

## SPECIFICATIONS

### GENERAL

DEPTH . . . . .	26-1/2 in. (67.3 cm.)
WIDTH . . . . .	41-1/2 in. (105.4 cm.)
HEIGHT . . . . .	51 7/8 in. (131.76 cm.)
SHIPPING WEIGHT (DOMESTIC) . . . . .	384 lbs. (151.96 Kg.)
NET WEIGHT . . . . .	365 lbs. (166 Kg.)
POWER REQUIREMENTS . . . . .	120 VAC, 60 Hz., 365 watts 4.2 amps. 220/240 VAC, 50 Hz., 430 watts 2.7 amps.

### RECORD CHANGER MECHANISM

CAPACITY . . . . .	100 records
RECORD SIZE . . . . .	7 inches
SPEED . . . . .	45 RPM

### CREDIT AND PRICING SYSTEM

ACCUMULATOR TYPE CREDIT SYSTEM - \$1 & \$5 BILLS, DOLLAR COINS, & HALF DOLLARS OPTIONAL

COINS ACCEPTED . . . . .	Nickels Dimes Quarters
TOTAL CREDIT ACCUMULATIONS . . . . .	255
PRICING . . . . .	See pricing, page 11

### SOUND SYSTEM

#### CARTRIDGE

TYPE . . . . .	Shure Dynetic variable reluctance
FREQUENCY RESPONSE . . . . .	20 to 20,000 Hz.
CHANNEL SEPARATION . . . . .	25 db @ 1,000 Hz.
NOMINAL COMPLIANCE . . . . .	20 x 10 <sup>-6</sup> cm/dyne
TRACKING FORCE . . . . .	3-4 grams
OUTPUT . . . . .	7 mv.
STYLUS . . . . .	1 mil, diamond

#### POWER AMPLIFIER

125 watt Stereo

FTC Rating, 4 Ohm Loads @ 1% THD . . . 144 watts RMS

FTC Rating, 70V Lines @ 1% THD . . . 126 watts RMS

#### PREAMPLIFIER

AVC CONTROL RANGE . . . . .	20 db
TREBLE CONTROL . . . . .	12 db/octave 10,000 Hz. full 6,000 Hz. moderate 3,000 Hz. low

BASS CONTROL . . . . . Compensates for bass loss at low volume levels 12db per octave.

## SELECTION SYSTEM

CAPACITY . . . . . 200 selections

## TRANSFORMER PACKAGE

POWER LEVELS FOR PHONOGRAPH SPEAKERS. .1, 4, 16, 64 watts  
PROVIDES 70-VOLT LINE FOR EXTENSION SPEAKERS

SPEAKER SYSTEM	WOOFER	MID/RANGE	TWEETER
SPEAKER DIAMETER . . . . .	10 inches	5 3/4 inches	1 inch
VOICE COIL DIAMETER. . . . .	1-1/2 inches	1 inch	Dome
IMPEDANCE. . . . .	8 ohms	8 ohms	1 inch
CROSSOVER. . . . .	650 Hz.		
SYSTEM FREQUENCY RESPONSE. . . . .	50 to 20,000 Hz. $\pm 4$ db		

## LIGHTING

DOORS. . . . . Fluorescent, 30 watts, 36 inch  
(T-8), 7-00601-12  
Fluorescent, 15 watt, 18 inch  
(T-8), 7-00600-22

## FUSES AND CIRCUIT BREAKERS

### MAIN POWER SUPPLY

120VAC CIRCUIT (Transformer Primary Only) 2 Amp Circuit Breaker, 7-00733-15  
120VAC CIRCUIT. . . . . 10 Amp Circuit Breaker, 7-00734-25  
+28VDC CIRCUIT. . . . . 5 Amp Slo-Blo Fuse (2) 7-00721-06  
+8VDC CIRCUIT. . . . . 5 Amp Slo-Blo Fuse 7-00721-06

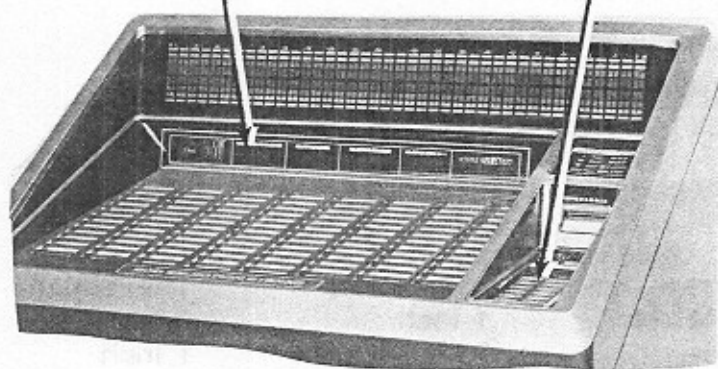
### AMPLIFIER

Stereo - 125W

120VAC CIRCUIT. . . . . 3 Amp Circuit Breaker 7-00733-17  
DC CIRCUIT. . . . . 5 Amp Fuse, Type MTH-5 (4) 7-00720-10

DIGITAL DISPLAYS - Selection Playing, Selection Being Made, Most Popular Selection, Selections Remaining.

SELECTOR KEYBOARD enters customers selections.



CENTRAL CONTROL COMPUTER - This unit controls all functions of the phonograph.

PREAMPLIFIER AND AMPLIFIER amplifies cartridge output and drives speaker system.

OUTPUT TRANSFORMER PACKAGE matches amplifier output to speaker system impedance.

SERVICE SWITCH

MAIN POWER SUPPLY distributes 120 volt power to components and provides 28 VDC 8 VDC and 28 VAC. Fused and regulated.

SPEAKER SYSTEM - Consists of two 10 inch Woofer Speakers, two 5 inch Mid-Range Speakers and two 1 inch dome Tweeter Speakers. Crossover network is located in the bass chamber, behind left Speaker.

MECHANISM CONTROL UNIT controls scan, transfer, and toggle shift functions on mechanism

COIN ACCEPTOR/COIN SWITCHES accepts valid coins; establishes credit in credit system.

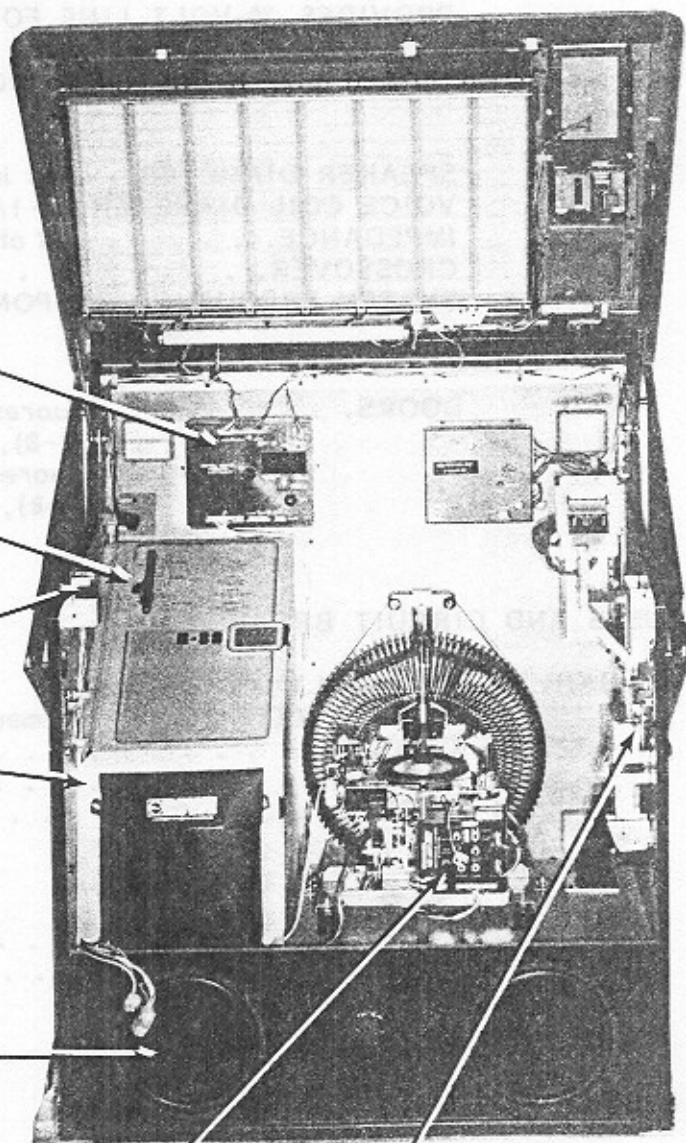


FIGURE 1. PHONOGRAPH MAJOR COMPONENTS



## SECTION 1—SYSTEM DESCRIPTION

### INTRODUCTION

This section of the Service Manual is intended to provide a general description of the R-89 Phonograph. It will help you familiarize yourself with the various components of the machine and understand its basic principles of operation.

The Rowe Model R-89 Phonograph is a Stereo Phonograph that can hold up to 100 45 rpm records for a total of 200 possible selections. It is designed to meet the needs of the people who will be using it in the field. Incorporating some of the latest technology in electronics, the R-89 is completely microprocessor-based and solid state controlled, providing a reliable and well designed unit that will prove easy to operate and maintain. It can be ordered with a variety of accessories and options. Some of the features that can be included as standard equipment or added as options later are: a bill acceptor, a bill stacker and a video interface and monitor for playing the latest and most popular video tapes.

### MAJOR COMPONENTS

The major components of the R-89 Phonograph are the record selection system, the central control computer, the audio reproduction system, the record changer mechanism, light display controller and the main power supply. A description of each of these and their primary functions are given below.

### RECORD SELECTION SYSTEM

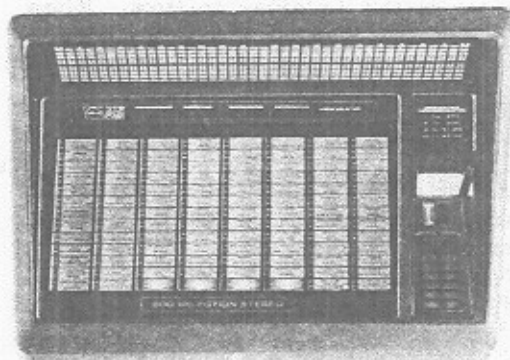
Record selections are made via a series of buttons and LED displays located on the top door of the Phonograph. The buttons are referred to as the Keyboard and are labeled from 1 to 10, Popular and Reset. The Keyboard is also used for programming certain features of the Central Control Computer. The Selector System LED's display the Selection Being Made, the Selections Remaining, the Selection Playing, and the Most Popular Selection.

To make a selection deposit money in the Phonograph to establish credit. When credit has been established the Make Selection display will light and the Selections Remaining display will show the number

of selections available for the amount of money deposited. Enter from the Keyboard the number of the selection you have chosen from the songs listed on the title rack. As the digits are entered on the keyboard the LED will display them. Only valid selection numbers will be displayed. If numbers other than those designated as acceptable are entered, they will not be displayed. It is not necessary to Reset if an invalid number has been entered, the Phonograph will not accept an invalid number.

The Reset button can be used to remove a partially entered selection number from the Selection Being Made display. Once the last digit has been entered the selection is made and cannot be changed.

The Popular Button can be used to select the song which has been chosen the most often from the playlist. The tally is kept until the Phonograph is serviced and the computer memory is cleared. Pressing the Popular button a second time will play the second most popular song. The process can be continued until the credit is exhausted. The computer will begin the sequence with the Most Popular Selection. (If selections are entered manually from the Keyboard and then are duplicated by pressing the Popular Selection button, the selection is not repeated. The duplication of selections is thus avoided.)



## THE CENTRAL CONTROL COMPUTER

Located on the rear wall of the cabinet is the Central Control Computer, the brain of the Phonograph. This unit directs all of the activities of the Phonograph. It is especially useful for such tasks as keeping track of the amount of money received, assuring that the proper amount of credit is given for money received, monitoring the selections made to determine the record played most often and the one played least often. The computer will also store up to 255 credits per customer. The total number of selections made can be monitored and compared with the total amount of coins and money taken in.

## MEMOREC

The Memorec function of the Central Control Computer is a record keeping function. It has these features: 1. It records the Total Selections made, 2. Records the number of times each side of the record (one selection) has been chosen. 3. Records the total amount of money deposited in the machine. Selections made with the Popular Selection button are not totaled with the records that are chosen from the list of songs on the title rack and entered manually on the Keyboard. The selections made with the Popular Selection button are included in the count for the Total Selections made, however. The Memorec does not count the selections made by the AutoPlay feature as a part of the Total Selections Made.

## AUTOPLAY

Another function of the Central Control Computer is the AutoPlay feature. When the Phonograph has not had a selection made within a predetermined time the computer will choose records from a predetermined list and it will play them to stimulate customer interest in the phonograph. The choice of records, the record sequence and the interval at which the computer will automatically play a selection can be predetermined by the owner of the phonograph or the person who services it. For instructions on how to set the AutoPlay function, refer to the section of this manual on installation and programming.

## THE AUDIO REPRODUCTION SYSTEM

The components of the Audio Reproduction System are: The Stylus and Cartridge, the Stereo Preamplifier, the Output Transformers, the Power Amplifiers and the Speaker System.

## THE STYLUS AND CARTRIDGE

Located on the tone arm of the Record Changer mechanism, the Stylus and Cartridge unit translate the groove modulations into equivalent electrical voltage. These voltages are conducted through shielded cable to the Preamplifier.

## THE PREAMPLIFIER

The Preamplifier amplifies the low voltages it receives to higher levels of voltage that can be utilized to drive the Power Amplifiers. Automatic Volume Control circuitry adjusts for different recording levels in records. Treble and bass controls are provided on the Preamplifier to compensate for differences in room acoustics and noisy records. The D.C. operated Volume Control circuit allows simple installation of remote volume controls. External inputs are provided for custom sound installations.

## THE AMPLIFIER

The Power Amplifiers amplify the Preamp-  
lifier outputs to voltage levels suitable  
to drive the Speakers. They are cap-

able of producing 62.5 watts per channel  
(125 watts total) at the 70 volt line con-  
nections. Protection is included for input  
transients and faulty loading.

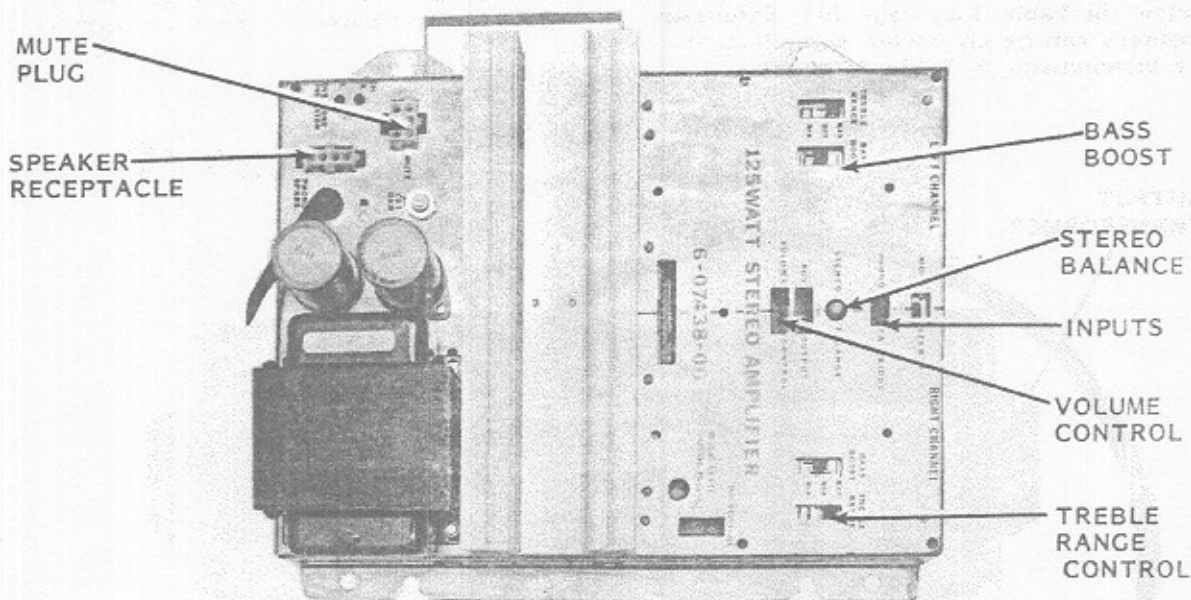


FIGURE 2. 125 WATT STEREO AMPLIFIER COMPONENTS



## THE OUTPUT TRANSFORMER

The Output Transformer steps up the Power Amplifiers output voltages to 70 volts for extension speakers. It also provides taps for obtaining several different power levels for both phonograph and low impedance extension speakers. Phonograph speaker power is selected by connecting the proper leads as explained in Table 3 on page 20. Extension speakers can be connected according to the instructions in Table 5, page 21.

## THE SPEAKER SYSTEM

The Speaker System consists of a Crossover Network, two 10 inch Woofers, two 5 inch Mid-Range and Two 1 inch dome Tweeter Speakers. This Speaker System is completely stereo, utilizing specially designed drivers for wide frequency response and good coverage. The Crossover Network has been redesigned and relocated in the bass chamber.

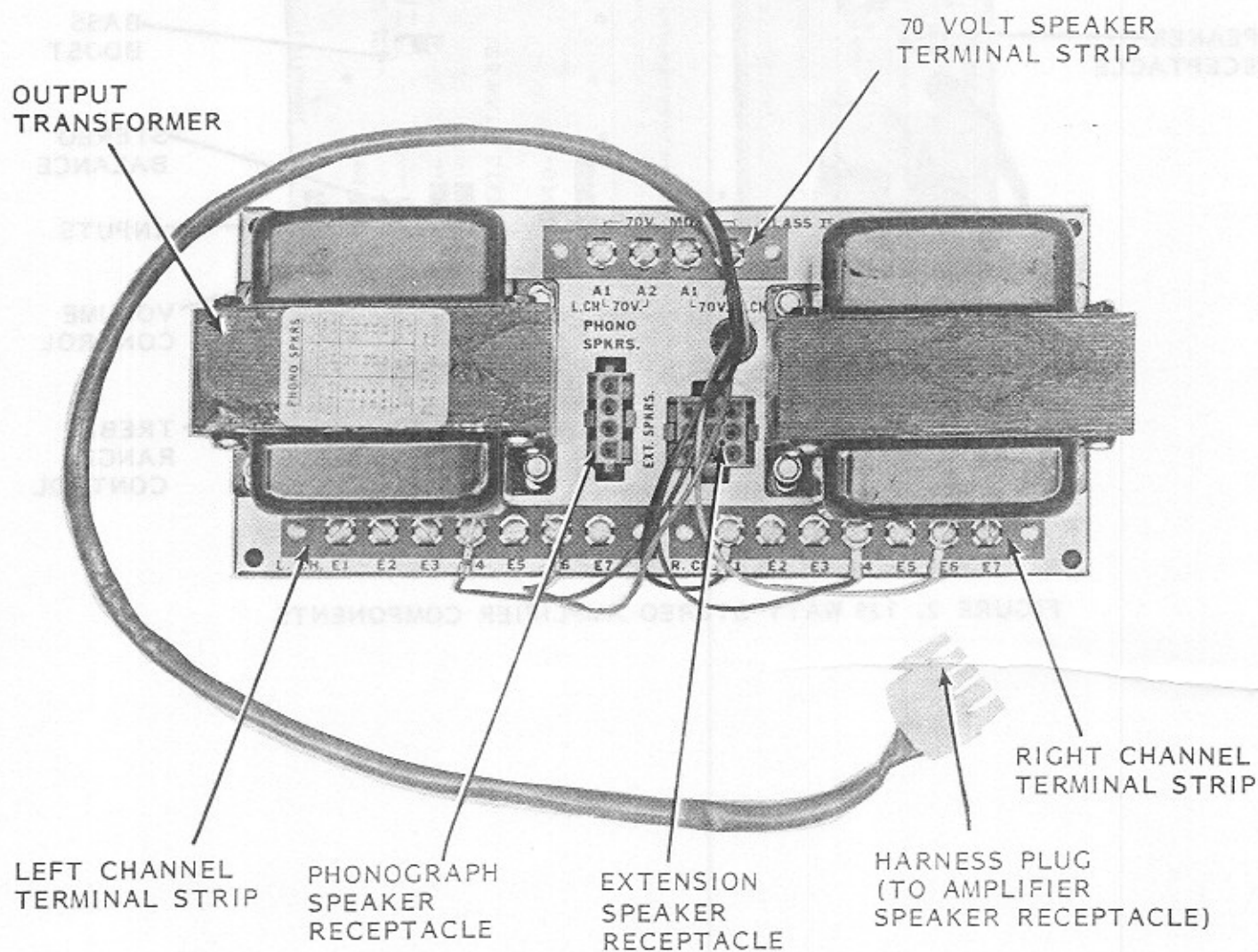


FIGURE 3. OUTPUT TRANSFORMER PACKAGE COMPONENTS

## THE RECORD CHANGER MECHANISM

The Record Changer Mechanism, also referred to as "the Mechanism", is located in the center of the cabinet's interior. It is the primary mechanical component of the Phonograph. The Mechanism holds 100 records and plays selections on command from the selection system. The following paragraphs list and briefly explain the function of the main components that make up the Mechanism.

Identification and location of each major component is shown in Figure 4, page 6.

### MAGAZINE, BELT AND TRANSFER ARM

The record magazine stores 100 7-inch 45 rpm records in a circular cage. A seamless belt around the cage keeps records in position. The rollers permit the transfer arm to clear the belt when removing and returning records to the magazine and also maintain belt tension.

### PLAY COUNTER

The play counter is mounted to the left of the turntable and accumulates the total number of plays on the phonograph.

### MONEY COUNTER

The Money Counter is mounted on the left side of the turntable and it registers the total money deposited in the phonograph.

### OPTICAL SWITCH

The Optical Switch is in front of the record magazine and straddles the magazine gear. There are two sensors in the switch. One sensor indicates when record "99" is in gripping position. This sensor is called the Home Sensor. The other sensor counts the number of gear teeth that pass by during scan to tell which record is in gripping position. This sensor is called the Index Sensor.

### MECHANISM CONTROL UNIT.

This solid state switching unit controls the scan, transfer and toggle shift function.

## SPRAG ASSEMBLY

This assembly operates the record magazine in position. It is located at the center of the record changer mechanism, immediately in front of the record magazine and below the record transfer arm. The magazine motor rotates the record magazine. The solenoid operated Sprag Assembly locks the magazine in place.

## TONE ARM ASSEMBLY

The tone arm assembly plays records after they are positioned on the turntable by the record transfer arm. The tone arm contains a stereo cartridge with a diamond stylus that is designed to track at three to four grams pressure. The stylus plugs into the cartridge for easy replacement. Four receptacles in the tone arm assembly mate with a plug to connect the cartridge to the pre-amplifier via 4-conductor shielded cable.

## TURNTABLE MOTOR

The turntable motor is a constant speed 300 RPM (at 60Hz.) synchronous motor. The turntable is driven with a belt to obtain the proper turntable speed with minimum wow and flutter. (For 50Hz. locations, a larger diameter motor pulley is used and a wiring change must be made on the motor terminal strip (See Section 6).

Because Rowe may purchase motors from more than one manufacturer, and because each motor requires a slightly different run capacitor, it is best to consult the Rowe Factory Service Dept. for wiring instructions when converting from one line frequency to the other.



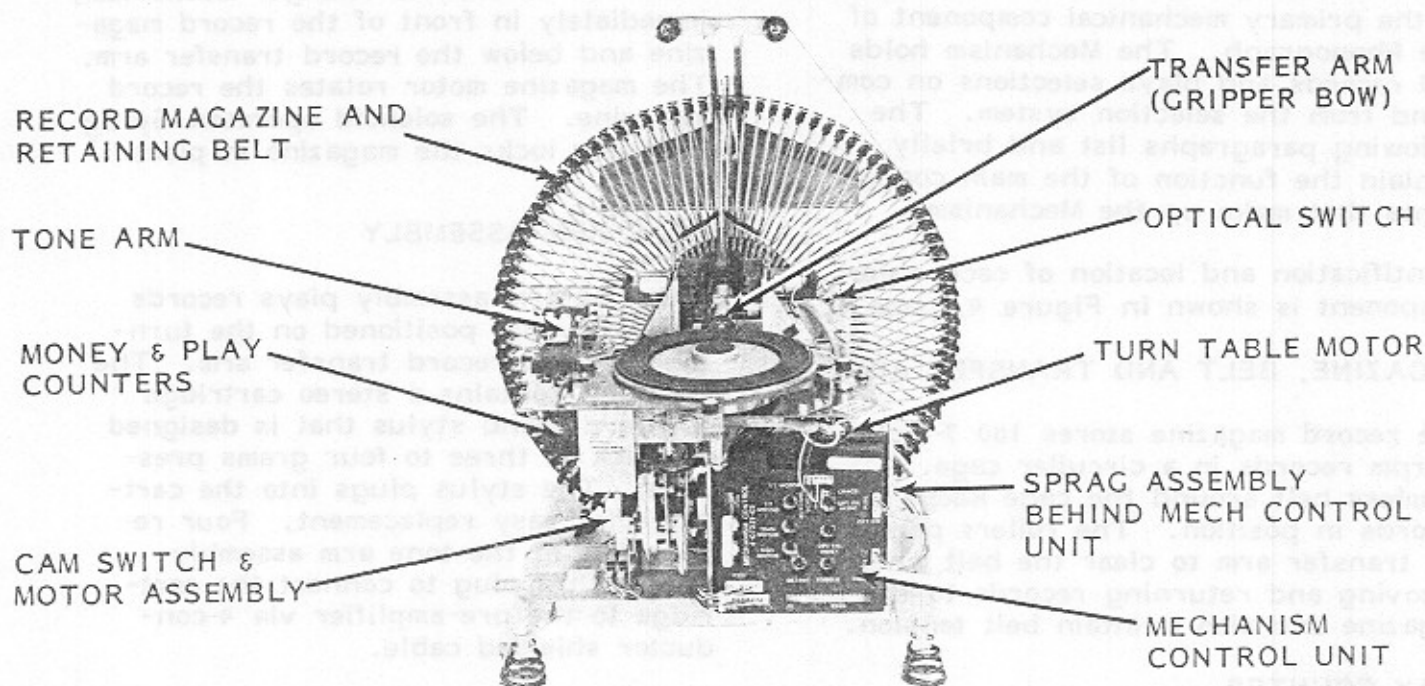


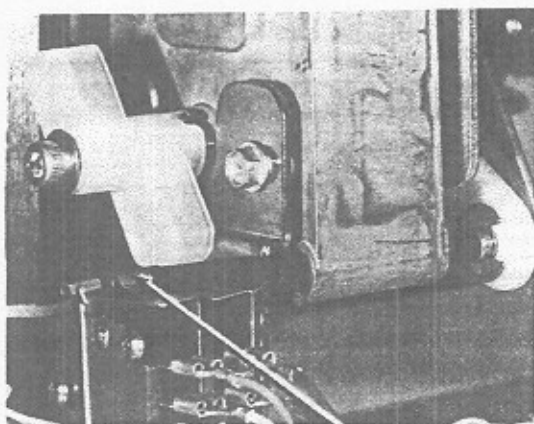
FIGURE 4: RECORD CHANGER MECHANISM

#### LIGHT DISPLAY CONTROLLER UNIT

The Light Display Controller Unit, located at the back of the enclosed compartment on the left side of the interior of the Phonograph, controls the light display of the bar graphics assemblies on the Top and Front doors. The bar graphics may be set to display a shifting pattern of either bars of light or individual dots of light, that respond to the music as it is playing, or set to display a shifting pattern of either bars or dots that repeats continuously while the Phonograph is in standby mode. The graphics display may be switched between the dot pattern and the bar graphics pattern as desired. The graphics bar may also be set to display all the lights in a continuous burning non-flashing mode while the Phonograph is in standby or Mute condition.

Two switches control the function of the display. The Display Mute Switch controls the graphics pattern in standby mode—it may be set for Continuous or Flashing mode. The Display Type Switch controls the graphics pattern as it responds to the music—it may be set for dot or bar graphics. When the Mute Display Switch is set to Flashing, the Display Type Switch may be used to choose either the bar or the dot pattern for the standby mode. To set the Light Display function, locate the Controller at the back of the enclosed compartment and set the switches to the settings desired. Five switch combination are possible:

(Standby Mode) 1. Flashing: Dot Graphics, 2. Flashing: Bar Graphics, 3. Continuously Lit, (Responsive Mode) 4. Dot Graphics, and Bar graphics.



OUTER CAM SWITCH  
ACTUATED IN RECORD  
PLAYING POSITION

INNER CAM SWITCH  
ACTUATED IN  
STANDBY

FIGURE 5. CAM SWITCH AND MOTOR  
ASSEMBLY COMPONENTS

Cam Switch and Motor Assembly. (See Figure 5). The cam switch and motor assembly consists of the transfer motor, cam, and two cam switches. A nylon cam operates the cam switches.

## THE MAIN POWER SUPPLY

Located in the enclosed compartment on the left of the interior of the phonograph the Main Power supply distributes unregulated +28 VDC, 28 VAC and regulated +8 VDC to the phonograph components. The power is controlled by a rocker switch located on the rear of the cabinet 120 volt AC receptacles are provided for the amplifier, light, accessories and service equipment. The AC receptacles and transformer primary are protected by the 10 amp circuit breaker CB1, while circuit breaker CB2 protects the transformer primary only. Both of these circuit breakers can be reset from the front panel.

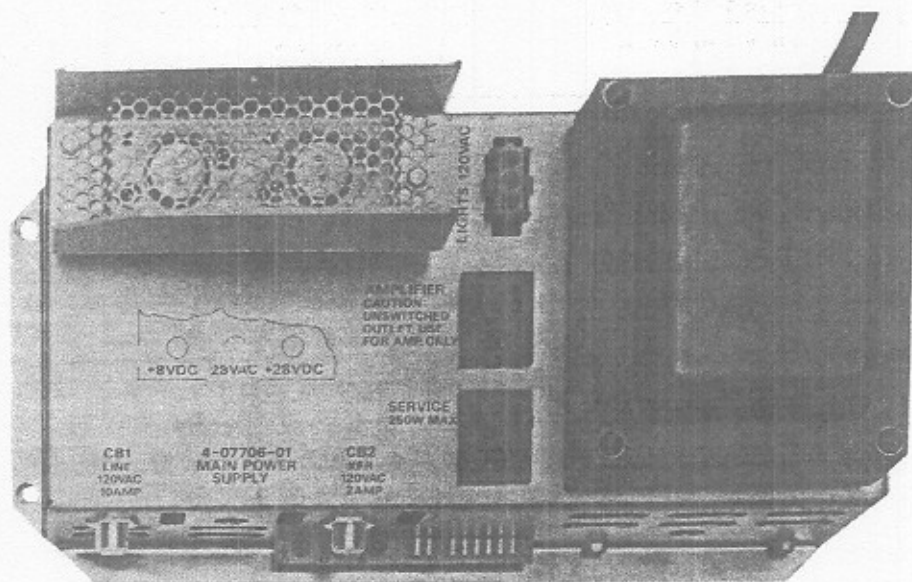


FIGURE 6. MAIN POWER SUPPLY

TABLE 1. ACCESSORY EQUIPMENT

PART NO.	DESCRIPTION	FUNCTION
6-50570-13	One & Five Dollar Bill Acceptor Kit (Includes Bill Stacker)	Accepts valid one & five dollar bills.
2-66946-04	Phono Paging System	Paging System not affected by A.V.C. All Plug-in unit, complete with microphone and 50 feet of microphone cable. Allows use of phono sound system for paging.
2-64014-01	Paging Adapter Kit	Adapts paging equipment for R-83 thru R-86 phonographs for use with R-87 and later phonographs.
2-66974-02	Amplifier Accessory Kit	Provides access to auxiliary inputs and outputs of the preamplifier. Inputs will accept signals from most background music sources such as tape players and AM or FM radios. Outputs available to drive slave amplifiers before or after volume control.
2-67003-01	125 Watt Amplifier Harness Kit	Three Adapter Cables to interchange-combo line plugs with Universal plugs.
3-06322-01	Remote Volume & Cancel Control	Remote stereo volume control and cancel button. Does not include cable.
6-08980-04	Remote Volume Power Switch & Cancel Control	Volume Control incorporates on-off switch. 115V only.
3-06322-09	Dual Remote Volume Control	Controls volume of each channel separately. Does not include cable.
2-08199-07	Remote Volume and Cancel Control Cable	For connecting remote volume control to phonograph 3-conductor cable, 50 ft. length.
2-08199-08	Remote Volume and Cancel Control Cable	For connecting remote volume control to phonograph 4-conductor cable, 50 ft. length.
6-65047-07	Service Kit	Includes Central Computer, Mech. Control, Power Supply Board and Fuses.
6-07447-01	Extension Speaker (Model EX 350)	32 watt, two channel system includes 3-1/2" tweeter and 10 inch bass speaker.
6-09025-01	WRF Wallette Wallbox	Remote control unit for solid state phonograph. R-89 and video takes nickels, dimes, quarters and half dollars.
2-66989-05	Wallbox Adaptor Harness Kit (WRF)	For making internal connections in phonograph to allow installation of WRF Wallbox.
4-06891-01	Auxiliary Power Supply	Permits operation with WRA, WRB, WRC, WRD & WRE, WRF Wallboxes.
0-05080-00 Belden No. 8447 Columbia No. 4082	7 Conductor Cable	For connecting WRF to phonograph. (Not supplied by Rowe)
2-66995-03	Security Bar Kit	Heavy steel bar locks in place over cash box door.
2-67025-01	Conversion Kit	Converts WRE to WRF Wallette