! WARNING !
RECEIVER MUST BE SHOCK
MOUNTED IN FOAM OR SPONGE.

INSTRUCTIONS FOR OPERATING

CITIZEN-SHIP DIGITAL

PROPORTIONAL SYSTEM

CITIZEN-SHIP RADIO CORPORATION
810 East 64th Street
Indianapolis, Indiana 46220

INDEX

FOR DP-1 PROPORTIONAL

CONTROL SYSTEM INSTRUCTIONS

INSTRUCTIONS FOR OPERATION OF

CITIZEN-SHIP SINGLE CHANNEL DIGITAL PROPORTIONAL SYSTEM

1. DESCRIPTION OF CITIZEN-SHIP DP-1 SYSTEM

The CITIZEN-SHIP DP-1 System uses a variable rate Digital type of transmission. The DP-1 is designed for use in model airplanes, boats, or cars requiring single channel or directional control only.

A. RECEIVER

The DP-1 Receiver is of the selective superheterodyne type and is completely temperature stabilized.

B. TRANSMITTER

The DP-1 Transmitter consists of the RF power section modulated by a Digital type encoder, the signal of which is varied by the stick which extends through the front of the transmitter case.

C. DECODER

The Decoder which is built on the servo mounting tray is a rate detector which converts the incoming pulses to a DC Voltage that is then fed into the APC-2 Servo.

D. SERVO

The APC-2 Servo supplied with the DP-1 System is a feedback proportional actuator featuring rugged construction, very low electrical noise, and linear output. Intended use is to move the control surface of a model aircraft, car, or boat.

2. FREQUENCY OF RECEIVER AND TRANSMITTER

The DP-1 Receiver is shipped adjusted and tuned for reception on the frequency which is stamped on the box. The frequency of the crystal in the receiver is not the frequency at which the set will operate, since the receiver crystal is always 0.455mc lower than the frequency of the transmitter and receiver. Example: If you have a receiver tuned for 27.145mc, the receiver crystal should read 26.690 (i.e.: 27.145 - .455 = 26.690).

The DP-1 Transmitter is crystal controlled and intended for use on all of the 27mc Citizens Band frequencies for radio control operation. It may be used on any of the 6 legal 27mc frequencies by plugging in the desired crystal without any retuning.

Crystals must be used in pairs as follows, and must be ground to a tolerance of .0025% to insure proper operation and allow replacement without making retuning necessary. Replacement crystals may be obtained directly from CITIZEN-SHIP for $4.50 each plus postage.

TRANSMITTER CRYSTAL FREQUENCY	RECEIVER CRYSTAL FREQUENCY
26.995mc	26.540mc
27.045mc	26.590mc
27.095mc	26.640mc
27.145mc	26.690mc
27.195mc	26.740mc
27.255mc	26.800mc

3. RECEIVER AND TRANSMITTER BATTERY REQUIREMENTS

A. RECEIVER BATTERY REQUIREMENTS

The Model DP-1 Receiver and APC-2 Servo may be powered by four Eveready E-91 Alkaline pencell batteries or four 250 MAH. Nicad batteries. Use of any other type of pencells is not recommended as the performance is not as precise. Batteries must be connected to wires with plug attached exactly as shown in Figure 1. Batteries should only be plugged in after the receiver, as the battery plug is keyed directionally with the receiver plug but not with the plug in the servo tray. (See Figure 2). A 250 MAH Nicad pack with the plug attached is available from your dealer or directly from the Citizen-ship factory. The cost is $11.95.

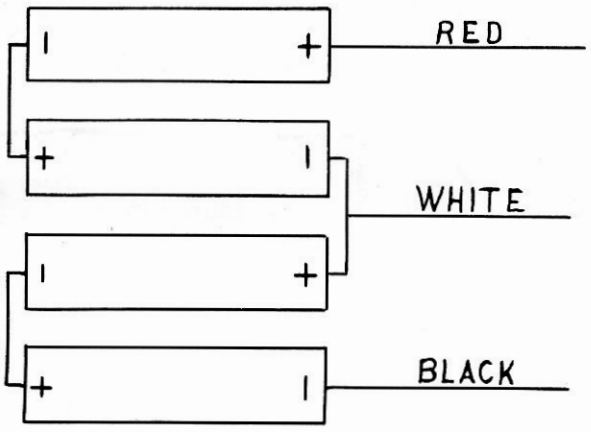


Figure 1

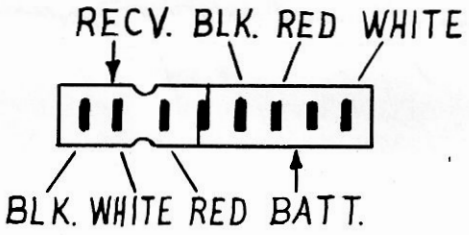


Figure 2

The receiver idle drain is approximately 15 MA. With the servo running, the drain is approximately 250 MA.

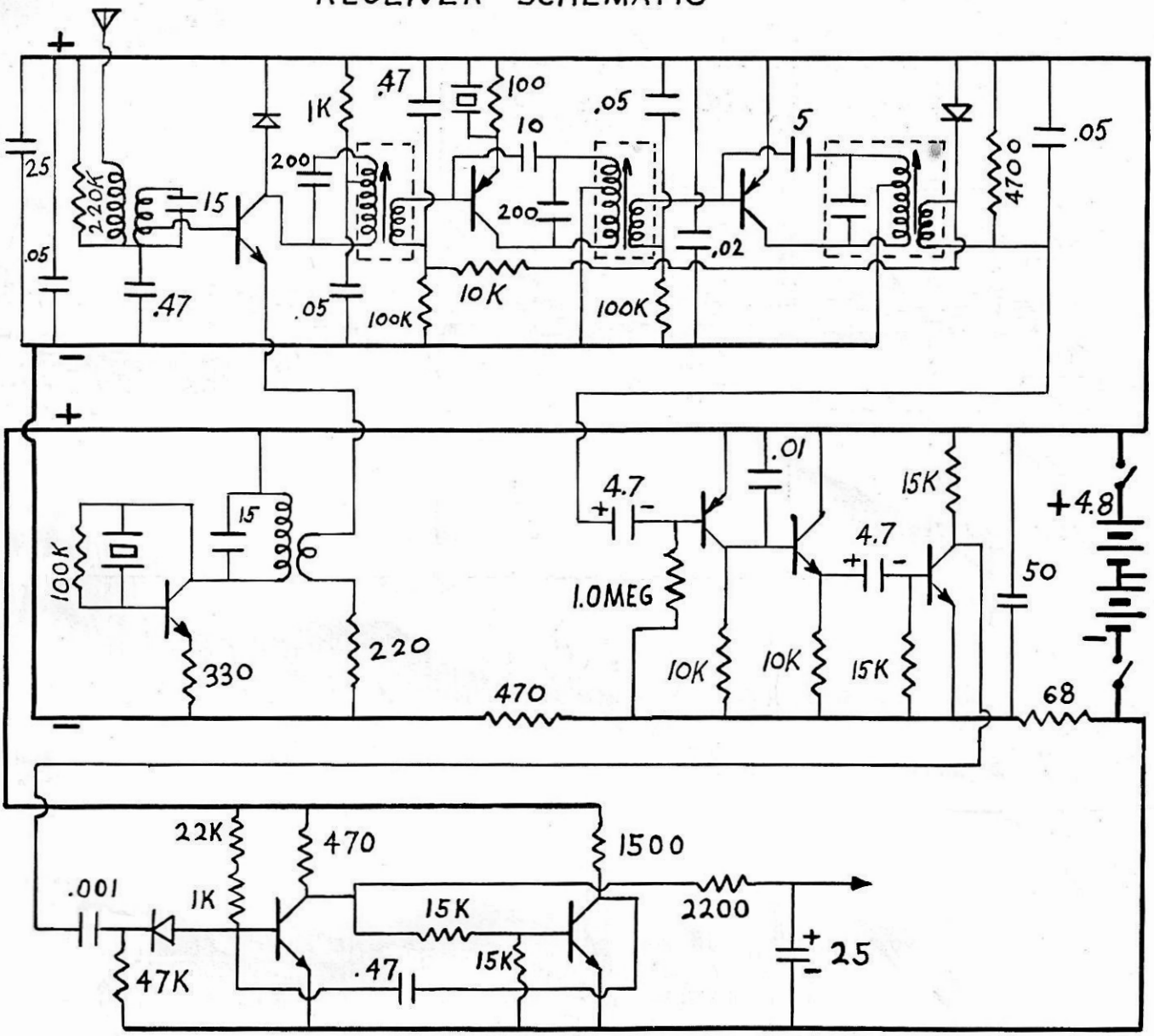
End Use of Receiver Batteries: When the Voltage of any one alkaline pencell reaches 1.1 volts under load of servo running, it is recommended that batteries be replaced. This type of cell is not rechargeable. Recharge nicads before any full day of flying. 250 MAH nicads should be recharged at a 25 MA rate for 14 hours to be fully charged.

B. TRANSMITTER BATTERY REQUIREMENTS

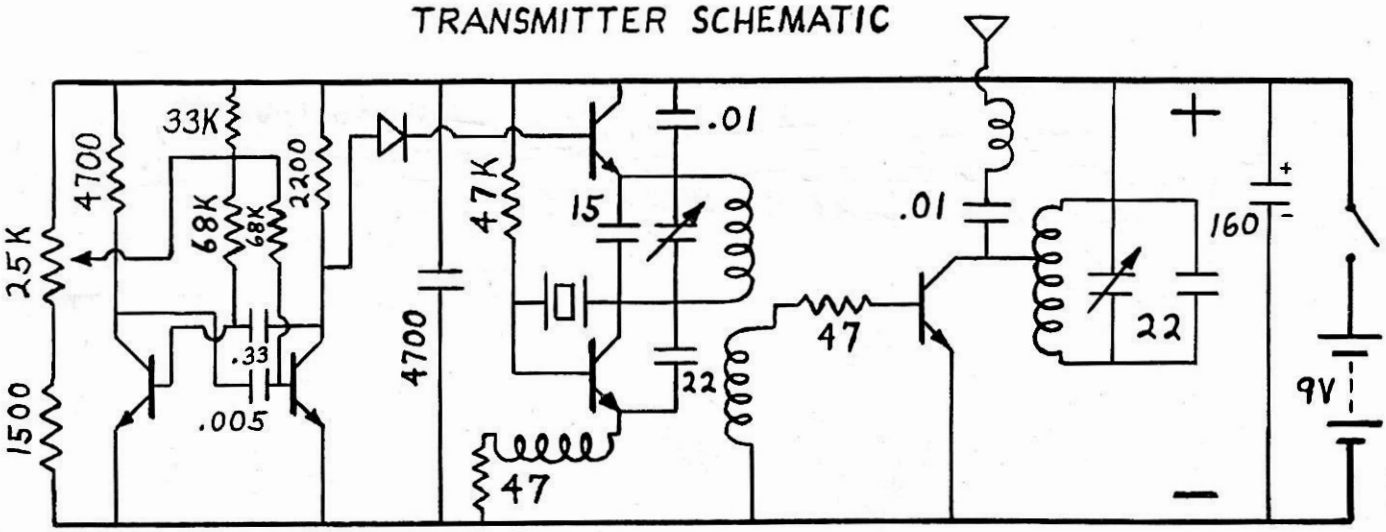
One of the advantages of the DP-1 Transmitter is the fact that it has a low battery drain (65 MA) and does not require an expensive power supply, but uses a standard 9 volt battery. Eveready Type #276 or Burgess D6 are recommended. Check

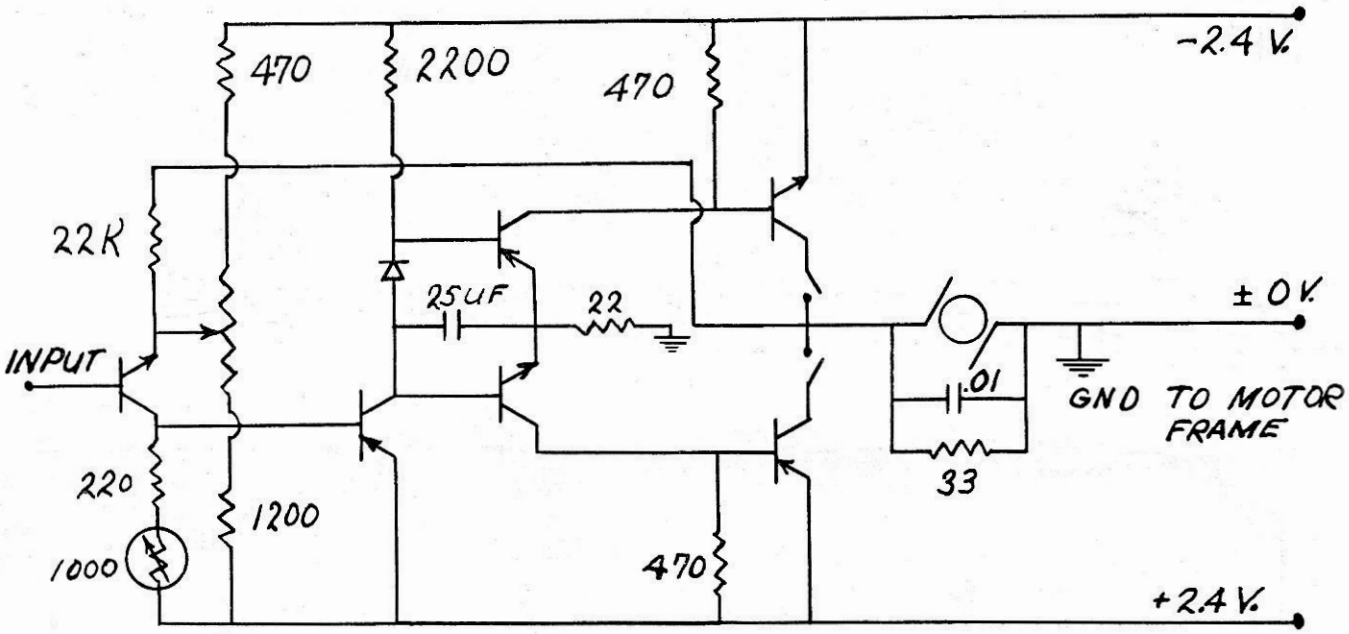
#266 (NEDA 1605)

RECEIVER SCHEMATIC



TRANSMITTER SCHEMATIC




-2.4 V.
470
2200
470
22K
25UF
22
± 0 V.
INPUT
.01
GND TO MOTOR FRAME
220
1200
33
1000
470
+2.4 V.

battery voltage periodically and replace when voltage reaches 7.5 volts with transmitter on. This should give 2-3 months of normal flying for each battery.

Nicads may also be used. Seven 450 MAH cells connected in series are recommended for the DP-1 Transmitter. This gives a voltage of 7.7 to 9.8 volts depending on the state of charge, and best matches dry battery voltages.

Do not try to operate your DP-1 Transmitter with low batteries. Low voltage causes range to drop sharply. In any transmitter, if the voltage drops to 1/2 the output drops to 1/4.

4. RECEIVER INSTALLATION

A. MOUNTING DIRECTIONS AND SPONGE PROTECTION

The Receiver can be mounted in any position, as its operation is unaffected by vibration. However, for best crash protection it is recommended that the receiver be turned so that the printed circuit board is in the same direction as the fuselage bulkheads. Also, receiver must be surrounded by foam rubber to eliminate fatiguing components from vibration and to prevent crash damage.

B. ANTENNA ARRANGEMENTS

Extensive flying with the DP-1 System has proven the superiority of two styles of antennas for the receiver over that which is now in common use. The antenna wire run directly to the rear of the plane along the body, inside our out, or to the top of the rudder fin -- which, while easy to install, is very directional and not always completely satisfactory for Proportional Systems, all of which require a continuous signal being received from the transmitter.

Recommended types of antenna in order of preference are:

1. A vertical steel wire 24-30" long, mounted on fuselage behind wing.

2. A wire from receiver to one tip of stabilizer and continuing on to top of rudder, and then down to the other tip of stabilizer.

3. A wire from receiver to tip of rudder and continuing on to one tip of stabilizer.

Superheterodyne receivers require long antennas for best sensitivity. Use 30" minimum total antenna length, including lead-in.

5. SERVO MOUNTING AND USE

A. Servo tray should be mounted in the direction shown in Figure 3 with the battery and receiver plug to the front of the plane for neatness and convenience. If it is desired to reverse direction of servo travel, servo may be easily unscrewed from the servo tray and turned around.

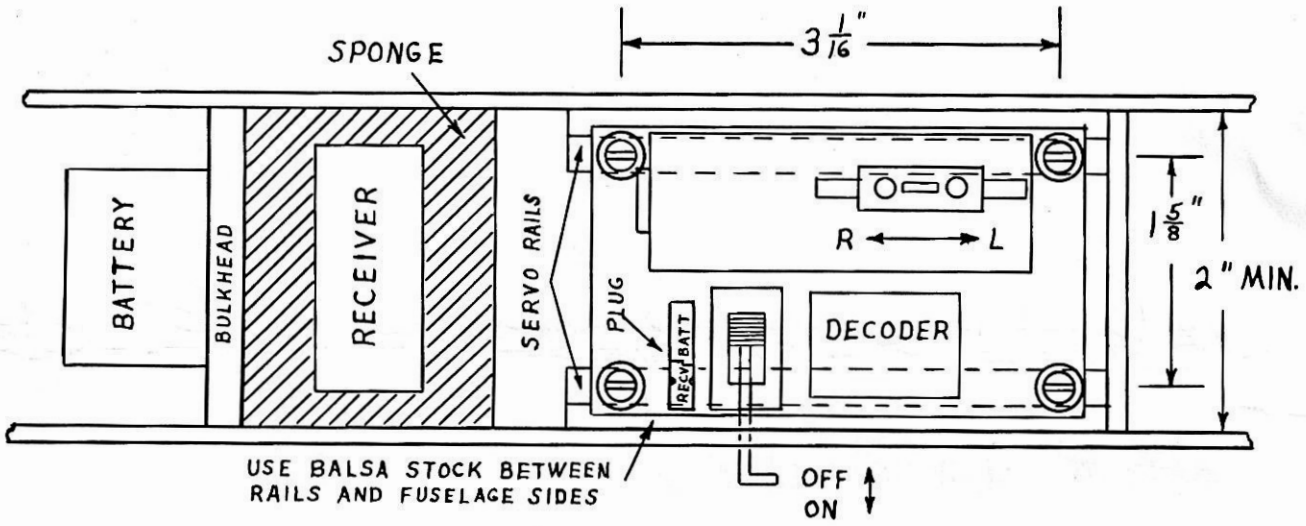


Figure 3

B. The servo is mounted on a combination wiring board, Decoder, and servo tray. The servo tray has four mounting holes with rubber grommets in them. The tray is mounted with wood screws into hardwood rails which are securely anchored in model. These rails must not become detached from the model even in a hard crash as the receiver will probably sustain serious damage if the servo tray comes forward and hits the receiver.

Machine screws and blind mounting nuts may be used in place of wood screws. Care should be taken not to compress grommets too tightly as this lessens their ability to absorb vibration.

C. Attachment to the output arm can be accomplished by use of adjustable Clevis links sold at hobby shops, or by 1/16'' wire as shown in Figure 4. Hobby shops stock a device which replaces the 1/32'' wire in Figure 4, and eliminates soldering. Push rods should not be metal along their entire length. Wood or other insulating material should be used with wire ends.

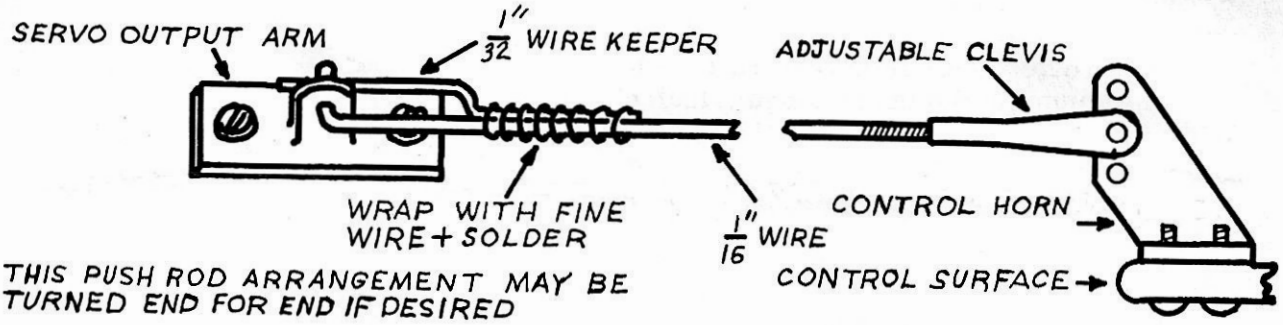


Figure 4

D. Limit switches are incorporated in the servo, which cut the power to the motor before the servo reaches its mechanical limit of travel. The linkage must not prevent the servo from running to these limits.

WARNING: If the above is not observed, batteries will be quickly exhausted due to the servo motor drawing a heavy current when the linkage prevents the servo from moving.

E. Care should be taken to prevent dirt, grit, balsa dust, or any foreign substance from entering the servo case, as erratic operation may result due to bad contact between the switcher plate or feedback potentiometer and the contact fingers.

The amplifier board, limit switches, and feedback potentiometer are assembled into one unit. This eliminates all interconnecting wires inside the Servo, preventing failures from wire breakage.

The Servo is skillfully constructed and carefully tested. If difficulty should be encountered, it is suggested that servicing be done only at the factory. Do not return to the dealer.

The limit switch fingers and printed circuit tracks are factory lubricated with an electronic contact lubricant. The feedback potentiometer is lubricated and should NOT be scraped, sanded or cleaned with any type solvent. Do NOT remove lubrication from any of these parts.

6. PUTTING TRANSMITTER IN OPERATION

Remove control handle from plastic bag inside transmitter and install through oblong hole in front of transmitter case. Insert the antenna through the rubber grommet in the top and screw onto the screw provided on the antenna mounting bracket. With the back cover off, this bracket is readily seen. The antenna can be removed from the set for convenience in transportation, or it can be left in place with the antenna collapsed. When flying, the collapsible antenna must be extended to its full length. The antenna should also be extended for testing as battery current is lower with the antenna fully up. Before flying, install screws that hold the back on the transmitter, as a loose back generates noise which is transmitted.

7. RANGE TESTING

If improper operation is suspected, a ground-range check would be in order. Ground range should be approximately 1/4 mile (2 - 3 blocks). Air range will be much greater than this.

Servo action will indicate when limit of range is reached. If all signal is lost (completely out of range) servo will move to left. However, just before complete loss of signal, servo may become somewhat erratic.

8. LICENSING

CAUTION: Before this transmitter may be operated, it must be licensed as a Class C Station in the Citizens Radio Service.

FCC Form #505 Application for Citizens Radio License is enclosed with the transmitter. Instructions on the front page are to be carefully followed in filling out the application.

In general, the only requirements for a Citizens Radio Station License with the CITIZEN-SHIP Transmitter are that the applicant be 12 years of age or older and a citizen of the United States. If some one under 12 wishes to purchase and use the transmitter, he may have his father or another adult file application for the license. After the Citizens Radio Station License has been obtained, anyone may operate the transmitter as long as the licensee assumes the responsibility for the proper operation of the station.

Do not operate your transmitter until you have received your Citizens Radio Station License.

WARRANTY AND SERVICE

Your CITIZEN-SHIP DP-1 System is warranted by the manufacturer to be free from defects in material and workmanship. Any unit failing to operate within 30 days after date of purchase will be repaired or replaced free of charge upon being returned directly to the factory by the owner. DO NOT return the unit to the distributor or dealer for service. This warranty does not apply to failure of operation due to exhausted or improper batteries, or if in our judgement the equipment has been retuned, tampered with or received abusive treatment beyond that encountered in normal usage. Warranty does not cover crash damage.

Any rewiring of equipment other than shortening of cables (do not cut them to less than 6") can only cost the modeler money if equipment is ever returned for service. Our test equipment will take only wiring of units as originally furnished and other plug types, etc., will not be contended with. All modified units returned to the factory will be converted back to stock condition at the modeler's expense.

Minimum charges for units returned and not covered by Warranty will be $2.50 plus parts for each individual item. Only pieces of equipment known to be defective need to be returned to the factory for service. This can mean a greater savings over the years to the owner of CITIZEN-SHIP Digital Proportional Equipment.

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