DESCRIPTION OF OPERATING SEQUENCE

The following is a description of component functions during oven operation.

1. OFF CONDITION

Closing the door activates door sensing switch and secondary interlock switch. (In this condition, the monitor switch contacts are opened.)

When oven is plugged in, 120 volts A.C. is supplied to the control unit. through the noise filter.

1) The display will show flashing "88:88".
2) To set any program or set the clock, touch the STOP/CLEAR pad. The display will clear, and " : " will appear.

2. COOKING CONDITION

Program desired cooking time by touching the NUMBER pads. And program the power level by touching the POWER LEVEL pad.

When the START pad is touched, the following operations occur:

1) 1.The contacts of the relays are closed and components connected to the relays are turned on as follows.

   (For details, refer to Figure O-2)

RELAY	CONNECTED COMPONENTS
RY-1	oven lamp/turntable motor/fan motor
RY-2	power transformer

2) 120 volts A.C. is supplied to the primary winding of the power transformer and is converted to about 3.8 volts A.C. output on the filament winding, and approximately 2000 volts A.C. on the high voltage winding.
3) The filament winding voltage heats the magnetron filament and the H.V. winding voltage is sent to a voltage doubler circuit.
4) The microwave energy produced by the magnetron is channelled through the waveguide into the cavity feed-box, and then into the cavity where the food is placed to be cooked.
5) Upon completion of the cooking time, the power transformer, oven lamp, etc. are turned off, and the generation of microwave energy is stopped. The oven will revert to the OFF condition.
6) When the door is opened during a cook cycle, monitor switch, door sensing switch, secondary interlock switch and primary interlock relay are activated with the following results. The circuits to the oven lamp, turntable motor, the cooling fan motor, and the high voltage components are de-energized, and the digital read-out displays the time still remaining in the cook cycle when the door was opened.

3. POWER LEVEL COOKING

When Variable Cooking Power is programmed, the 120 volts A.C. is supplied to the power transformer intermittently through the contacts of relay (RY-2) which is operated by the control unit within a 32 second time base.

4. POWER TRANSFORMER

The transformer consists of three windings: primary, filament and secondary high voltage.
During a cook cycle, the 120V AC applied to the primary winding of the transformer through the relay RY-2 contacts is converted to approx. 3.8 V AC on the filament winding and approx. 2000 V AC on the high voltage winding. The 3.8V AC heats the magnetron filament. This causes the tube cathode to readily emit the electrons necessary for tube condition whenever the negative 4000 DC voltage is applied to the cathode. The 2000 V AC is supplied to the voltage doubler circuit.

5. VOLTAGE GOUBLER CIRCUIT

The voltage doubler circuit consists of a silicon rectifier and a high voltage capacitor. The 2000 V AC from the high voltage winding of the power transformer is applied to the voltage doubler circuit, where it is rectified and converted to approx. 4000 V negative DC needed fro magnetron operation.

Silicon rectifier: The rectifier is a solid state device that allows current flow in the opposite direction. This acts as rectifier changing alternating current into pulsating DC.

High voltage Capacitor: The capacitor is able to store energy on one half of the power cycle and then release it along with the transformer output to produce approx. 4000 negative DC V to the magnetron.

6. MAGNETRON TUBE

The basic magnetron tube is a cylindrical cathode within a cylindrical anode surrounded by a magnetic field. When the cathode is heated by the filament winding of the power transformer, electrons are given off by the cathode. These negatively charged electrons are attracted to the more positive anode of the tube when the negative 4000 DC V is applied to the cathode. Ordinarily, the electrons would travel in a straight line from the cathode to the anode as Figure-1. But the addition of magnetic field, provided by parmanent magnets surrounding the anode, causes the electrons to take an orbital path between the cathode and anode, Figure-2.
As the electrons approach the anode, they travel past the small resonant cavities that are part of the anode. Interaction occures, causing the resonant cavities to oscillate at the very high frequency of 2450 megahertz. This RF energy is radiated from the magnetron antenna into the waveguide, and finally into the cooking cavity where food has been placed to be cooked.

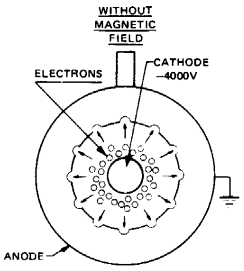

Figure-1 Basic Magnetron without Magnetic Field

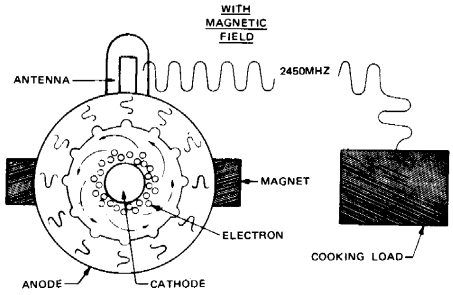

Figure-2 Basic Magnetron with Magnetic Field

7. TURNTABLE MOTOR

The turntable motor rotates the turntable located on the bottom of the oven cavity, so that the food on the turntable is cooked evenly. The turntable may turn in either direction.

8. COOLING FAN MOTOR

The cooling fan motor drives a blade which draws external cool air. This cool air is directed through the air vents surrounding the magnetron and cools the magnetron. This air is channelled through the oven cavity to remove steam and vapours given off from the heating foods. It is then exhausted through the exhausting air vents at the oven cavity.