be shot down! On my own first flight everything looked good until the conclusion of the 3rd outside loop when my engine stopped dead. Later, I found that I had some large dirt particles in the tank which subsequently blocked the fuel pickup.

Ed flew in the next round. His flight was hampered by a rich needle valve setting. The wind velocity had increased some, too. The flight was, however, excellent considering the engine and wind conditions.

Ralph's flight in the 3d round was made in a strong wind. He did an ex-

cellent job of putting his ship through the maneuvers—so well, in fact, that the judges gave him the highest score for the day.

Saturday and I was first to fly again. To my way of thinking, the flight was sub-par. There was a rich engine condition plus the usual gusty winds. The flight was completed and the points would help the overall team standing.

Ed was still having needle valve trouble on his second flight, but it turned out to be an excellent job, point-wise. His chances at the World Championship were not too high, however.

Ralph put in another good flight in the second round—not as good as Friday's flight, but still second highest of the day. The Doctor looked good for the Championship.

On Sunday, yours truly finally managed a decent flight. The points from this one put us over the top for the Team victory. Half the battle was over. Now all we had to do was to get Ralph on top for the title.

Ralph looked good in the third round of the battle—his only difficulty was in losing the spin. Ed put his Taurus through the pattern without any problems, and despite the weather, for his best flight of the meet.

The only person still left to fly who could jeopardize Ralph's lead was Bosch of Germany. Throughout the meet he had done an excellent job of flying. If he put in a good flight in the third round there would have to be a flyoff for the World cup. When his turn arrived, the excitement at the 3rd World Championships was at its peak. It was a do-or-die effort for Bosch. His flight was excellent—almost flawless. As a result he received the highest single flight score of the entire contest. His best two flight total score was under the 2% maximum point lead as required by the FAI rules, however, and a flyoff was now called between Ralph and Bosch.

And now the excitement was feverish! The flyoff commenced at the end of the third round. Ralph and Bosch flipped a coin to see who would fly first. Ralph lost the toss and Bosch elected to fly second.

Proving he is a real competitive flier, working well under extreme pressures, Ralph put in his best flight of the contest. It was precision of the highest quality. Bosch started his flight, and it too was excellent. Both flights were close, but when the results were announced that evening at the award presentations, Dr. Ralph Brook of Seattle Washington, won the flyoff by a good margin and was the new Multi Radio Control Champion of the World! In addition, at the same award banquet, the U.S. took almost everything they had to offer. Ed Kazmirski even won the Concours D'Elegance with his Taurus.

Summing up the contest is easy. The quality of flying and the sportsmanship was the highest I have ever seen. I believe that everyone that entered could do the entire pattern well. The South African and Canadian team did a tremendous job—and they had to pay all of their own expenses over!

In my opinion, Bosch of Germany was the single most outstanding flyer. His shouder wing ship flew as if were on rails—smooth and fast. He was using the Telecont filter system, allowing him to send extremely fast short pulses which made the model fly quite smoothly. His only problem seemed to be outside loops. The corrections required in the outside maneuvers seemed to be quite critical.

Ralph's ship was quite unique in construction, and different from most model designs. The fuselage is of fibreglass construction, round in shape and nicely proportioned. The design and molds were by Bob Kirn. The wing is also different, being of all sheet covered, egg-crate geodetic type construction that is assembled on an elaborate set of jigs and finished with a special built drum-sander that is capable of sanding the sheeting to the exact airfoil to a tolerance in thousandths of inches. Full span ailerons were used. The empennage was of conventional design and construction.

The radio equipment used by both Ralph and myself was the new Orbit Proportional. This system performed excellently throughout the contest. Veco 45's were the power plants and Veco #1 was the fuel used by all of us.

The most popular design at the Internat's was the Taurus. I would estimate that at least two-thirds of the models flown were Taurus's, and most of them built from Top-Flite kits. Orbit equipment was used by over half of the contestants, just as it was at the Nationals. Bonner servos filled most of the actuator needs. All kinds of engines were in use with a predominance of Super Tigre 56's.

In conclusion, I would like to interject something here about the help the American GI's gave us during the Internats—Sgt. Stals, Captain Ebby, Captain Morris, and many others really helped us with our many problems, and was a major factor in the team doing as well at it did.

This exclusive coverage for RC Modeler was started on the French Riviera. We are now in Venice, Italy.The new style gondolas are speed boats powered by Chrysler engines. Those things really move out! And the girls...

Well, the 1963 Internats are over. It's been a ball. I would recommend radio control as a hobby to anyone. The possibilities are unlimited!

Flyer RIC Club City, State	Age	Yrs. in Modeling	Yrs. in RC	Event Place	Plane	Span Area	Weight Lbs.-Oz.	Finish	Control System	Receiver	Transmitter	Freq.	Engine Prop	Fuel	Notes
Hallock, Meade E. Fresno Radio Modelers Clovis, California	33	25	3	C11	Nova	58 452	4-2	Butyrate	RM Bonner servos	F&M	F&M	27, 145	ST 23 TF 9/4	KB 100	Own design
Hanks, Bill LARKS Long Beach, Calif.	15	3	1	C11Jr	Falcon	56 558	3-12	Butyrate	RM Annco servos	Deans	Deans	27, 195	OS 19 RU 9/4	KB HiLo	
Hayes, Charles Bakersfield, Calif.	31	17	5	C13	Original	650	5-3	Butyrate	REMAT Space Control	Space Control	Space Control	27, 095	KB 45 Torn 11/6	KB HiLo	'59 RO winner
Hazelton, Luther Arizona RC Society Flagstaff, Arizona	35	8	5	C13	Hustler Delta	880	4-8	Butyrate	EA Space Control	Space Control	Space Control	27, 145	Veco 19 Torn 9/5	KB 1000	
Heise, R. D. EBRC Alameda, Calif.	45	36	8	C13	Apollo	60 800	7-8	Butyrate	REMA Space Control	Space Control	Space Control	26, 995	Merco 49 Torn 11/6	Blue Blazer	
Henrickson, Ted Seattle, Washington	34			C13	Whistler					Orbit	Orbit	27, 145			
Hertzog, Doug Long Beach, Calif.	14			C11Jr 3rd	Aero Dynamic	450	2-12	Butyrate	RM VariComp	Orbit	Orbit	26, 995	Fox 15 TF 8/4	KB 100	
Hester, Maxey Des Moines Modelaires Des Moines, Iowa	38	28	10	Scale 1st	P63 Kingcobra	71 844	10-8	Butyrate	REMAT Bonner servos	Orbit	Orbit	27, 045	Fox 59 TF 13/5.5	Own	Scale surfaces, moments.
Hester, Maxey Des Moines Modelaires Des Moines, Iowa	38	28	10	C13 4th	Taurus	68 690	6-3	Butyrate	REMAT Bonner servos	Orbit	Orbit	27, 045	Veco 45 TF 11/6	Own	
Hill, Maynard L. DCRC Silver Spring, Md.	37	27	15	C13	Merrylander	66 720	6-8		REMATF Sampey	Sampey Proportional	Sampey Proportional	53, 0	Merco 49 Torn 12/5	KB 100	
Hoover, C. G. LARKS Albuquerque, N. M.	16	10	10	C13	Taurus	70 720	7-8	Butyrate	REMAT Bonner servos	F&M	F&M	27, 145	Merco 49	KB 100	
Horn, Richard LARKS	15	4	1	C12	Tauri	57 530	4-8	Butyrate	REMT Bonner servos	Orbit	Orbit	27, 145	Veco 35 RU 10/6	KB 100	

Flyer RIC Club City, State	Age	Yrs. in Modelling	Yrs. in RC	Event Place	Plane	Span Area	Weight Lbs.-Oz.	Finish	Control System	Receiver	Transmitter	Freq.	Engine Prop	Fuel	Notes
Hunt, William E. Wavemasters San Jose, California	47	2	2	C11	White Cloud	55 550	4-0	Epoxy	RM Babcock esc.	Citizenship	F&M	27.195	OS 19 Grish 9/4	Piston Power	
Husak, Victor J. RC Club of Chicago Chicago, Illinois	39	25	5	C13	Altair	73 720	6-2	Acrylic lacquer	REMAT Bonner servos	Bramco	Bramco	53.0	Veco 45 TF 11/6	Own	Magnificent finish
Izzo, Edward R. ARCS Syracuse, N. Y.	40	32	6	C13	Sabre Hawk	68 720	6-8	Butyrate	REMATF Bonner servos	Orbit	Orbit	27.095	Veco 45 Torn 11/6	Neotane	2 servos on ailerons.
Jackson, Ralph Aero Guidance Soc. Endicott, N. Y.	40	28	17	C12 1st	Stark Shark	60 720	5-4	Butyrate	REM ACL prop.	ACL Proportional	ACL Proportional	27.145	ST 46 Torn 11/6	Neotane	R. C. Allen design.
Jackson, Ralph Aero Guidance Soc. Endicott, N. Y.	40	28	17	Scale	B-24	70	8-0	Butyrate	REMA ACL prop.	ACL Proportional	ACL Proportional	27.145	(4) Fox 15 (4) Torn 3-blade 7/6	Neotane	
Jenkins, Thomas E. Great Falls, Montana	31	7	7	C13	Orion	68 690	6-4	Butyrate	REMAT Bonner servos	Orbit	Orbit	27.095	KB 45 TF 11/6	Testors	
Jensen, Jeffry Armstrong RC Armstrong, Iowa	15	1	1	C13	Taurus	68 670	5-10	Butyrate	REMAT Bonner servos	F&M	F&M	27.095	Veco 45 TF 11/5	KB 100	
Jensen, Laurence P. Armstrong RC Armstrong, Iowa	40	8	6	C13	Taurus	68 670	5-10	Butyrate	REMAT Bonner servos	Orbit	Orbit	27.095	Veco 45 TF 11/5	KB 100	
Johannes, Robert O. Airfoilers Escondido, Calif.	34	12	5	C13	Stormer	68 796	7-8	Butyrate	REMAT Bonner prop.	Digicon Proportional	Digicon Proportional	26.995	Veco 45 TF 11/6	KB 100	
Katagiri, Dave T. RAMS Seattle, Washington	38	20	2	C11 4th	Zue	56 590	5-0	Butyrate	RM Bonners ervos	Orbit	Orbit	27.145	OS 29 Torn 11/6	KB 100	Modified
Kelly, Robert J. Mile Hi RC Club Denver, Colorado	13	7	2	C13	Taurus	68 670	6-0	Butyrate	REMAT Bonner servos	Orbit	Orbit	27.095	Veco 45 RU 11/6	KB 100	
Kempton, William Puyallup, Washington	31	15	5	Pylon	T2 Delta	630	2-6	Butyrate	EM Bonner servos	Orbit	Orbit	27.045	Cox 15 Power 8/6	KB 1000	
Kempton, William Puyallup, Washington	31	15	5	C13	Original	64 760	6-0	Butyrate	REMAT Bonner servos	Orbit	Orbit	27.045	KB 45 Power 11/6	KB HiLo	
Kern, Robert L. Stardusters Portland, Oregon	39	29	3	C12	Glass Bat	68 640	5-1	Epoxy	REMT Bonner servos	Orbit	Orbit	27.095	Veco 45 TF 11/6	Own	
King, Laor H. BIRDS Long Beach, Calif.	54	12	5	C12	Tri-Squire	51	4-4	Butyrate	REM Bonner servos	Min-X	Min-X	27.095	KB 19 Torn 10/4	KB 100 KB HiLo	
Kirkland, Jim Guided Mites Valpraiso, Florida	38	26	9	C13 1st	Beachcomber	66 792	6-4	Butyrate	REMAT Sampey prop.	Sampey Proportional	Sampey Proportional	53.0	OS 49 TF 11/6	KB 100	Own design
Kline, Al S. Illinois Valley RC St. Charles, Illinois	31	15	10	C13	Taurus	70 720	6-12	Acrylic lacquer	REMAT Bonnerprop	Klinetronics Proportional	Klinetronics Proportional	27.195	Veco 45 RU 11/6	KB 100	
Kraft, Phil Monterey Park, Calif.	37	30	15	C13	Original	72 900	7-8	Butyrate	REMA Bonner prop.	Kraft Proportional	Kraft Proportional	52.170	ST 56 TF 12/6	KB 100	
Lee, Clarence LARKS Tujunga, Calif.	39	32	4	C13	Taurus	70 720	5-12	Butyrate	REMAT Bonner servos	Orbit	Orbit	27.095	Lee 45 TF 11/6	Veco	Inc. surfaces; sym. stab.

Flyer RIC Club City, State	Age	Yrs. in Modeling	Yrs. in RC	Event Place	Plane	Span Area	Weight Lbs.-Oz.	Finish	Control System	Receiver	Transmitter	Freq.	Engine Prop	Fuel	Notes
Lind, Eldon J. Long Beach, Calif.	38			C13	P63 Kingcobra					Orbit	Orbit	27.195	Merco 49		
Lomax, Graham DRCC Newark, Delaware	36	25	10	C13	Graham Cracker	70 720	7-0	Epoxy	REMAT Bellamatics	Quadruplex Proportional	Quadruplex Proportional	52.0	Fox 59 Torn 12/6	Missile Mist	Taurus wing.
Loughridge, Don H. Jr. SRAC Seattle, Washington	40	30	8	C13	Tauri	57 533	5-10	Butyrate	REMAT Bonner servos	Orbit	Orbit	26.995	KB 45 Grish 9/6	KB 100	
Love, Clifford D. EBRC Berkeley, Calif.	45	10	3	C13	Beatnik	66 760	6-8	Butyrate	REMAT Bonner servos				Veco 45 11/6	Blue Blazer	
Lowe, Donald T. WORKS Dayton, Ohio	38	32	11	C13	Sabre	720	6-8	Epoxy	REMAT Bonner servos	Controlaire	Controlaire	27.145	ST 46 Torn 11/6	KB 100	Original
Malherbe, Monte LARKS Pretoria, So. Africa				C13	Sultan	70 820			REMA Space Control	Space Control	Space Control		Veco 45		
Martin, Joseph FBRC Livermore, Calif.	28	7	7	Scale	XB47D	78 760	12-4	Butyrate	REMAT Bonner prop.	Digicon Proportional	Digicon Proportional	27.195	(2) KB 45 Grish 11/6	KB HiLo	Beautiful scale.
McCabe, Dave BIRDS Long Beach, Calif.	15	3	2	C11Jr	Original	49	3-0	Butyrate	RM VariComp	Orbit	Orbit	26.995	OS 15 Torn 9/4	KB 100	
McCracken, Roger Downey, California	16	8	4	C11	Esquire	50 500	4-4	Epoxy	RM Bonner servos	Orbit	Orbit	26.995	McCoy 35 TF 10/6	KB 100	
McCullough, Claude Des Moines Modelaires Ottumwa, Iowa	41	33	17	Scale	C125 Raider	87 1180	14-8	Butyrate	REMAT Bonner servos	Min-X	Min-X	27.045	Fox 59 (2) ST 23 TF props	Own	Rare tri-motor.
McGee, A. Randy Oklahoma City, Okla.	36			C13	Taurus	70 720				F&M	F&M	53.0	Veco 45		
McGuire, R. L. Lancaster, Calif.	41			C13	Taurus	70 720				Controlaire	Controlaire	27.145	Veco 45		
Morgan, Harrison New England RCM Suncook, N. H.		27	7	C11 2nd	Super Cub	56 580	4-0	Butyrate	RM VariComp	Mac-Tone	Own	52.5	Fox 25 Torn 9/4	Fox	Mod LW Cub.
Munn, Robert H. San Diego Drones Chula Vista, Calif.	36	25	9	C12	Wasp	57 600	5-12	Butyrate	REMT Bonner servos	Orbit	Orbit	27.045	Johnson 36 RU 11/4	KB 100	Own design
Murphy, William J. LARKS Redondo Beach, Cal.	33	25	10	Scale	F4U4 Corsair	62 744	8-12	Butyrate	REMAT Bonner servos	Orbit	Orbit	27.195	ST 60 Y&O 12/7	KB 100 Powermist	Monogram plastic eng. for scale.
Noll, Bob Endicott, N. Y.	26			C13	Orion	71 744			REMAT			27.095	Merco 49		
Oliver, H. G. No-Bodys El Paso, Texas	40	30	10	C13	Taurus	70 720	6-4	Epoxy	REMAT Bonner servos	F&M	F&M	52.852	KB 45 Y&O 11/6	KB 100	
Parker, Jack G. El Paso, Texas	28	5	3	C11	Original	48 480	3-11	Butyrate	RM Du-Ac	Kraft	Own	51.160	McCoy 19 TF 9/4	KB 100	
Parker, Kenneth R. Sunset, Utah	34	15	4	C11	Falcon	56 560	3-12	Butyrate	RM Babcock esc.	Ecktronics	CG	27.255	ST 19 RU 9/4	KB 100	
Peterson, Harold R. Long Beach, Calif.	39			Scale	Boeing 707					Orbit	Orbit	27.045	Veco 45		

Flyer RIC Club City, State	Age	Yrs. in Model	Yrs. in RC	Event Place	Plane	Span Area	Weight Lbs.-Oz.	Finish	Control System	Receiver	Transmitter	Freq.	Engine Prop	Fuel	Notes
Prime, Bill Los Angeles, Calif.	32			C13	Stormer	72 720				Orbit	Orbit	27.195	Veco 45		
Proctor, Lou DRONES San Diego, Calif.	53	40	4	C13	Antic	84	8-8	Butyrate	REMAT Bonner servos	Orbit	Orbit	26.995	Morton M5 Own 16/8	Gas & Oil	
Prull, Dean LARKS Inglewood, Calif.	25	6	6	C11 5th	LW Cruiser	65 775	4-8	Butyrate	RM Bonner servos	Orbit	Orbit	26.995	KB 45 TF 11/6	KB 100	
Pullen, Jerry LARKS Sun Valley, Calif.	35	10	10	C13	Stormer	72 720	7-0	Butyrate	REMA Bonner prop.	Kraft Proportional	Kraft Proportional	52.217	Lee 45 TF 11/6	KB 100	
Rambo, Nate LARKS Camarillo, Calif.	33	23	15	C13	Candy	71 840	7-2	Butyrate	REMA Bonner prop.	Kraft Proportional	Kraft Proportional	53.4	Lee 45 TF 11/6	KB 100	
Rehling, Richard Costa Mesa, Calif.	34			C13	Original				REMAT Space Control	Space Control	Space Control	27.145	ST 56		
Rigg, Dick Costa Mesa, Calif.	33			C13	Kawasaki Tony		7-2			Orbit	Orbit	53.5	Merco 49		
Rigg, Dick Costa Mesa, Calif.	33			C13	Original				REMAT Space Control	Space Control	Space Control	27.195			
Ritchie, Charles A. LARKS Westminster, Cal.	13	3	1	C12	Rainbow	56	4-8	Butyrate	REMT Space Control	Space Control	Space Control	26.995	KB 45 Torn 9/6 3-blade	KB 100	
Ritchie, Zel LARKS Westminster, Cal.	34	20	6	C13 2nd	Phantom	63 800	7-8	Butyrate	REMAT Space Control	Space Control	Space Control	26.995	Fox 59 Torn 12/6	KB 100	
Ritchie, Zel LARKS Westminster, Cal.	34	20	6	Pylon 1st	Delta	30 630	2-12	Butyrate	EA Space Control	Space Control	Space Control	26.995	Fox 59 TF 8/6	KB 1000	Time: 1:10:4
Ritter, Howard F. RC Club of Kalamazoo Gobles, Michigan	39	30	2	C11	Tri-Squire	52 522	4-0	Butyrate	RM VariComp	Min-X	Min-X	27.145	KB 19 Torn 10/4	KB 100	
Ritter, Michael A. RC Club of Kalamazoo Gobles, Michigan	13	8	2	C11Jr 5th	Tri-Cloud	52 522	4-0	Butyrate	RM VariComp	Min-X	Min-X	27.145	KB 19 Torn 9/4	KB 100	White Cloud and Tri Squire mod.
Ritter, Paul RC Club of Kalamazoo Gobles, Michigan	16	10	2	C11	Tri Squire	52 522	3-12	Butyrate	RM VariComp	Min-X	Min-X	27.145	KB 19 Torn	KB 100	Mod kit.
Root, Dale W. East Bay RC Oakland, Calif.	40	34	9	C13	Root-Tang III	66 790	6-0	Butyrate	REMAT Bonner servos	Orbit	Orbit	52.5	KB 45 Torn 11/6	KB 100	
Roth, John E. Flying Bisons Tonawanda, N. Y.	34	8	5	C13	Interceptor	68 750	6-8	Butyrate	REMATF Space Control	Space Control	Space Control	27.195	Merco 49 TF 11/6	KB 100	DeBolt design.
Sager, Lloyd RCLOC-LARKS Riverside, Calif.	34	8	8	C13	Astro-Hog	66 790	7-4	Butyrate	REMAT Bonner servos	Orbit	Orbit	27.045	KB 45 TF 11/6	Own	Flew in '59 Nats, over 700 flights.
Schroder, John WRAM Bedford, N. Y.	16	4	3	C11Jr 1st	Tri-Squire	440	3-3	Butyrate	RM Anneo servos	C&S	C&S	26.995	OS 19 Torn 9/4	KB 100	Shortened wing.

Flyer RIC Club City, State	Age	Yrs. in Modeling	Yrs. in RC	Event Place	Plane	Span Area	Weight Lbs.-Oz.	Finish	Control System	Receiver	Transmitter	Freq.	Engine Prop	Fuel	Notes
Scott, Charles B. DCRC-NVRC-FARC Annandale, Virginia	36	27	10	Pylon	Hustler Delta	36 582	2-6	Butyrate	EA Bonner servos	Own	Own	51.0	Cox 15 Torn 8/6	Cox	Modified
Sharp, Roger Valley Flyers Pacific Palisades, Cal.	15	4	3	C13	Taurus	70 720	6-4	Butyrate	REMAT Bonner servos	CG	CG	27.145	Veco 45 11/6	KB 100	
Sing, George Jr. ARCS Glendale, Arizona	40	22	3	C13 Pylon	Original	68 816	6-8	Butyrate	REMAT Bonner servos	Orbit	Orbit	27.195	Veco 45 RU 11/6	KB 100	
Sizemore, Romayne TORKS Oklahoma City, Okla.	32	6	6	C13 Pylon	Taurus	70 720	6-2	Butyrate	REMAT Bonner servos	F&M	F&M	27.095	Veco 45 TF 11/6	KB 100	
Smith, C. B. Long Beach, California	49			C11	Charger				RM	Orbit	Orbit		KB 19		
Smith, Steven Long Beach, California	13			C11Jr	Tri-Squire	52 522			RM	Orbit	Orbit	26.995			
Smith, Willie Valley Flyers Canoga Park, Calif.	46	4	4	C13	Torero	64 832	7-4	Butyrate	REMATF Bonner prop.	Digicon Proportional	Digicon Proportional	27.195	Veco 45 TF 11/6	KB 100	
Spillicke, Harold L. Inglewood, Calif.	54			C13	Orion				REMAT Bonner servos	Orbit	Orbit	27.095	KB 45		Mod. Orion
Spreng, Douglas C. Valley Flyers No. Hollywood, Cal.	31	12	10	C13	Torero	70 910	7-4	Butyrate	REMAT Bonner prop.	Digicon Proportional	Digicon Proportional	26.995	Veco 45 TF 11/6	KB 100	
Staff, Walter Utah State Aeromodelers Salt Lake City, Utah	46	28	4	C11	Falcon	56 558	3-4	Butyrate	RM Bonner servos	Orbit	Orbit	27.045	Veco 19 TF 9/4	KB 100	
Stafford, J. P. LARKS Culver City, Calif.	30	20	7	C13	Miss Behaving	74 900	7-0	Butyrate	REMA Bonner prop.	Kraft Proportional	Kraft Proportional	27.195	Merco 49 RU 11/6	KB 100 KB HiLo	Kitted by Stafford.
Stevens, Jim EBRC Oakland, Calif.	32	4	4	C13	Apollo	64 830	7-0	Butyrate	REMATF Bonner servos	Orbit	Orbit	27.145	Veco 45 Torn 11/6	KB 100	
Storey, Keith FAST Los Angeles, Calif.	37	29	16	Pylon 3rd	Gold Rush III	62 785	4-10	Butyrate	REAT Bonner servos	Orbit	Orbit	53.5	McCoy 19 RU 9/4	KB 1000	
Sump, Donald Sheridan, Wyoming	60			C11	Original					Min-X	Min-X		Veco 35		
Tompkins, Fred Torrance, Calif.	43			C13	Stormer	68 796			REMAT Bonner servos	Orbit	Orbit	27.095	Fox 59		
Tregellas, Loren WRCC Wichita, Kansas	28	20	4	C13	Taurus	70 720	6-4	Butyrate	REMAT Bonner servos	Orbit	Orbit	27.195	Veco 45 TF 11/6	KB 100	Mod. kit.
Usher, Darryl G. Portland Stardusters Portland, Oregon	28	20	10	C13 3rd	F9	68 700	7-0	Butyrate	REMAT Bonner servos	Orbit	Orbit	27.095	ST 56 Torn 12/6	KB 100	Own design.
Van Beek, Ronald H. Chicago, Illinois	29	10	3	C13	Original	75 700	6-0	Butyrate	REMA Annco servos	Orbit	Orbit	27.145	Veco 45 TF 11/6	Own	
Van Court, Carl P. LARKS Canoga Park, Calif.	51	40	17	C12 C13	CF102 Delta	42 960	6-12	Butyrate	REMT Space Control	Space Control	Space Control	53.3	Veco 45 Elf Quad Torn 10/6P	Own	

Flyer RIC Club City, State	Age	Yrs. in Modelling	Yrs. in RC	Event Place	Plane	Span Area	Weight Lbs.-Oz.	Finish	Control System	Receiver	Transmitter	Freq.	Engine Prop	Fuel	Notes
Vidmar, Frank CRC Euclid, Ohio	49	20	15	C13	Push-Pull	72 763	8-0	Butyrate	REMAT Bonner servos	Bramco	Bramco	53.0	KB 45 (2) Grish	Testor 39	Own tractor-pusher design.
Von Adelung, Edward EBRC Berkeley, Calif.	67	15	10	C13	Navaho	66 740	6-8		REMAT Bonner servos	Orbit	Orbit		Veco 45	KB	
Vomannen, Robert O. Escondido, California	32			C13	Stormer	68 796			REMA Bonner servos			26.995	Veco 45		
Weigardt, Dave Portland Stardusters Portland, Oregon	41	25	10	C13	Original	60 660	6-4	Butyrate	REMAT Bonner servos	Orbit	Orbit	27.145	Veco 45 RU 11/6	Own	
Weirick, Clifford LARKS Point Mugu, Calif.	35	30	11	Pylon 4th	Hustler Delta	34 768	4-0	Butyrate	EA (elevons) Bonner prop.	Kraft Proportional	Kraft Proportional	52.217	Veco 19 RU 8/6	Veco #2	Mod. kit.
Weirick, Clifford LARKS Point Mugu, Calif.	35	30	11	C13	Candy	64 768	6-8	Butyrate	REMAT Bonner prop.	Kraft Proportional	Kraft Proportional	52.217	Lee 45 RU 11/6	KB 100	Own design.
White, Theodore Albuquerque, N. M.	26	18	2	C13	Giddledooper	68	6-3	Butyrate	REMAT Bonner servos	F&M	F&M	27.195	Veco 45 TF	KB 100	Butler design.
Wilf, Philip P. BIRDS Lynwood, Calif.	31	15	4	Pylon	Delta	39 646	2-9	Butyrate	EA Space Control	Space Control	Space Control	26.995	Cox 15 8/6	KB 1000	
Willet, Richard H. EBRC Oakland, Calif.	48	34	1	C13	Qualifier	70 900	7-8	Butyrate	REMAT Bonner servos	Orbit	Orbit	27.095	Merco 49 Torn 11/6	Blue Blazer	
Williams, Bernard RCCK Kalamazoo, Michigan	38	9	8	C11 1st	LW Cruiser	60 700	6-4	Butyrate	RM Bonner servos	Min-X	Min-X	27.095	KB 35 RU 11/6	KB HiLo Glo-Life	Won '61 Nats, 3rd '62 Nats; Flown since '56.
Williams, Willie LARKS-RCLOC-FAST Santa Ana, California	35	21	8	C13 5th	Dominator	62 700	6-2	Enamel	REMA Bonner servos	Deans	Deans	27.045	KB 45 TF 11/6	KB 100	Kitted by Williams. Styrene ribs.
Williams, Willie LARKS-RCLOC-FAST Santa Ana, California	35	21	8	Pylon 2nd	86 Proof	576	3-4	Butyrate	REA Bonner servos	Orbit	Orbit	52.5	Cox 15 TF 8/5	Cox	Same design as above but smaller.
Williams, Ed R. Redondo Beach, Calif.	30			C12	Falcon				REM	Orbit	Orbit	27.095			Mod. kit
Williams, Granger FAST Huntington Park, Cal.	43	30	5	Pylon	Duck Hawk	53 576	3-8	Butyrate	CARE Bonner servos	Orbit	Orbit	27.195	Cox 15 8/6	Cox	To be kitted by Williams Brothers.
Williams, Granger FAST Huntington Park, Cal.	43	30	5	Scale 3rd	Nieuport 28	53 720	5-8	Butyrate	REMAT Bonner servos	Orbit	Orbit	52.7	KB 35 Power 12/4	KB 100	
Williams, Lawrence FAST- Huntington Park, Cal.	50	30	5	Pylon	Duck Hawk	53 576	4-0	Butyrate	REA Bonner servos	Orbit	Orbit	27.095	Cox 15 Torn 8/6	Cox	
Williams, Tom TORKS Oklahoma City, Okla.	35	19	12	1 3rd	Original	510	3-8	Butyrate	RM Bonner servos	F&M	F&M	52.85	KB 35 Torn 10/6	KB 100	
Willoughby, Dale RCLOC-HSSS Tustin, California	46	28	10	Scale	Cessna Skylane	74 670	9-8	Plast	REMAT Bonner servos	Kraft	Kraft	27.195	OS 49 Torn 12/6	KB HiLo	
Woods, Bobby Oklahoma City, Okla.	10	2	1	C11Jr	Charger			Butyrate	RM Bonner servos	F&M	F&M	26.995	Veco 19 TF 10/6	KB HiLo	

ANOTHER FIRST . . .

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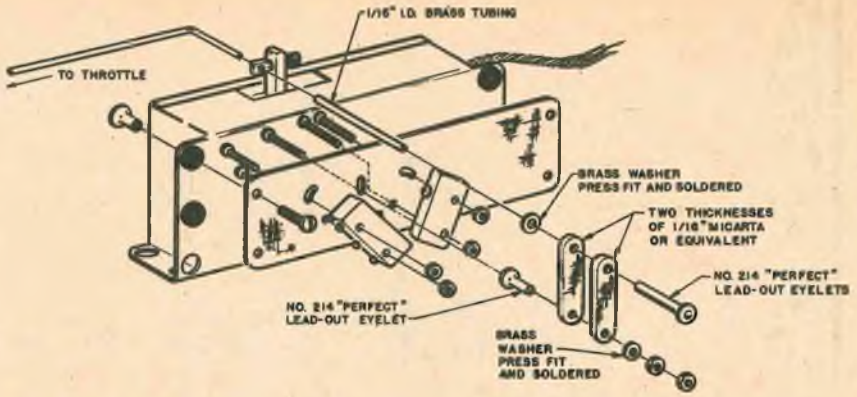
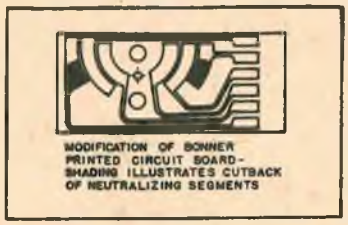
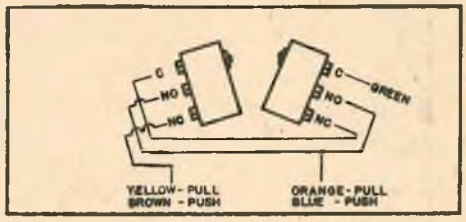



MODIFICATION OF BONNER PRINTED CIRCUIT BOARD - SHADING ILLUSTRATES CUTBACK OF NEUTRALIZING SEGMENTS



Ultra-Multi

(Continued from page 17)

approach you would have held high throttle long enough for the engine to go from idle to high speed, then actuated up elevator to get the nose back up.

As a final note, RC'ers with full-house 10 or 12 channel equipment may find this method useful for an auxiliary function, such as flaps or retractable gear.

TIPS

Want to clean the "muck" from your engine's cylinder head? Use a 5c stiff bristle acid brush from your local hardware store.

Southpaws, take note: you can get a pair of left-handed scissors in the notion department of your favorite department store — makes the accurate cutting of silk much easier!

One of the handiest tools for sanding cap stripping is an emery board—once you try it, you'll find many other uses for this "feminine tool."

Scale buffs who want an authentic leather helmet for scale pilots heads can look for a kid glove in the local used clothing store or rummage sale. They're excellent for this purpose!

A can of spray "Pride," used in household dusting, is an excellent model cleaner. Carry it with you to the field—not only cleans fuel, dirt, and oil, but polishes as well.

Want to cut down the number of coats of dope on your wing and stab? After covering, rub dry talcum powder into the pores of the silk, then apply butyrate. Cuts the necessary amount of dope in half, and makes an excellent filler. Provides a high gloss surface. Sand between coats of dope with wet-or-dry paper.

Tried-Squire

(Continued from page 36)

in the tank, and while your pumper can is still hooked to the tank, place a finger over the end of your overflow vent behind the nosewheel strut and give the can one more pump. This will force fuel through your filter, the fuel lines, up to the engine, and you won't use up two or three prime shots on false starts while trying to suck fuel through the lines with the engine.

We think you will like the Tri-Squire and these modifications. It has proven completely reliable and successful on hundreds of flights. Good flying!

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The Justin Micro-Tie is a high quality printed circuit board designed to simplify the installation of multi-channel equipment. The use of the Micro-Tie eliminates up to 6 connectors and 44 solder joints in the average ten channel installation. It provides hook up for 5 Bonner Servos, power to the receiver and servos and hook up for the reeds. The Micro-Tie uses a mil spec edge connector to supply the receiver with all requirements except the antenna lead. The connector has gold contact and supplies a maximum wipe area to the circuit board and is able to withstand extreme shock and virbration.

The Micro-Tie comes complete with all necessary hardware for mounting to the back of a Bonner Servo, although it can be mounted in any convenient spot that allows servo leads to reach the unit. Lacing cord and insulation tubing is also supplied.

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