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Federal Communications Commission  
EQUIPMENT APPROVAL SERVICES  
PO Box 358315  
Pittsburgh, PA 15251-5315

Re: Request for Certification

Enclosed is an application, fee in the amount of \$940, and exhibits for Certification of a Remote Control Transmitter, Model TC1. There are a total of 3 transmitter models, TC1, TC2, & TC4, which use the same PC board and RF circuitry. They are designed to accept 1, 2, and 4 pushbutton inputs respectively, and transmit on either 300 MHz fixed frequency antenna or 310 MHz fixed frequency antenna.

The final instruction sheet is not available at this time, so I have included a typical instruction sheet indicating the FCC statement and important information.

The FCC ID of this model, upon certification, will be HBW1420.

We would appreciate your prompt attention to the submittal.

Sincerely,  
THE CHAMBERLAIN GROUP, INC.

A handwritten signature in black ink that reads "Barbara P. Kelkhoff". The signature is written in a cursive style and is enclosed within a rectangular box defined by a dotted line.

Barbara P. Kelkhoff  
Manager, Regulatory Affairs

**LIST OF EXHIBITS**  
**REMOTE CONTROL TRANSMITTER**  
**MODEL TC1**

1. Expository Statement
2. Theory of Operation
3. Schematic
4. Photographs
5. FCC Label Drawing
6. Operating Instructions
7. Test Report

**EXPOSITORY STATEMENT  
REMOTE CONTROL TRANSMITTER  
MODEL TC1**

1. Since the final instruction sheet is not available at this time, a marked-up typical version has been included. The instructions include statements required to assure compliance with the Commission's Rules; Part 15.
2. Labeling is in accordance with the Commission's labeling requirements, Parts 2 and 15, Section 15.19.
3. This transmitter is intended for use with the certified receivers of our manufacture only.
4. The transmitter is equipped with an automatically releasing push-button switch. Transmission is terminated upon release of the push-button.
5. The TC1 is factory set to 300 and  $310 \pm 0.1\%$  MHz. It is not intended to be readjusted in the field, and specific instructions prohibiting tampering are provided to the user.
6. Test data for the Model TC1 is part of this submission. No emissions were detected in the forbidden bands below 1.0GHz.

Certified by:

*Barbara P. Kelkhoff*

Barbara P. Kelkhoff  
Manager, Regulatory Affairs

## **Theory of Operation and Circuit Description TriCode TC1, TC2, & TC4 Transmitters**

(Please refer to the enclosed schematic assembly drawing: 195D1420)

### **Overview**

The TriCode transmitters TC1, TC2 & TC4 are designed to accept 1, 2, & 4 pushbutton inputs respectively, and transmit on either a 300 MHz fixed frequency antenna or 310 MHz fixed frequency antenna. The circuit has two sets of user-settable switches. Each set is comprised of a configuration switch and a DIP switch. The output of the transmitter is determined by the pushbutton pressed, configuration switch settings, and DIP switch settings. TC1 and TC2 are subsets of the TC4 transmitter, and thus, TC4 will be described here in order to include the full circuit.

### **Power supply circuitry**

Power is supplied to the circuit by a 9V battery. The battery is connected to the circuit board via wires soldered into holes E1 & E2. Power is supplied to the transmitter circuitry through the pushbutton switches S1, S2, S3, and S4/S7. Power is only supplied to the transmitter circuitry when one or more of the pushbuttons are pressed. R7, C16, & D4 provide regulation of the power supply circuit to the transmitter circuit. R8 & D5 provide visual indication that power has been supplied to the transmitter circuit.

### **Pushbutton circuitry**

Pushbuttons S1, S2, S3, and S4/S7 are the primary components of the pushbutton circuitry. D1, D2, and D3 are used to provide isolation between the pushbutton inputs to the microprocessor, U1. R9, R10, R11, R12, R13, and R14 are used to bias the pushbutton inputs to the microprocessor.

### **Configuration switch circuitry**

Three-position slide switches S8 & S9 are the primary components of the configuration switch circuit. R20, R21, & R37 are used to bias the configuration switch inputs to the microprocessor.

### **DIP switch circuitry**

DIP switches S5 & S6 are the primary components of the DIP switch circuit. R22, R23, R24, R25, R26, R32, R33, R34, R35, R36, R15, R16, R17, R18, R19, R27, R28, R29, R30, R31, C17, C18, C19, C20, C21, C22, C23, C24, C25, and C26 are used to bias and provide timing for the inputs to the microprocessor

### **RF circuitry**

TriCode transmitters have two fixed antenna outputs – 300 MHz & 310 MHz.

C1, C4, C7 & C9 are the primary components of the 300 MHz antenna circuit. R4, R1, C8, Q1, R5, & C11 are the means by which a coded message from the microprocessor, U1, may be transmitted on the 300 MHz antenna.

C2, C3, C5, & C10 are the primary components of the 310 MHz antenna circuit. R2, R3, C6, Q2, R6, & C12 are the means by which a coded message from the microprocessor, U1, may be transmitted on the 310 MHz antenna.

**Microprocessor**

The microprocessor, U1, performs two main functions: Input recognition and coded message construction. Input recognition is accomplished by monitoring the input pins for the pushbutton switches, polling and reading the configuration switches, and polling and reading the DIP switches. The combination of inputs determines the makeup of the coded messages. Each coded message directly correlates to a specific antenna output. This combination of coded message and antenna output forms the transmission of the TriCode transmitter. If an error is detected while reading the inputs, no coded message is generated, and the transmitter does not transmit a signal.

## **7. TEST REPORT**