SECTION 2 - CREDIT AND SELECTION SYSTEM MAINTENANCE

INTRODUCTION

This section contains price setting procedures, troubleshooting and adjustment instructions and a complete theory of operation of the credit and selection system.

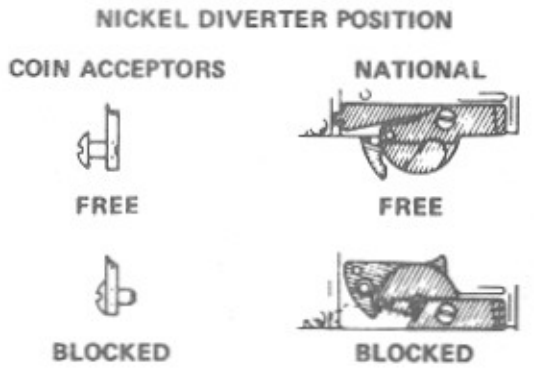
PRICING

The credit and pricing system of the phonograph can be adapted to an almost unlimited variety of pricing combinations. Pricing for each phonograph as set at the factory is indicated by the price card installed in the price window. The following information is provided to facilitate price setting.

SETTING PRICES

Setting prices is accomplished by simply setting 2 banks of 9 switches each in either "ON" or "OFF" positions. A bonus relay is not required for any pricing. Although not compatible with the Model MAF Money Meter, the Credit Computer can be used with Models MBA & MBB Digital Print-Out Money Meters.

The Credit Computer will register nickels and dimes. The nickel diverter in the coin mechanism should be in blocked position as shown.



Using the following charts for reference, set prices in the following manner:

1. Select desired pricing program from chart. (If desired pricing is not shown, refer to "Making Your Own Price Combinations" on page 2-34
2. Set switches S1 and S2 to OFF position; then set to desired program as shown below.
3. Install correct price card in phonograph.
4. Insert coins and make selections to check proper operation.

TABLE 2-1. PRICE OF PLAY PROGRAMMING (Continued)

STANDARD SELECTIONS					ALBUM SELECTIONS			
$1.00	75¢	50¢	25¢	10¢	$1.00	75¢	50¢	25¢
15	11	7	3	1	5	3*	2*	1
*PLUS STANDARD PLAY								

STANDARD SELECTIONS					ALBUM SELECTIONS
$1.00	75¢	50¢	25¢	10¢	NO ALBUMS
15	11	7	3	1	
*PLUS STANDARD PLAY					

STANDARD SELECTIONS					ALBUM SELECTIONS			
$1.00	75¢	50¢	25¢	15¢	$1.00	75¢	50¢	25¢
12	7	4	2	1	6	3*	2	1
*PLUS STANDARD PLAY								

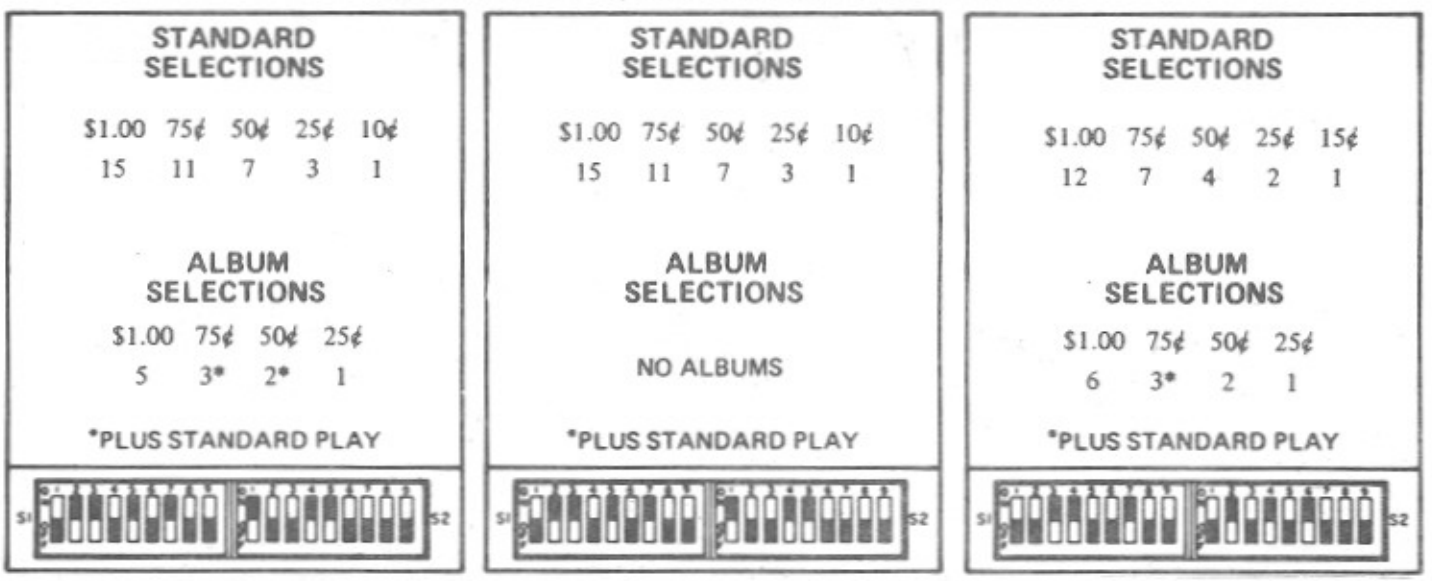


TABLE 2-1. PRICE OF PLAY PROGRAMMING (Continued)

STANDARD SELECTIONS

$1.00	75¢	50¢	25¢	15¢
12	8	5	2	1

ALBUM SELECTIONS

$1.00	75¢	50¢	25¢
6	4	2*	1

*PLUS STANDARD PLAY

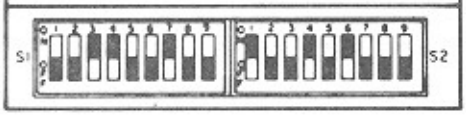
STANDARD SELECTIONS

$1.00	75¢	50¢	25¢	15¢
13	8	5	2	1

ALBUM SELECTIONS

$1.00	75¢	50¢	25¢
6*	4	2*	1

*PLUS STANDARD PLAY



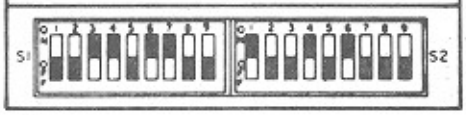
STANDARD SELECTIONS

$1.00	75¢	50¢	25¢	15¢
14	8	5	2	1

ALBUM SELECTIONS

$1.00	75¢	50¢	25¢
7	4	2*	1

*PLUS STANDARD PLAY



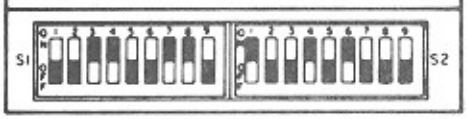
STANDARD SELECTIONS

$1.00	75¢	50¢	25¢	15¢
14	9	5	2	1

ALBUM SELECTIONS

$1.00	75¢	50¢	25¢
7	4*	2*	1

*PLUS STANDARD PLAY



STANDARD SELECTIONS

$1.00	75¢	50¢	20¢
8	5	3	1

ALBUM SELECTIONS

$1.00	75¢	50¢
4	2*	1*

*PLUS STANDARD PLAY

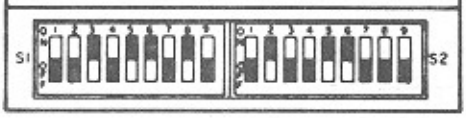
STANDARD SELECTIONS

$1.00	75¢	50¢	20¢
9	5	3	1

ALBUM SELECTIONS

$1.00	75¢	50¢
4*	2*	1*

*PLUS STANDARD PLAY



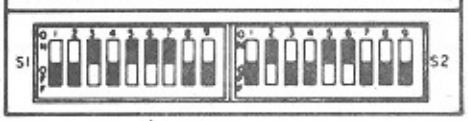
STANDARD SELECTIONS

$1.00	75¢	50¢	20¢
10	6	3	1

ALBUM SELECTIONS

$1.00	75¢	50¢
5	3	1*

*PLUS STANDARD PLAY



STANDARD SELECTIONS

$1.00	75¢	50¢	20¢
11	6	3	1

ALBUM SELECTIONS

$1.00	75¢	50¢
5*	3	1*

*PLUS STANDARD PLAY

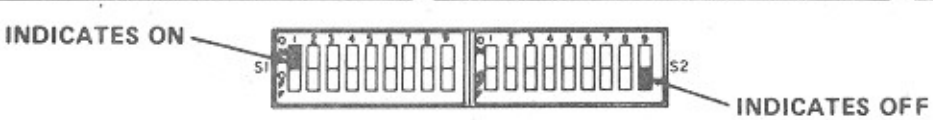
STANDARD SELECTIONS

$1.00	75¢	50¢	25¢
7	4	3	1

ALBUM SELECTIONS

$1.00	75¢	50¢
3*	2	1*

*PLUS STANDARD PLAY



SWITCHES SHOWN IN ON POSITION

TABLE 2-1. PRICE OF PLAY PROGRAMMING (Continued)

STANDARD SELECTIONS

$1.00	75¢	50¢	25¢
11	7	4	2

ALBUM SELECTIONS

$1.00	75¢	50¢	25¢
5*	3*	2	1

*PLUS STANDARD PLAY

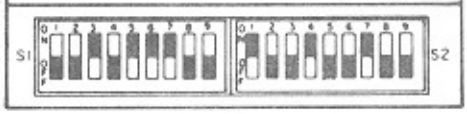
STANDARD SELECTIONS

$1.00	75¢	50¢	25¢
12	8	5	2

ALBUM SELECTIONS

$1.00	75¢	50¢	25¢
6	4	2*	1

*PLUS STANDARD PLAY



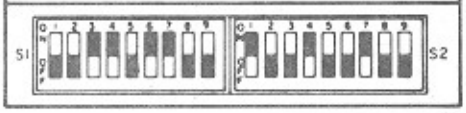
STANDARD SELECTIONS

$1.00	75¢	50¢	25¢
14	8	5	2

ALBUM SELECTIONS

$1.00	75¢	50¢	25¢
7	4	2*	1

*PLUS STANDARD PLAY



STANDARD SELECTIONS

$1.00	75¢	50¢	25¢
14	9	5	2

ALBUM SELECTIONS

$1.00	75¢	50¢	25¢
7	4*	2*	1

*PLUS STANDARD PLAY

STANDARD SELECTIONS

$1.00	75¢	50¢	25¢
15	9	5	2

ALBUM SELECTIONS

$1.00	75¢	50¢	25¢
7*	4*	2*	1

*PLUS STANDARD PLAY

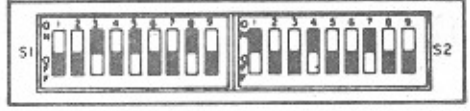
STANDARD SELECTIONS

$1.00	75¢	50¢	25¢
10	7	5	2

ALBUM SELECTIONS

NO ALBUMS

*PLUS STANDARD PLAY



STANDARD SELECTIONS

$1.00	75¢	50¢	25¢
11	8	5	2

ALBUM SELECTIONS

$1.00	50¢	25¢
5*	2*	1

*PLUS STANDARD PLAY

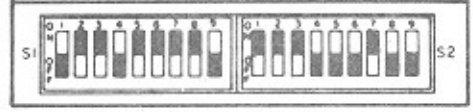
STANDARD SELECTIONS

$1.00	75¢	50¢	25¢
15	11	7	3

ALBUM SELECTIONS

$1.00	75¢	50¢	25¢
5	3*	2*	1

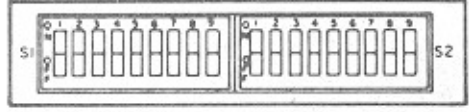
*PLUS STANDARD PLAY

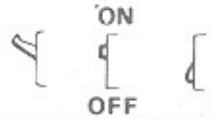


STANDARD SELECTIONS

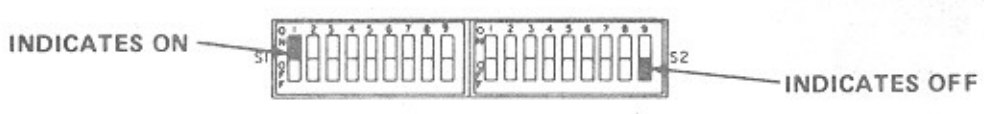
ALBUM SELECTIONS

*PLUS STANDARD PLAY

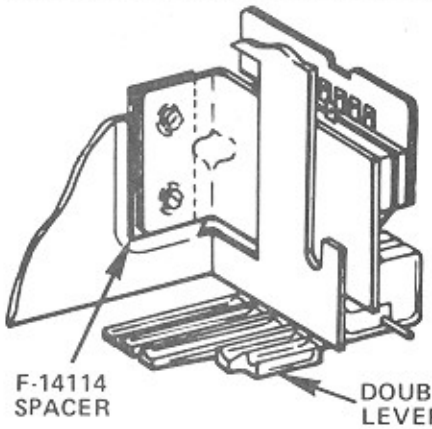




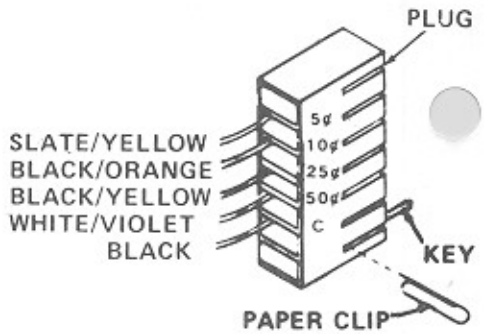
SWITCHES SHOWN IN ON POSITION

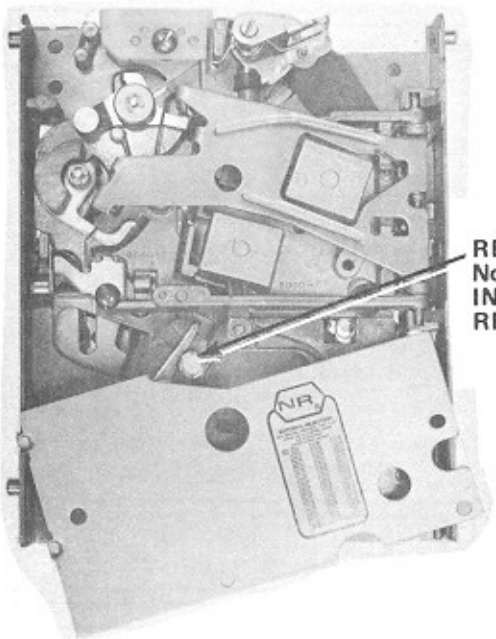


THREE PRICE COIN MECHANISMS



CA slug rejector can be interchanged with NRI slug rejector. F-14114 spacer must be used with CA for alignment.

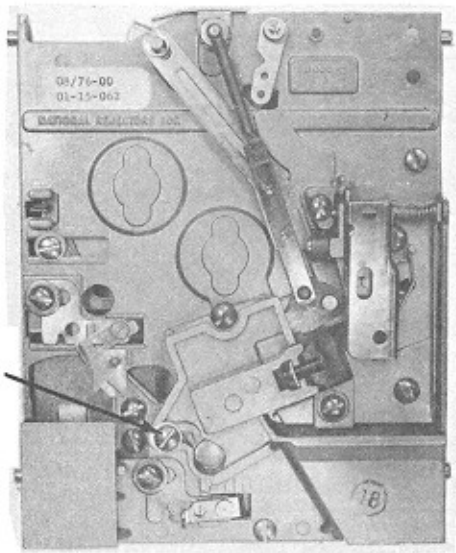


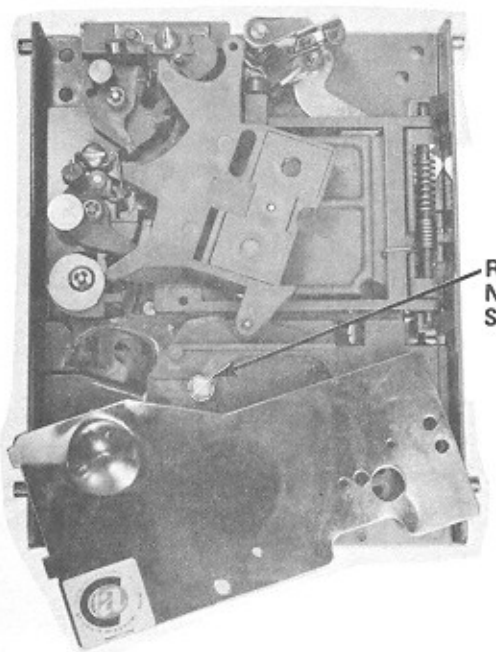


NATIONAL
3 COIN
402-06961

REMOVE COVER AND DRIVE No. 6-32 SELF-TAPPING SCREW INTO BOSS AS SHOWN TO REJECT NICKELS

MOVE THIS SCREW TO RIGHT TO REJECT DIMES (OR JUST FAR ENOUGH TO LEFT TO ACCEPT DIMES)

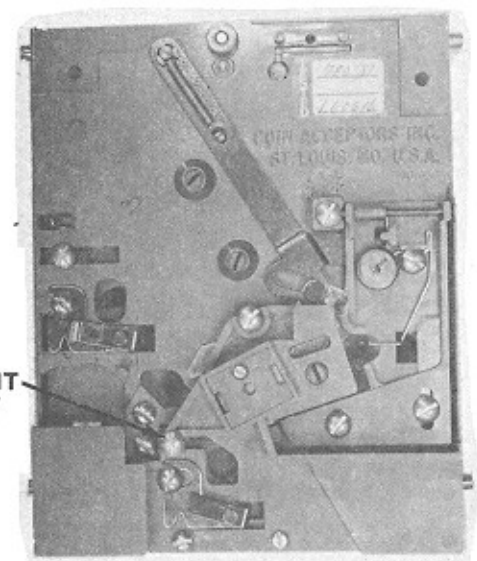


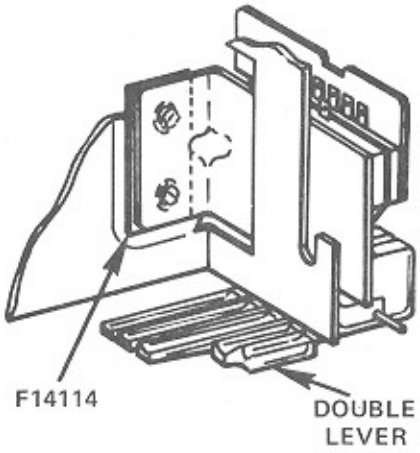


COIN ACCEPTORS
3 COIN
401-06961

REMOVE COVER AND DRIVE No. 6-32 SCREW INTO BOSS AS SHOWN TO REJECT NICKELS

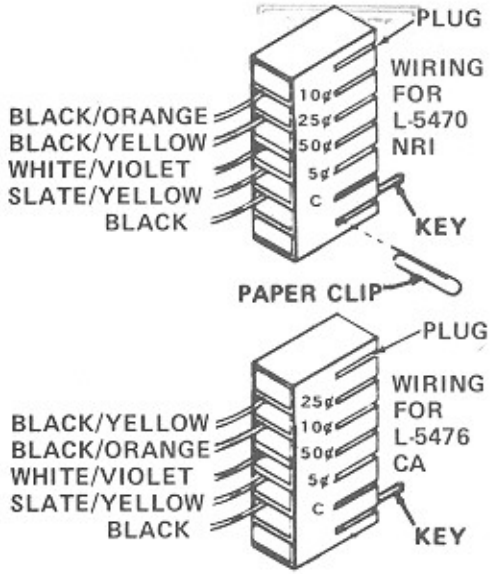
MOVE THIS SCREW TO RIGHT TO REJECT DIMES (OR JUST FAR ENOUGH TO LEFT TO ACCEPT DIMES)



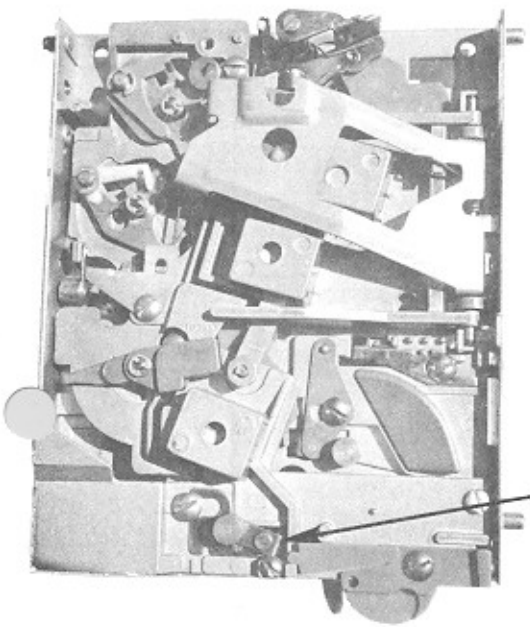


CA slug rejector can be interchanged with NRI slug rejector when coin switch has double width nickel lever. F-14114 spacer must be added for alignment when CA is used.

NOTE: Coin switch wiring in edge connector must be changed if rejectors are changed. To interchange black/orange and black/yellow wires, use tip of paper clip as tool. Press side of contact to release holding tab. Wire and contact can be pulled out. Tab may need reforming before reinsertion into edge connector.

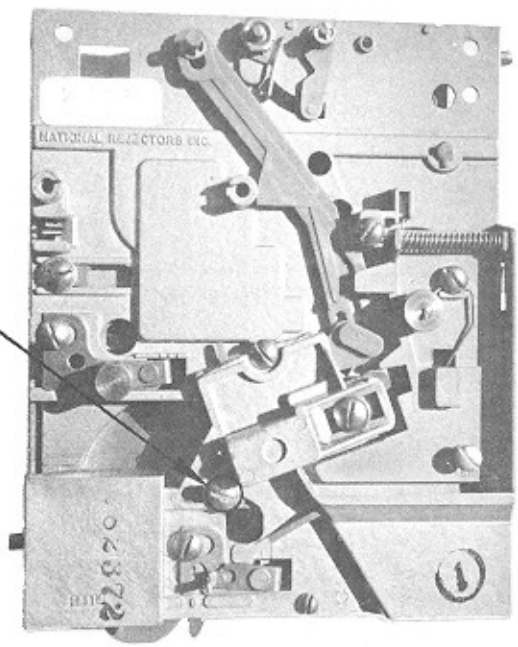


NATIONAL



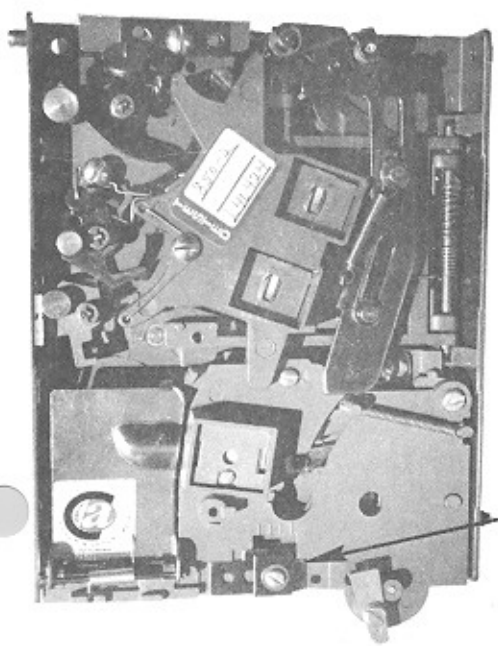
Move this screw to right to reject dimes (or just far enough to left to accept dimes).

Move this bracket to right to reject nickels (or just far enough to left to accept nickels).



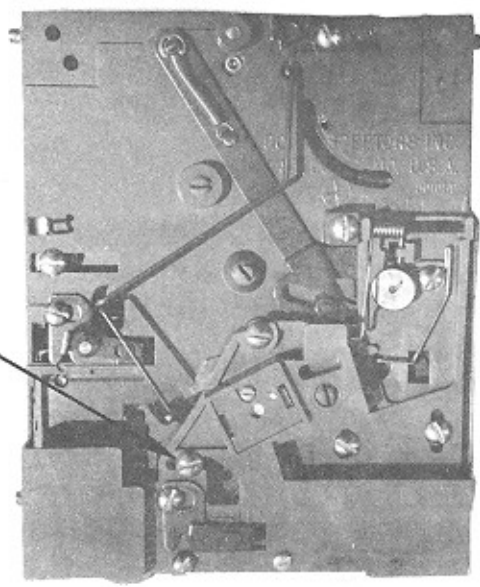
FRONT VIEW

COIN ACCEPTORS



Move this screw to right to reject dimes (or just far enough to left to accept dimes).

Move this bracket to right to reject nickels (or just far enough to left to accept nickels).



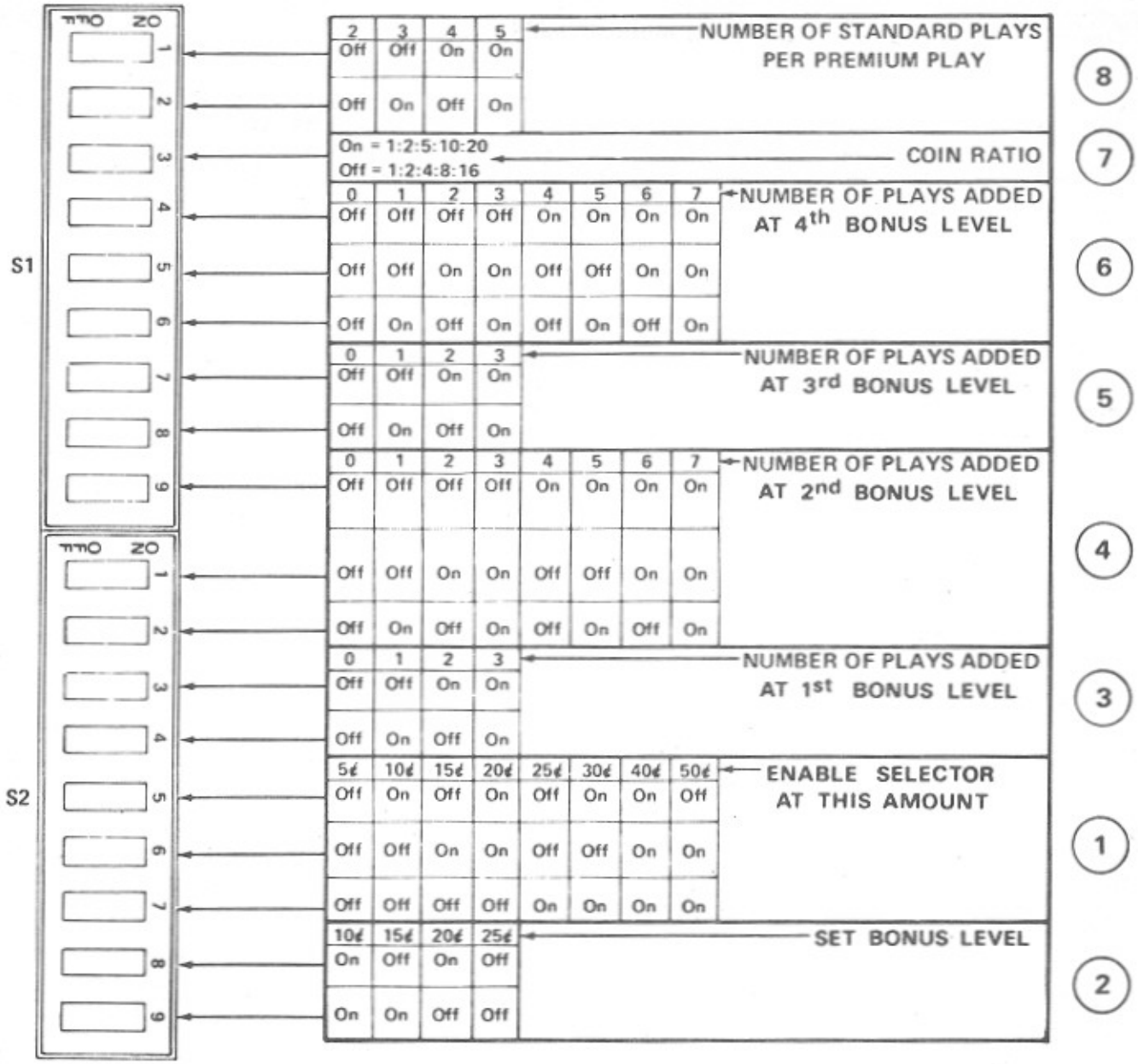


FIGURE 2-15. CREDIT COMPUTER PRICING SWITCHES AND THEIR FUNCTIONS

MAKING YOUR OWN PRICE COMBINATIONS

Pricing combinations other than those shown on the pricing charts are possible with the build-in flexibility of the Rowe Credit Computer.

Follow these steps:

1. Determine the lowest amount of money that you want to turn on the selector, i.e. give just enough credit to light the "make standard selection" lamp.
   Set switches S2-5, S2-6, and S2-7

2. The setting in step (1) gave you one play per amount chosen. The first bonus level should be at that value or above. Determine the first bonus level. Generally this will be at 25¢ whether you actually add a bonus or not in step (3).
   Set switches S2-8 and S2-9

3. How many plays do you want to add at the first bonus level determined in step (2)?
   Set switches S2-3 and S2-4

4. The second bonus level is at two times the amount of the first bonus level. (If the first level is at 25¢ the second level is at 50¢). How many plays do you want to add at the second bonus level? Add up what you have so far and see how many more you want at this level.
   Set switches S1-9, S2-1, and S2-2

5. The third bonus level is at three times the amount of the first bonus level. How many plays do you want to add at the third bonus level? Add up what you have so far and add enough to give you what you want at this level.
   Set switches S1-7 and S1-8

6. The fourth bonus level is at four times the amount of the first bonus level. How many plays do you want to add at the fourth bonus level? Follow same procedure as before.
   Set switches S1-4, S1-5, and S1-6

7. Set coin ratio.
   1: 2: 5: 10: 20 Means 5¢, 10¢, 25¢, 50¢, $1.00
   Set switch S1-3

8. Determine desired price of Album Play. This is set as a multiple of standard play.
   Set switches S1-1 and S1-2

EXAMPLES

STANDARD SELECTIONS	ALBUM SELECTIONS
1 for 10¢	1 for 25¢
3 for 25¢	2* for 50¢
7 for 50¢	3** for 75¢
11 for 75¢	5 for $1.00
15 for $1.00	* Plus one standard play

	Step		Am't	Std.	Bonus	Cumulative Total
Enables selector at 10¢. Adds one credit for each 10¢ deposited.	1	S2-5 On S2-6 Off S2-7 Off	10¢ 20¢	1 1	0 0	1 2
Sets bonus levels at 25¢, 50¢, 75¢, and $1.00	2	S2-8 Off S2-9 Off				
Adds one bonus credit at 1st bonus level (25¢)	3	S2-3 Off S2-4 On	25¢ 35¢ 45¢	0 1 1	1 0 0	3 4 5
Adds two bonus credits at 2nd bonus level (50¢)	4	S1-9 Off S2-1 On S2-2 Off	50¢ 60¢ 70¢	0 1 1	2 0 0	7 8 9
Adds two bonus credits at 3rd bonus level (75¢)	5	S1-7 On S1-8 Off	75¢ 85¢ 95¢	0 1 1	2 0 0	11 12 13
Adds two bonus credits at 4th bonus level ($1.00)	6	S1-4 Off S1-5 On S1-6 Off	$1.00	0	2	15
Sets coin ratio for U.S. coins.	7	S1-3 On				
Sets album play at 3x standard play	8	S1-1 Off S1-2 On				

NOTE: Each time a bonus is added the standard play amount starts over at that level. If a bonus level is reached but no bonus is added the standard play amount ignores the bonus level.

For additional information, see Principles of Operation on page 2-54

STANDARD SELECTIONS	ALBUM SELECTIONS
2 for 25¢	1 for 25¢
5 for 50¢	2* for 50¢
9 for 75¢	4* for 75¢
14 for $1.00	7 for $1.00
	* Plus one standard play

	Step		Am't	St'd	Bonus	Cumulative Total
Enables selector at 25¢. Adds one credit for each 25¢ deposited.	1	S2-5 Off S2-6 Off S2-7 On		1		1
Sets bonus levels at 25¢, 50¢, 75¢, and $1.00	2	S2-8 Off S2-9 Off				
Adds one bonus credit at 1st bonus level (25¢)	3	S2-3 Off S2-4 On	25¢	1	1	2
Adds two bonus credits at 2nd bonus level (50¢)	4	S1-9 Off S2-1 On S2-2 Off	50¢	1	2	5
Adds three bonus credits at 3rd bonus level (75¢)	5	S1-7 On S1-8 On	75¢	1	3	9
Adds four bonus credits at 4th bonus level ($1.00)	6	S1-4 On S1-5 Off S1-6 Off	$1.00	1	4	14
Sets coin ratio for U.S. coins	7	S1-3 On				
Sets album play at 2x standard play	8	S1-1 Off S1-2 Off				

PREMIUM PRICING

For premium pricing, an optional switch unit, part no. 702-00430, must be plugged into a receptacle on the selector logic module. Set selections 60 through 99 for premium (album) price, using premium pricing switches on selector logic module. Each switch represents 10 records (20 selections). Set switches for premium or standard price as desired. The test switch bypasses the credit computer, enabling phonograph operations for test purposes. It may also be used as a "free play" switch.

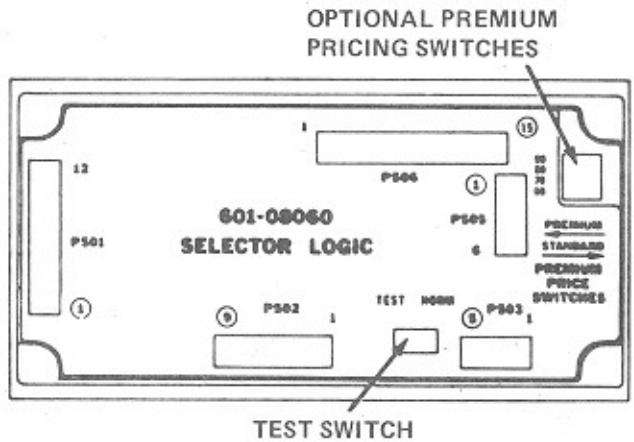


FIGURE 2-16. SWITCH LOCATIONS ON SELECTOR LOGIC MODULE

CREDIT COMPUTER TROUBLESHOOTING

The following troubleshooting procedures apply only to the 601-07674 Phonograph Credit Computer Assembly. The computer circuitry is designed around a single, non-repairable MOS chip, however the remainder of the components are discrete and can be replaced using circuit board soldering techniques described on page 2-3. To avoid damage to the computer while attempting repair, the unit should be returned to the factory if a qualified electronic technician is not available.

TEST EQUIPMENT

To aid in troubleshooting, the TE-475 Credit Computer Tester, is available. This unit provides a convenient, portable facility for operating the computer out of the phonograph cabinet. Credit is entered with pushbutton switches and accumulated credit is displayed with light emitting diodes. Other test equipment required is as follows:

- Oscilloscope - Textronix D66, or equivalent
- Voltmeter - Ballantine 3/24 DVM, or equivalent (1 Meg. or greater input impedance).

PRECAUTIONS

To avoid damage to the MOS chip by static electricity or current leakage, observe the following precautions:

- Use a soldering iron with a grounded tip.
- Do not repair computer in a carpeted area.
- Touch ground before touching the circuit board.

TROUBLESHOOTING PROCEDURE

Use the following chart to isolate and correct computer malfunctions:

CREDIT COMPUTER TROUBLESHOOTING CHART

TROUBLE	PROBABLE CAUSE	REMEDY
I. Any Trouble	Poor Solder Joints	Resolder
	-13 VDC Power Supply Faulty	Replace Zener Diode CR
	Oscillator not operating	Readjust R806, Replace C602 or Z601. Frequency must be 6.0 ± .2 KHz.
II. No Credit Established	Refer to cause in Section I.	
A. Credit established at Z601 output pin 2 and pin 12 of P601 but not at pin 13 of P601.	Defective Q602 or poor solder connection.	Replace Q602 or resolder connector pin.
B. Credit established at Z601 output pin 4 and pin 11 of P601 but not at pin 15 of P601.	Defective Q601 or poor solder connection	Replace Q601 or resolder connector pin.
C. Credit not established on Z601, pins 2 or 4.	Spurious ground on Z601 pins 12, 13, 14, 15, 16, 17 or 18 due to leaky capacitor C604, C605, C606, C607, C608, C609, C610 or C611; or faulty Z601.	Isolate cause to faulty component and replace.
III. Continuous Free Play	Refer to causes in Section I.	
A. Credit on Z601, pins 2 and 4 continuous at power turn on.	Spurious ground on Z601, pins 14-18 due to: 1. Shorting Wire 2. Short inside Z601.	Remove Short. Replace Z601.
B. Credit on Z601, pins 2 and 4 cannot be cancelled by cancel signals.	Cancel connections open. Leaky capacitor C606 or C607. Faulty Z601.	Solder connections. Replace capacitor. Replace Z601.
IV Incorrect Credit	Refer to causes in Section I.	
	S602 and S603 set incorrectly	Reset switches S602 and S603.
	Z601 faulty.	Replace Z601.
V. Money pulses not generated at output.	Faulty Q603 or Q604.	Replace transistor Q603 or Q604.
	Z601 not generating pulses on pin 39.	Replace Z601.

160, 120, 100 SELECTION PROGRAMMING

Program the Phonograph for 160, 120, or 100 selection operation by grounding selector logic pins as follows:

TABLE 2-2. 160, 120, 100 SELECTION PROGRAMMING

Number of Selections	160	120	100
Connect the following Sel. Logic chip pins to ground (Pin 4)	39	40	39 and 40
Selections Played	100 to 179 200 to 279	First 6 of each group of 10, i.e.,100 to 105, 110 to 115,etc.	100 to 149 200 to 249
Switchable Premium Pricing	60 Group 70 Group	160 to 165 170 to 175 180 to 185 190 to 195 260 to 265 270 to 275 280 to 285 290 to 295	*None

*Premium pricing is possible for 100 selection operation by adding diodes, part no. 707-00350, to function in the same way as CR503 through CR506. For example, to premium price group 50, add a diode between pins 32 and 23 of the selector logic chip.

SELECTION SYSTEM OPERATION

The selection system permits the customer to choose desired selections after credit is established. The purpose of each selection system component is explained in the following paragraphs.

KEYBOARD ASSEMBLY (See figure 2-14)

The keyboard assembly is located on the selector panel just below the selector display window. It contains two rows of five selection pushbutton switches (1 through 5 and 6 through 0) and a RESET switch. The switches are mounted on a printed circuit board which plugs into the selector logic module on the rear wall of the cabinet.

SELECTOR LOGIC MODULE (See figure 2-14)

The selector logic receives circuit closures from the keyboard assembly and converts this data to binary form for transmission to the memory unit. The selection data is synchronized with an internal clock and transmitted as a pulse train at pin 26. Two red indicator lamps on the memory unit indicate the operation of the clock and data line.

COIN SWITCH ADJUSTMENTS

For convenience, mount slug rejector on the bracket provided in front of the coin chute.

OPERATIONAL CHECK

1. Hold plastic coin switch lever in normal position and drop a coin through slug rejector.
2. When the coin comes to rest on the lever, release the lever slowly.
3. Check that the weight of the coin operates the lever enough to close the coin switch and allow the coin to fall free.
4. Repeat steps 1, 2 and 3 for other three levers.

CONTACT PRESSURE AND GAP

1. Check that each moving switch blade pushes against its lever with 7 to 8-grams force to hold lever against cushion. To adjust pressure, bend the blade near its mounting point.
2. Check that each non-moving blade pushes against its stiffener blade with 8- to 15-grams force. To adjust pressure, bend the contact blade near its mounting point.
3. Check that contact gap at switch with short double paddle is 0.030 to 0.035". Check that contact gap for long lever switches is 0.040 to 0.045 inch.

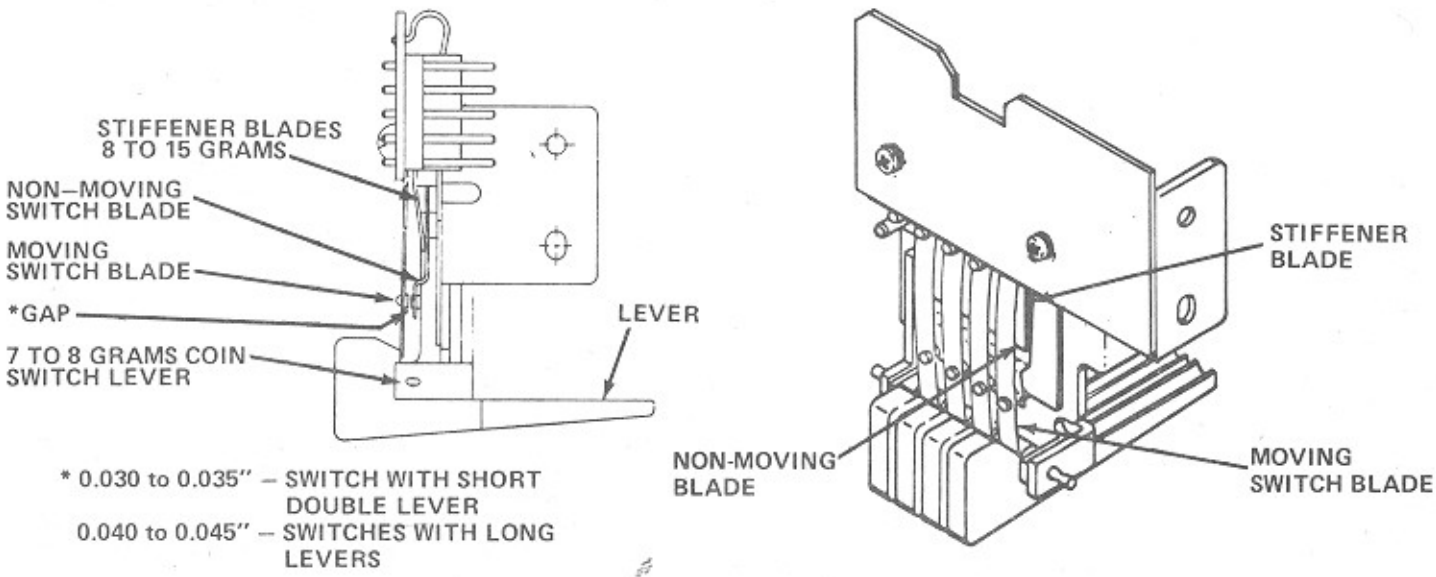


FIGURE 2-17. CONTACT PRESSURE AND GAP ADJUSTMENT

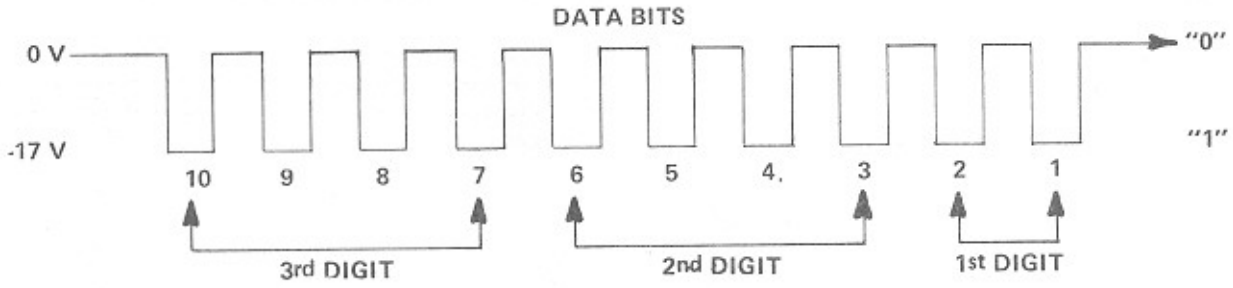


FIGURE 2-18. TEN BIT DATA PULSE TRAIN

Figure 2-18 shows a ten bit data pulse train. In this instance all bits are shown equal to "1" but for various selections, the bits may be combinations of "0"s and "1"s. The clock pulses are always equal to "1".

Table 2-3 shows how the data bits are arranged by the selector logic unit. Bits 1 and 2 indicate the source and if the record is a 100 selection or a 200 selection. The first selected digit must be either a 1 or a 2. Bits 3 through 6 carry the second digit information while bits 7 through 10 carry the third digit information. See table 2-4.

The selector logic module also incorporates rocker switches for premium pricing selections 60 through 99.

TABLE 2-3. FIRST DIGIT SELECTION

SELECTION	BITS COMING FROM	BIT NO. 1 2
2 X X	MEMORY	0 0
2 X X	SELECTOR	1 0
1 X X	SELECTOR	0 1
1 X X	MEMORY	1 1

TABLE 2-4. SECOND AND THIRD DIGIT SELECTION

DIGIT NUMBER	SECOND DIGIT BITS 3	4	5	6	THIRD DIGIT BITS 7	8	9	10
0	0	0	0	0	0	0	0	0
1	0	0	0	1	0	0	0	1
2	0	0	1	0	0	0	1	0
3	0	0	1	1	0	0	1	1
4	0	1	0	0	0	1	0	0
5	0	1	0	1	0	1	0	1
6	0	1	1	0	0	1	1	0
7	0	1	1	1	0	1	1	1
8	1	0	0	0	1	0	0	0
9	1	0	0	1	1	0	0	1

DIGITAL DISPLAY (See figure 2-16)

The digital display (annunciator) consists of three LED number display units soldered to a printed circuit board and harness. The display is operated by the selector logic.

Each number display unit consists of seven LED's. The displays are lit by a time multiplexing circuit. This means that the displays are lit or scanned one at a time from left to right. Due to the image retention ability of the human eye all three digits appear to be lit at once.

CREDIT SYSTEM OPERATION

The Rowe credit computer is a solid state credit system developed specifically for jukebox operation. Located on the middle of the rear wall of the phonograph, the credit computer accumulates credit for deposits up to 255 standard plays. There are no moving parts to wear out and no bonus relays, 2 quarter adapter, pulse chopper, 2 quarter wheel or such parts required. See 'Setting Prices" in Section 2 for additional information.

Input signals are applied to the coin switch leads of the custom MOS circuit through appropriate interface circuits. One programming switch (S1-3) within credit computer permits these input signals to be weighted 1, 2, 5, 10, 20(i.e. nickel, dime, quarter, half dollar, dollar) or to be weighted 1, 2, 4, 8, 16 (some foreign coin ratio such as 50 pf, 1 DM 2 DM.

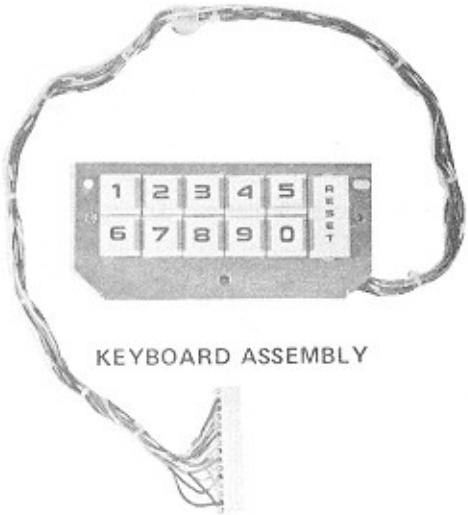
As coins are deposited in acceptable denominations and in any sequence, deposits are weighted, by connection to specific input terminals, and deposit credit is accumulated

When accumulated deposit credits equal or exceed the programmed price of play, credit chip provides an output signal to light standard play credit lamp ("Make Standard Selection"). It also provides an output enabling the phonograph selector.

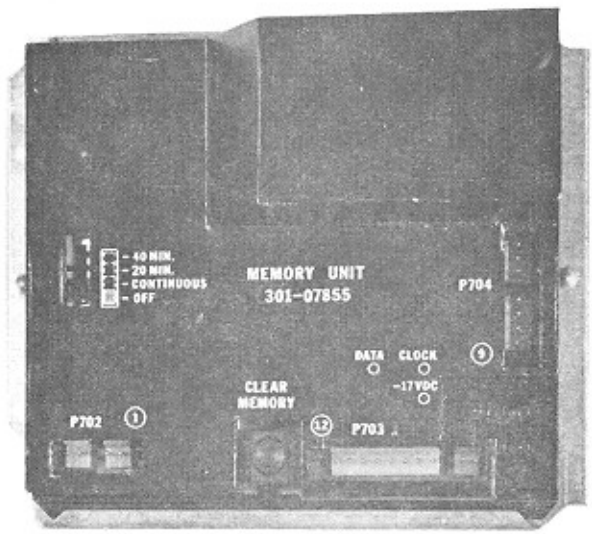
When a standard selection is made by phonograph patron a "standard cancel" signal is generated which is applied to appropriate input of credit chip. The "Cancel" signal cancels or erases credit equivalent to programmed price of play.

It is also possible to accomodate premium (album) priced records through programming switches. When selections are made which are "premium" priced, the cancel signals will erase 2, 3, 4, or 5 accumulated play credits, depending on programming switch settings. Depending on the "premium" price programmed, credit chip has a premium selection output to enable premium selections and to light premium credit lamp ("Make any Selection"). When insufficient credit exists for "Premium" price programmed, premium selections are inhibited and "Make any Selection" lamp goes out.

The Credit Computer also provides an output signal which can be used with the Print-Out Money Meter. The money pulse signals from Credit Computer occur for each deposit, and appear as a series of pulses of Minimum Coin Value (MCV). For example, when a nickel is deposited (minimum

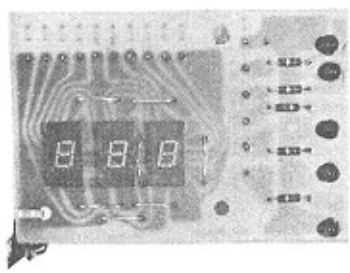


KEYBOARD ASSEMBLY

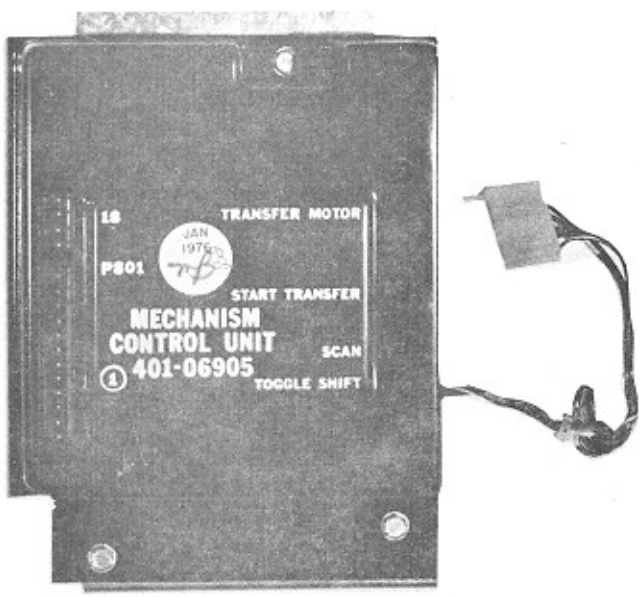


MEMORY UNIT

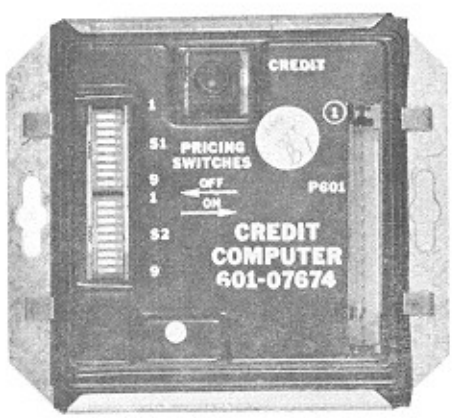
SELECTOR LOGIC MODULE



DIGITAL DISPLAY



MECHANISM CONTROL UNIT



CREDIT COMPUTER

FIGURE 2-19. CREDIT AND SELECTION SYSTEM MAJOR COMPONENTS

coin value) a single MCV pulse is provided to the money meter. When a dime is deposited, two (MCV) pulses occur. When a quarter is deposited, five (MCV) pulses occur. These pulses are registered by the money meter.

Slug Rejector and Coin Switches. The slug rejector takes good coins and rejects slugs and bad coins. It takes nickels, dimes, quarters and half-dollars.

The coin switches establish credit in the credit computer. They are located at the bottom of the slug rejector. They are operated by the coins as they fall into the cash box. A good coin moves the switch lever, closing the switch and completing a circuit to the credit computer board.

Premium Pricing Switches. The optional premium pricing switches plug into the selector logic assembly. Each switch represents one number selection group and may be set for premium (album) price or regular price as desired. A test switch is also provided. This switch can be used as a "free play" switch.

SECTION 3 - RECORD CHANGER MECHANISM MAINTENANCE

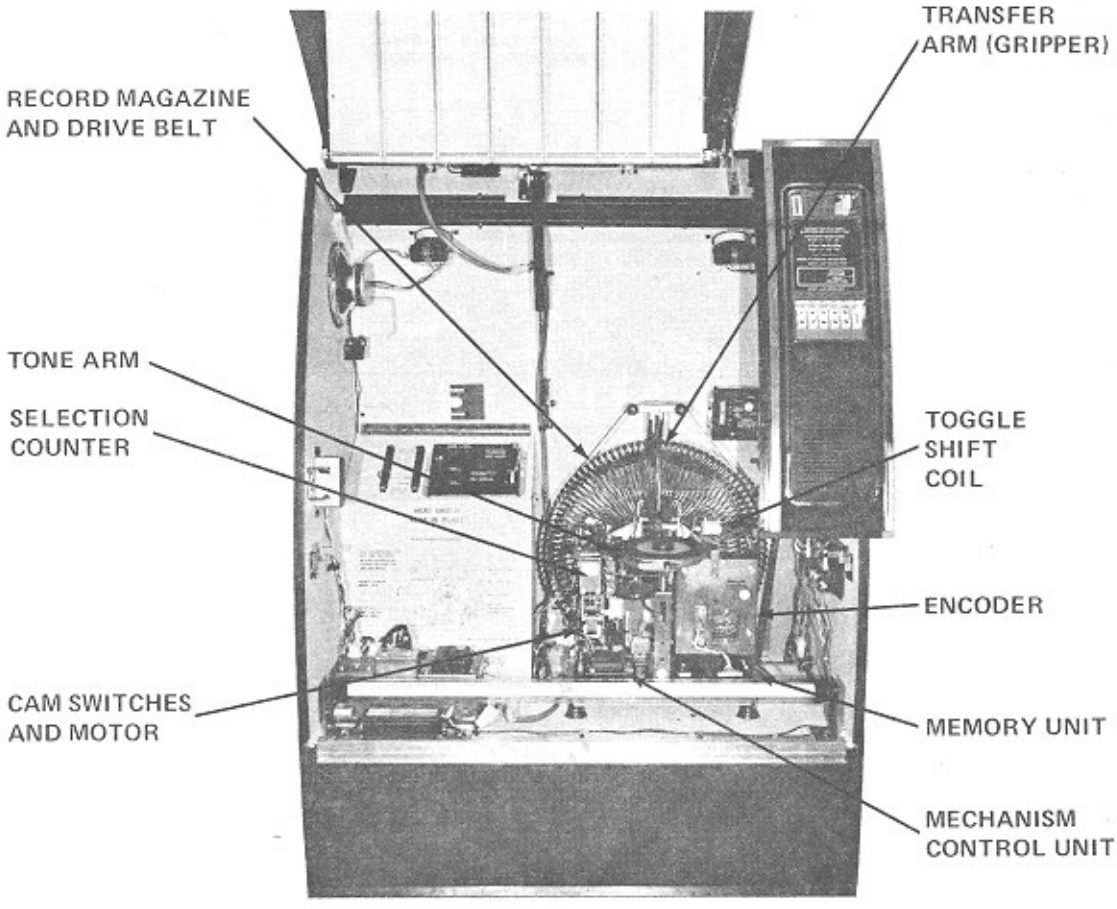


FIGURE 2-20. MAJOR COMPONENTS, RECORD CHANGER MECHANISM

INTRODUCTION

This section contains preventive maintenance procedures, including cleaning and lubrication instructions. A description of record changer operation is included along with complete adjustment instructions.

Cleaning and lubrication procedures should be performed at regular intervals specified, while adjustments should be made only when necessary.

PREVENTIVE MAINTENANCE

CLEANING

In addition to cleaning the cabinet exterior each time the location is visited, clean the cabinet interior every three to six months, as required. Keeping the cabinet interior clean reduces dust, resulting in increased record and component life. Always clean the phonograph cabinet prior to lubrication.

1. Use a vacuum cleaner, if available to remove heavy dust deposits.

WARNING

USE SOLVENTS IN A WELL–VENTILATED AREA ONLY; DO NOT USE SOLVENTS OF ANY TYPE ON PLASTIC PARTS.

2. Use a clean, lint-free cloth saturated in denatured alcohol to clean mechanical parts.

3. Clean electrical parts using a clean, dry cloth or camel's hair brush.

4. Clean the slug rejector as specified in the applicable slug rejector manual. Order the manual directly from the manufacturer of the slug rejector.

5. The encoder board commutator should not require cleaning under normal conditions. If cleaning is required, first remove the clear plastic window from the encoder housing and proceed as follows:

   - Using a clean cloth and alcohol solvent, gently clean the surface of the commutator board.
   - Release the magazine detent pawl from the detent wheel and rotate the magazine to gain access to the entire surface of the board.
   - Be careful not to disturb the positioning or tension of the wiper fingers. Do not apply solvent to the clear plastic window.
   - Replace the window when cleaning is completed.

FIVE-YEAR LUBRICATION (See Figure 2-21)

Your phonograph requires lubrication only after five years. To maintain smooth, trouble-free operation, lubricate the record changer mechanism as shown:

- One Drop F-1379 Light Machine Oil

Do Not Over - Lubricate

Do Not Use Oil or Grease on Solenoid Plungers.

RECORD CHANGER MECHANISM OPERATION

The following paragraphs contain a brief explanation of the operation of the record changer mechanism. The mechanism holds 100 records and plays selections on command from the selection system. Identification and location of each major component is shown in figure 2-20. The purpose and description of each component is explained in the following text.

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

Magazine, Belt and Transfer Arm. The record magazine stores 100 7-inch 33 or 45 rpm records in a circular cage. A seamless belt around the cage keeps records in position when they are at the bottom of the gripper bow bracket, above the cage. The rollers permit the transfer arm to clear the belt when removing and returning records to the magazine and also maintain belt tension.

Encoder Assembly. The encoder consists of a rotating commutator disc and a stationary set of wiper contacts which complete circuits to the memory unit and mechanism control unit. The commutator disc contains 100 segments corresponding directly to selections in the record magazine. The disc is driven by the magazine motor.

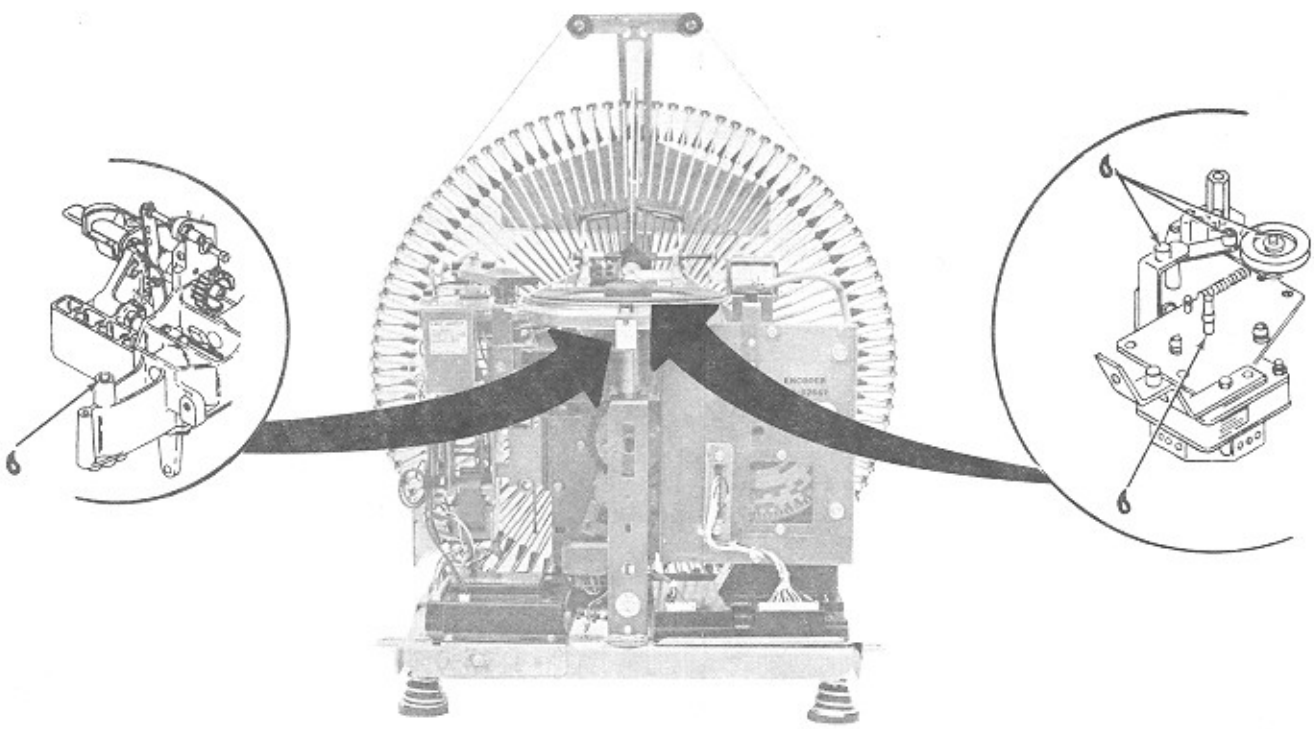
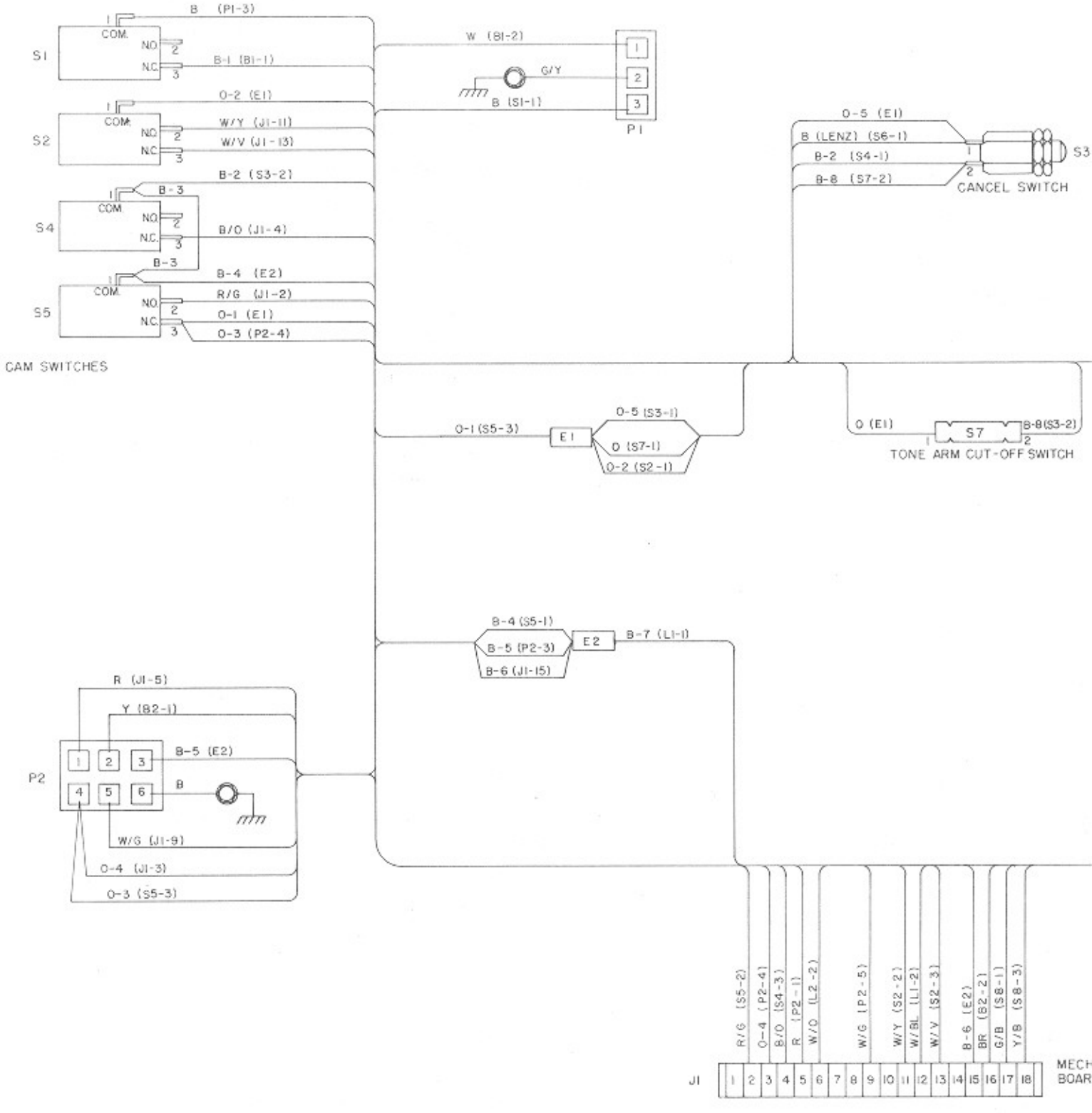
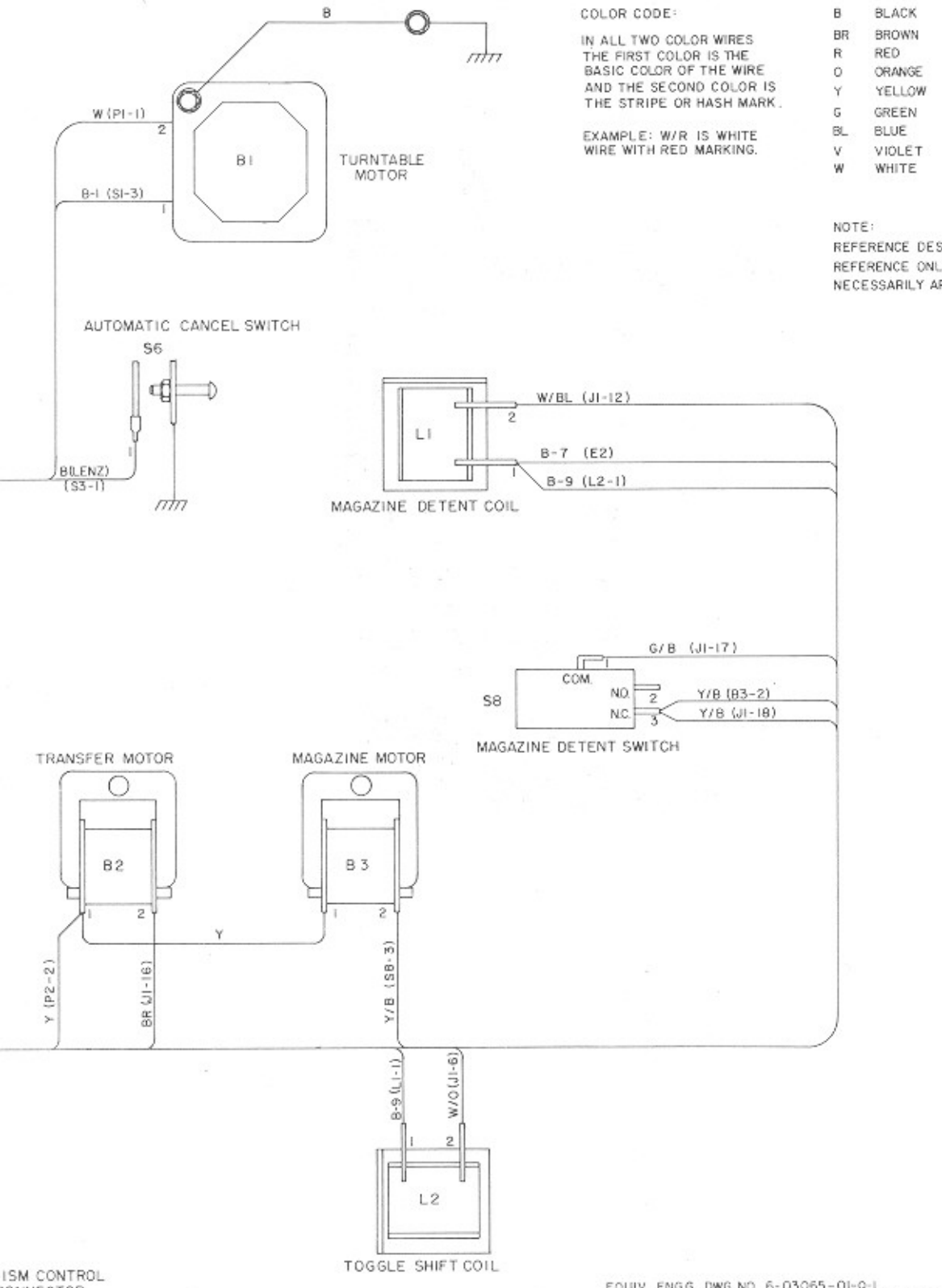


FIGURE 2-21. PHONOGRAPH LUBRICATION


S1
S2
S4
S5
COM.
NO.
N.C.
B (P1-3)
B-1 (B1-1)
O-2 (E1)
W/Y (J1-11)
W/V (J1-13)
B-2 (S3-2)
B-3
B/O (J1-4)
B-4 (E2)
R/G (J1-2)
O-1 (E1)
O-3 (P2-4)
CAM SWITCHES
W (B1-2)
G/Y
B (S1-1)
P1
O-5 (E1)
B (LENZ) (S6-1)
B-2 (S4-1)
B-8 (S7-2)
S3
CANCEL SWITCH
O-1 (S5-3)
E1
O-5 (S3-1)
O (S7-1)
O-2 (S2-1)
O (E1)
S7
B-8 (S3-2)
TONE ARM CUT-OFF SWITCH
B-4 (S5-1)
B-5 (P2-3)
B-6 (J1-15)
E2
B-7 (L1-1)
P2
R (J1-5)
Y (B2-1)
B-5 (E2)
B
W/G (J1-9)
O-4 (J1-3)
O-3 (S5-3)
J1
R/G (S5-2)
O-4 (P2-4)
B/O (S4-3)
R (P2-1)
W/O (L2-2)
W/G (P2-5)
W/Y (S2-2)
W/BL (L1-2)
W/V (S2-3)
B-6 (E2)
BR (B2-2)
G/B (S8-1)
Y/B (S8-3)
MECH
BOAR



COLOR CODE:

IN ALL TWO COLOR WIRES THE FIRST COLOR IS THE BASIC COLOR OF THE WIRE AND THE SECOND COLOR IS THE STRIPE OR HASH MARK.

EXAMPLE: W/R IS WHITE WIRE WITH RED MARKING.

B	BLACK
BR	BROWN
R	RED
O	ORANGE
Y	YELLOW
G	GREEN
BL	BLUE
V	VIOLET
W	WHITE

NOTE:
REFERENCE DESIGNATIONS ARE FOR REFERENCE ONLY AND DO NOT NECESSARILY APPEAR ON PART.

EQUIV. ENGG. DWG. NO. 6-03065-01-Q-1
FOR SCHEMATIC DIAGRAM SEE 6-08000-03-Q-2

6-03065-01-Q-1

FIGURE 2-22. RECORD CHANGER MECHANISM WIRING DIAGRAM

Memory Unit. The memory unit contains digital circuits which receive and store selections from the selector logic unit. The memory matches encoder disc segments against the stored data and commands the mechanism control unit to deenergize the magazine motor and detent coil and operate the record transfer motor and toggle shift coil, if required. In addition, the memory unit houses the auto play feature. Auto play enables the phonograph to play a flip side selection, completely at random, every 20 or 40 minutes as desired, or continuously.

Also included in this package is a battery unit. The battery unit maintains voltage to the memory unit to retain selections if power to the phonograph is interrupted. The unit incorporates three long-life NICAD batteries and a built-in charger. The batteries are charged automatically during normal phonograph operation.

Mechanism Control Unit. This solid state switching unit controls the scan, transfer and toggle shift functions. The unit is switched by the memory unit through the encoder assembly.

Toggle Shifter Coil. The coil drives a linkage which rotates the transfer arm for right side selections. The linkage is spring loaded and will rotate the transfer arm for left side selections when the coil is deenergized.

Magazine Motor and Detent Assembly. This assembly operates the record magazine and popularity meter and locks the magazine in position. It is located at the center of the record changer mechanism, directly under the record transfer arm. The magazine motor and gear box, located behind the mounting plate, rotates the gears that operate the record magazine, and popularity meter drive. The solenoid operated detent 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 four to five grams pressure. The stylus plugs into the cartridge for easy replacement. A seven-pin receptacle on the tone arm assembly mates with a plug to connect the cartridge to the preamplifier via 4-conductor shielded cable.

Turntable Motor and Plate Assembly. The turntable motor and plate assembly consists of the turntable motor and associated components necessary to rotate the turntable. The turntable motor rotates a rubber idler wheel, mounted on a spring-loaded idler arm. The idler wheel contacts the inner rim of the record turntable. The turntable has heavy mass to reduce wow and flutter. Its upper surface is a rubberized pad to prevent records from slipping and to avoid record damage.

Automix. (Optional) Automix operation enables the phonograph to play both 33 and 45 rpm records in any order. Automix components consist of a speed shift coil, a hub shift coil and a trip wire and switch on the turntable hub.

Cam Switch and Motor Assembly. (See figure 2-19) The cam switch and motor assembly consists of the transfer motor and gear box, a switch cam, and four cam switches. A nylon cam operates the cam switches. The function of each switch is described in Table 2-5.

TABLE 2-5. CAM SWITCH FUNCTIONS

SWITCH	FUNCTION
CS-1	Controls turntable motor.
CS-2	Magazine motor interlock during record transfer stops record transfer in magazine.
CS-4	Operates with CS-5 to sustain beginning of 2nd half of transfer cycle.
CS-5	Stops record transfer over turntable. Signals memory unit to end transfer and toggle shift signals.

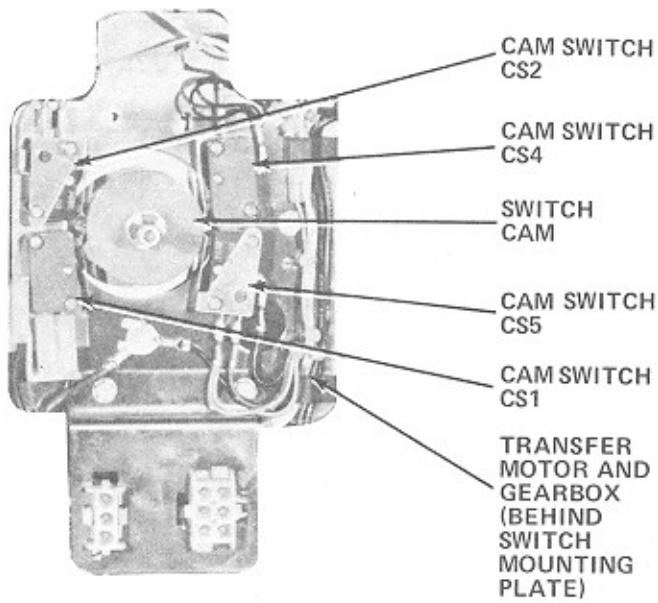


FIGURE 2-23. CAM SWITCH AND MOTOR ASSEMBLY COMPONENTS

ADJUSTMENTS

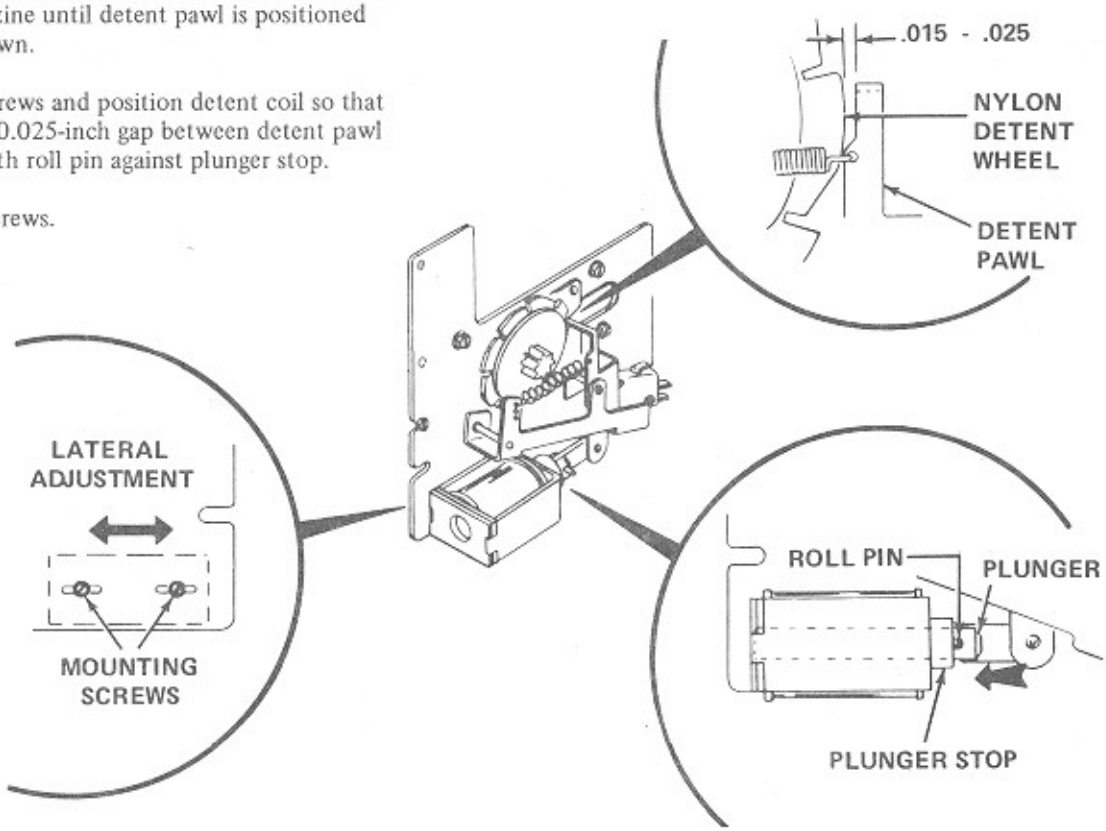
Record changer mechanism adjustments are listed in Table 2-6. Perform adjustments only when necessary.

TABLE 2-6. RECORD CHANGER ADJUSTMENTS

MAGAZINE MOTOR AND DETENT ASSEMBLY ADJUSTMENTS

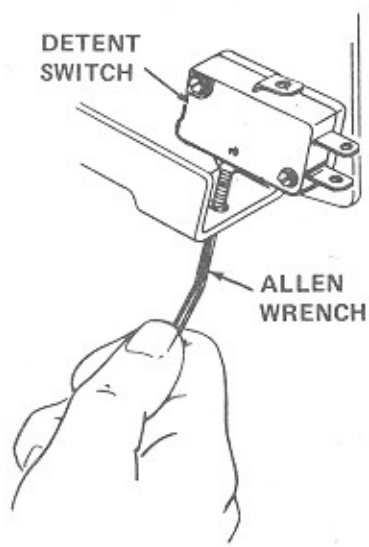
Obtain 0.015 To 0.025 – Inch Gap Between Detent Pawl And High Point Of Detent Wheel.

1. Release detent pawl from detent wheel.
2. Rotate record magazine until detent pawl is positioned on high point as shown.
3. Loosen mounting screws and position detent coil so that there is an 0.015 to 0.025-inch gap between detent pawl and detent wheel with roll pin against plunger stop.
4. Tighten mounting screws.



Adjust Magazine Detent Switch.

1. Rotate detent wheel until pawl is seated in notch, locking wheel in place.
2. Turn detent switch actuating screw in until switch just clicks, then turn screw in 1/2 turn more for stable adjustment.



CAM SWITCH ADJUSTMENTS
Locate Cam In Proper Position

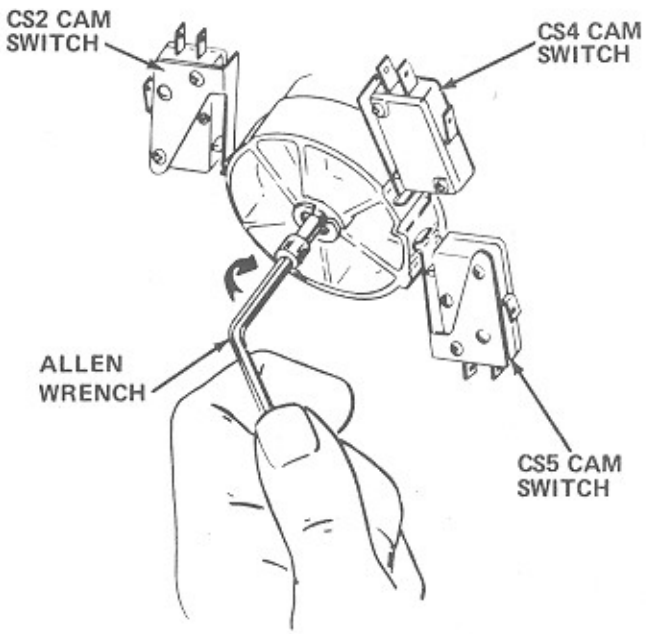
1. Using a 5/32" allen wrench, turn transfer motor clockwise until transfer arm just starts to remove a record from the magazine.

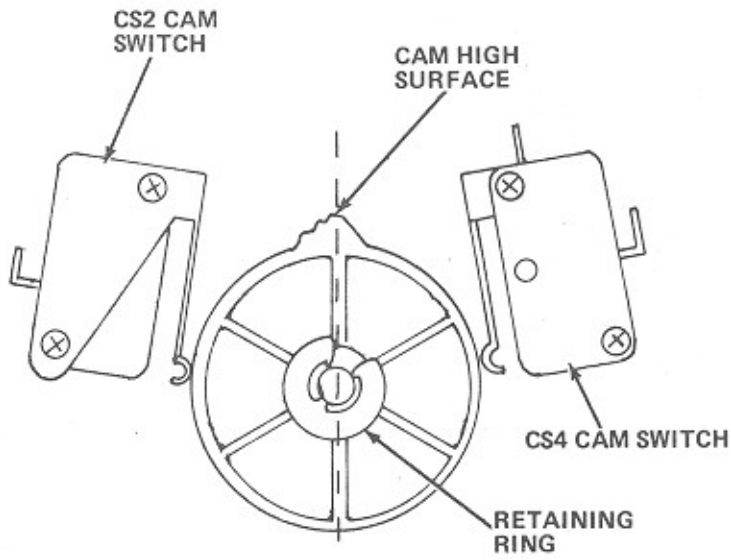
2. At this point, the high surface of the cam must be 90° from the horizontal, pointing up. Since cam is keyed to shaft, it can only be in this position, or 180° out of position and pointing downward in error.

3. If necessary to reposition cam, remove retaining ring from shaft and pull cam forward on shaft.

4. Locate cam so that high surface points up, 90° from the horizontal, as shown.

5. Push cam in and secure with retaining ring.



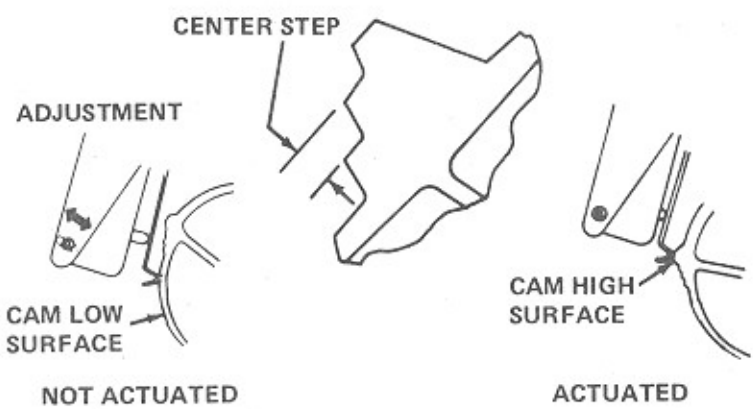


Check And Adjust Cam Switch Operation

1. Check that each cam switch operates (on and off) within center cam step.

2. To adjust a switch, loosen mounting screw closest to actuator end and move switch housing accordingly.

3. Tighten mounting screw and recheck operation.



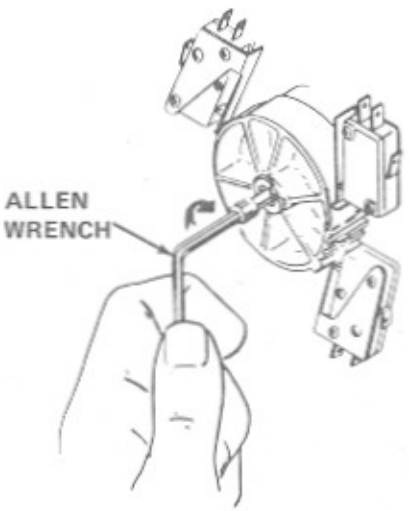
SECTOR GEAR ADJUSTMENTS

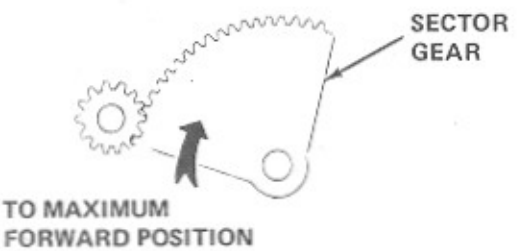
Adjust The Sector Gear Retaining Collar

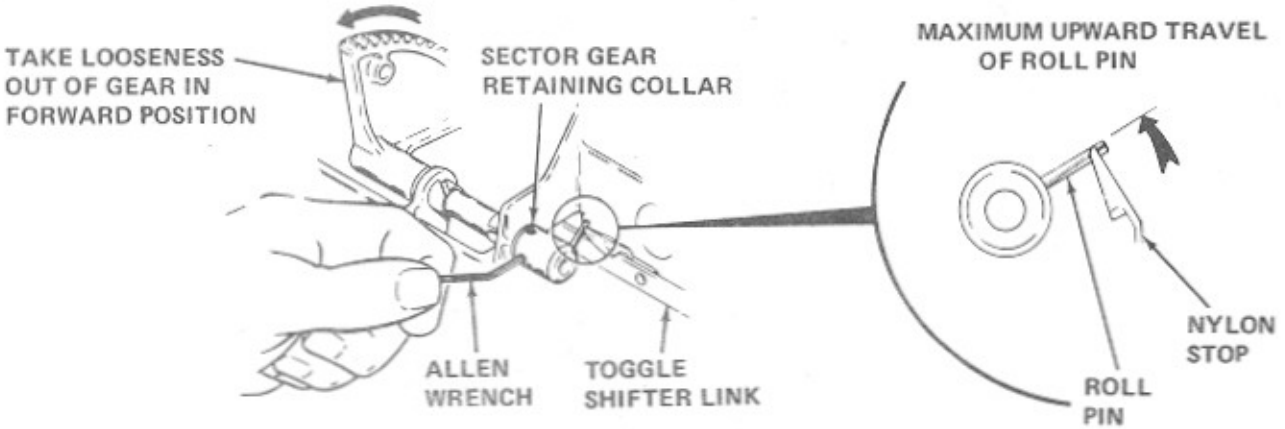
1. Using a 5/32-inch allen wrench, turn transfer motor shaft clockwise until sector gear is in maximum up, or forward position.

2. Set retaining collar so that roll pin is flush with top surface of toggle shifter link nylon stop. Take all looseness out of sector gear in forward direction.

3. Check that there is no end play in sector gear shaft.



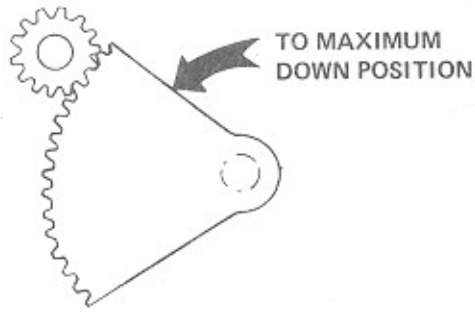




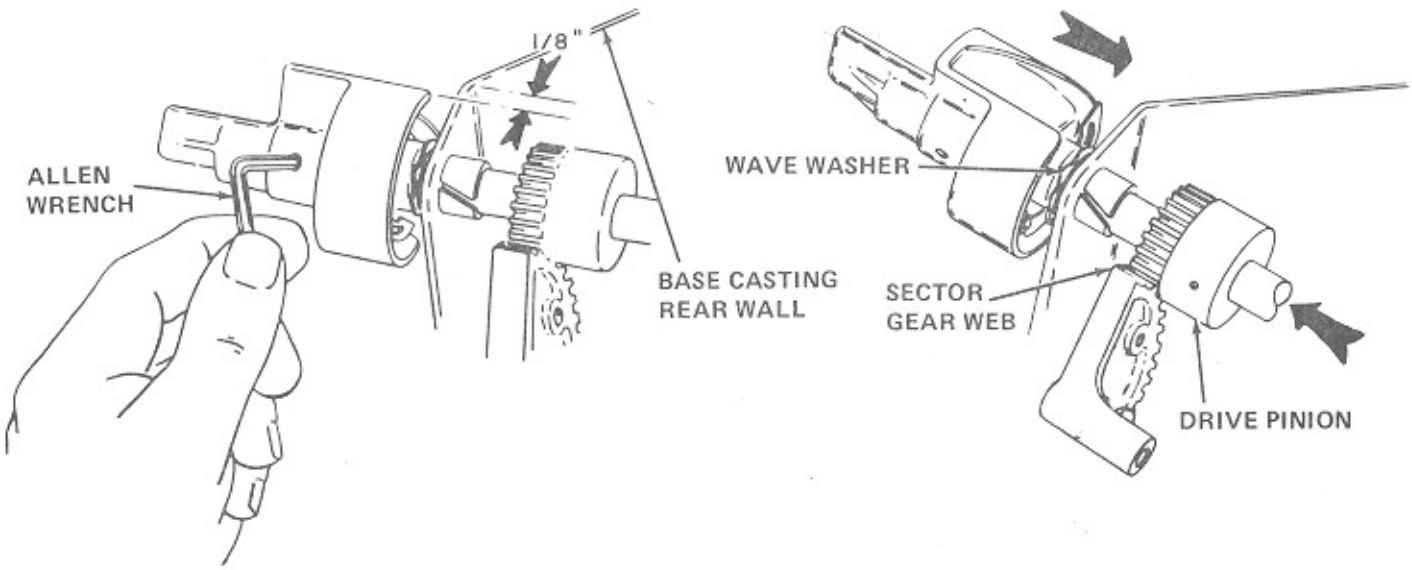
TONE ARM CAM ADJUSTMENTS

Adjust Tone Arm Cam

1. Using a 5/32-inch allen wrench, turn transfer motor shaft clockwise until sector gear is in maximum down position.
2. Loosen allen screws and position tone arm cam so straight cutout in cam surface is 1/8-inch from base casting rear wall front surface plane. Use a 1/8-inch allen wrench to gauge this distance.
3. Remove end play from shaft and tighten allen screws.



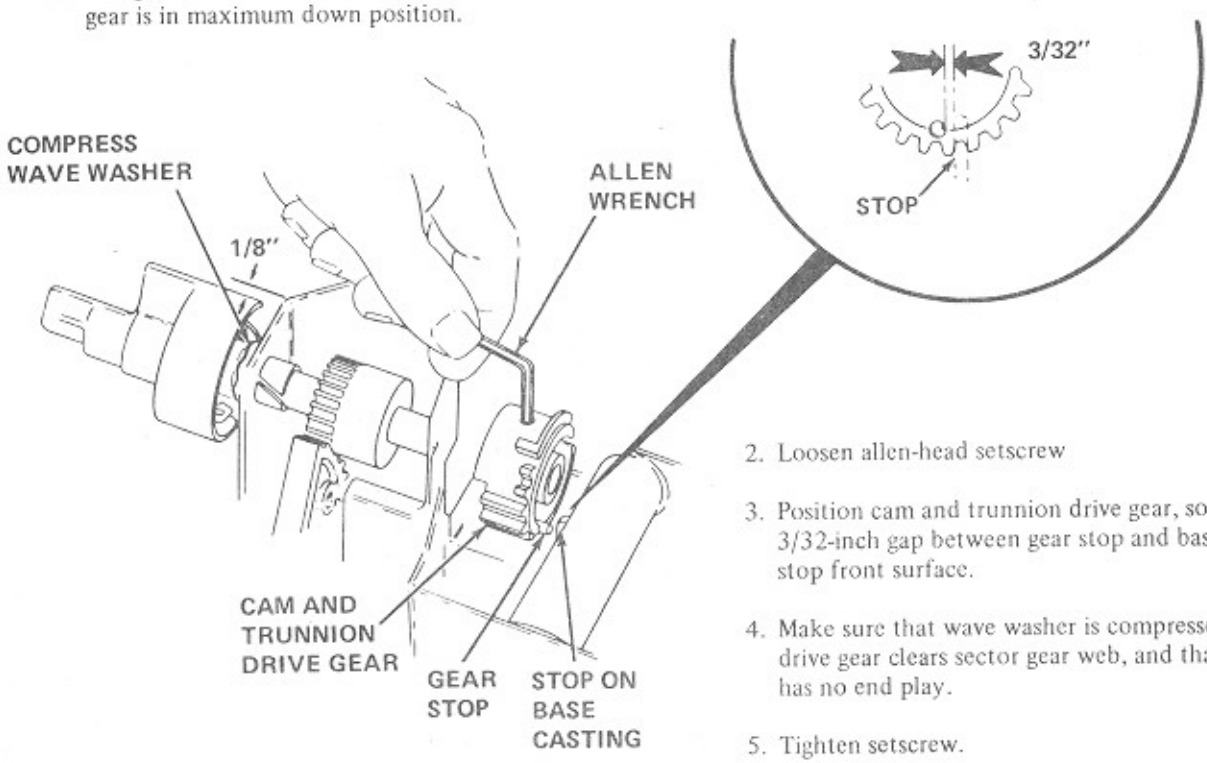
NOTE: PINION GEAR TEETH MUST NOT RIDE ON SECTOR GEAR WEB.



CAM AND TRUNNION DRIVE GEAR ADJUSTMENT

Adjust Cam And Trunnion Drive Gear

1. Using a 5/32-inch allen wrench, turn transfer motor shaft clockwise until sector gear is in maximum down position.



2. Loosen allen-head setscrew
3. Position cam and trunnion drive gear, so there is a 3/32-inch gap between gear stop and base casting stop front surface.
4. Make sure that wave washer is compressed, that drive gear clears sector gear web, and that shaft has no end play.
5. Tighten setscrew.

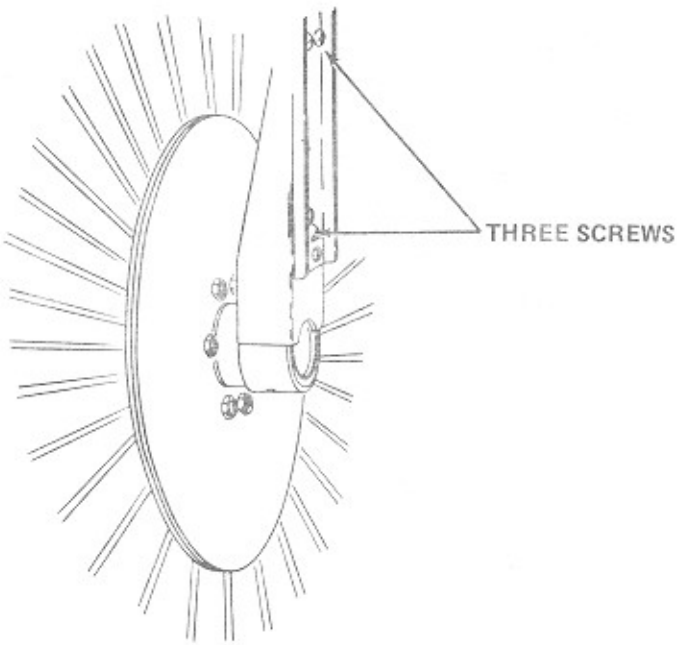
RECORD MAGAZINE TRANSFER ARM SUPPORT ADJUSTMENT
Eliminate Magazine End Play And Center Transfer Arm Support

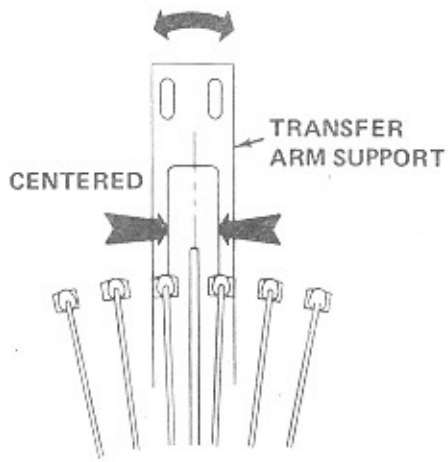
1. Loosen setscrews in transfer arm support.

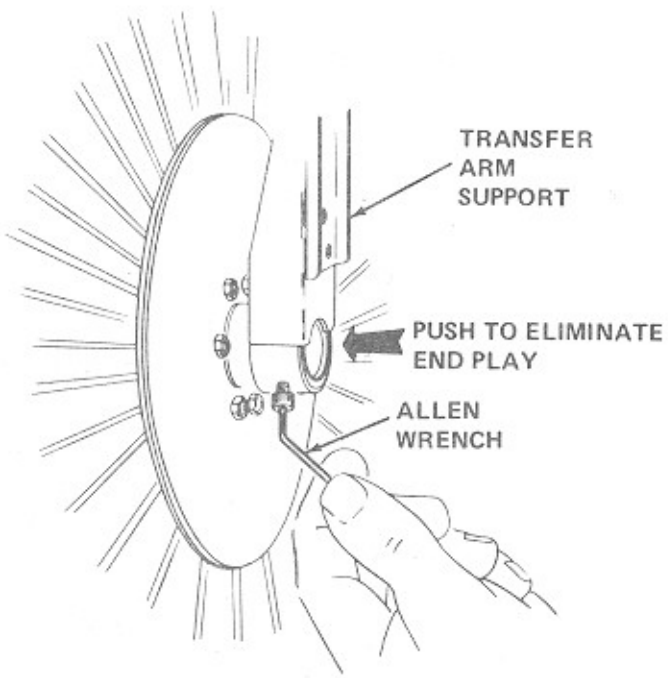
2. Push transfer arm support onto magazine shaft to eliminate end play and adjust it so transfer arm will not rub on either side of opening.

3. Tighten screws.

4. If slight adjustment is necessary after setscrews are seated, loosen three screws on rear of transfer arm support, adjust, and tighten screws.

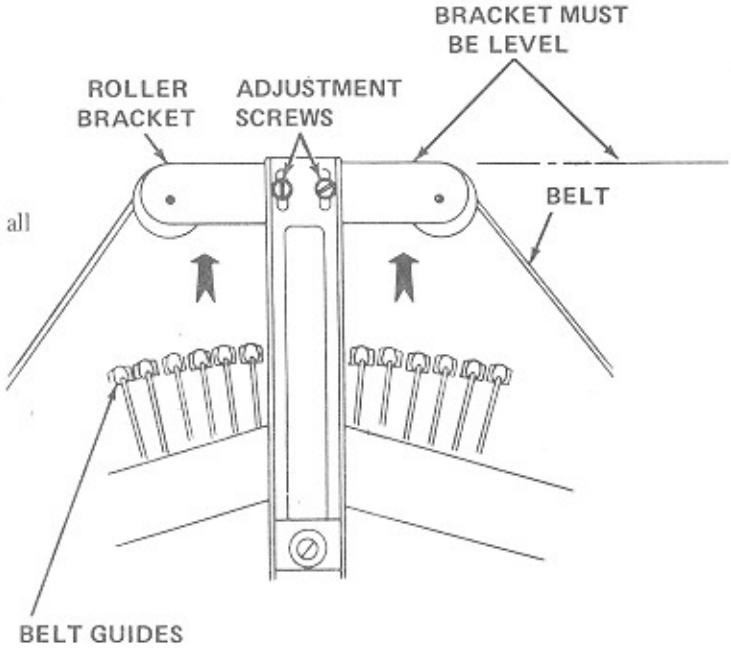






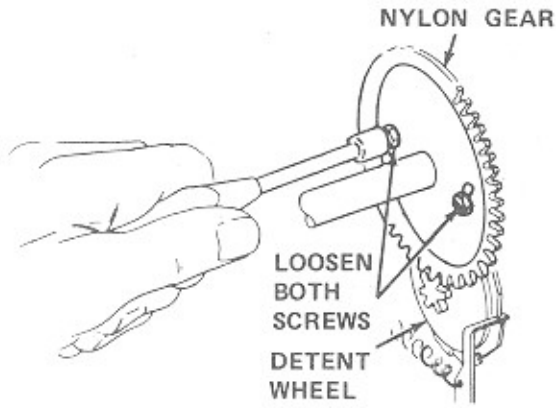
MAGAZINE BELT ADJUSTMENT
Tighten Magazine Belt

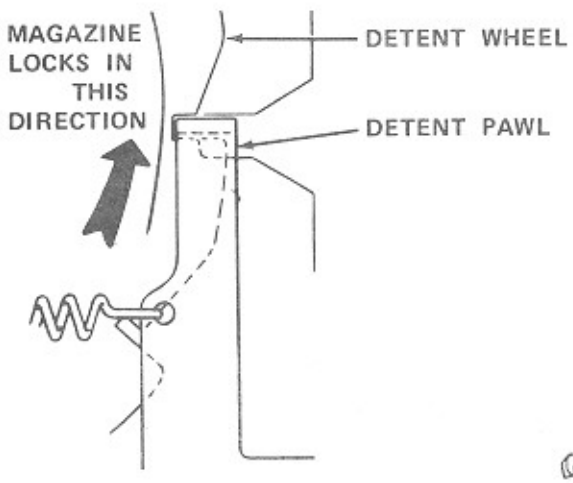
1. Loosen two adjustment screws shown.
2. Raise bracket to tighten belt around magazine.
3. Check that belt rides evenly in center of belt guides, all the way around the magazine.

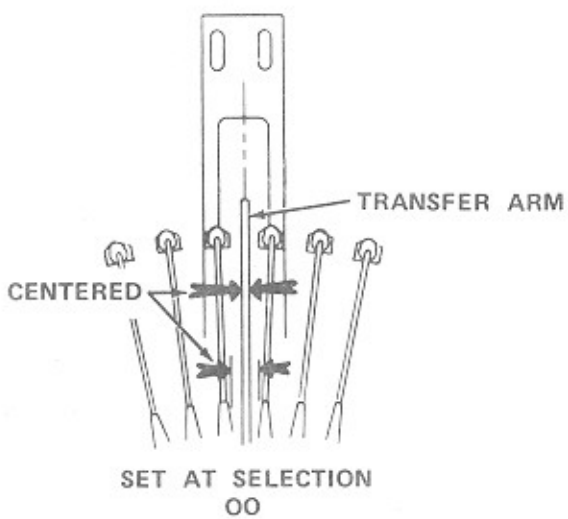


ALIGNING MAGAZINE STOPPING POSITION WITH TRANSFER ARM
Align Stopping Position Of Magazine With Transfer Arm

1. Rotate magazine until selection OO is at top center. Allow magazine detent to engage and lock magazine in place.
2. Loosen two screws in large nylon gear.
3. With detent wheel locked, move magazine until transfer arm is centered in record slot.
4. Tighten two screws in large nylon gear securely.





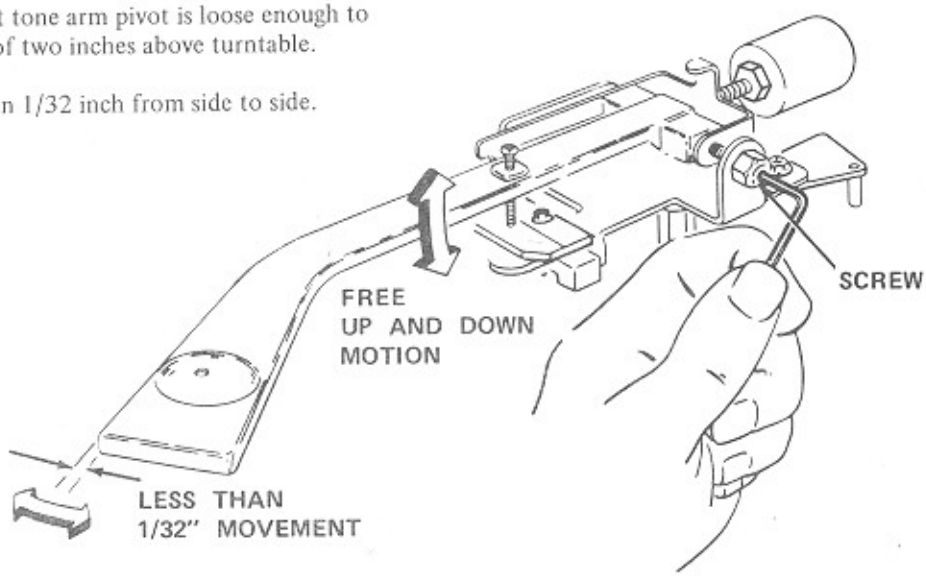


TONE ARM ADJUSTMENTS

Adjust Vertical Pivot

1. Adjust tone arm pivot screw so that tone arm pivot is loose enough to move free vertically for a distance of two inches above turntable.

2. Check that tone arm moves less than 1/32 inch from side to side.

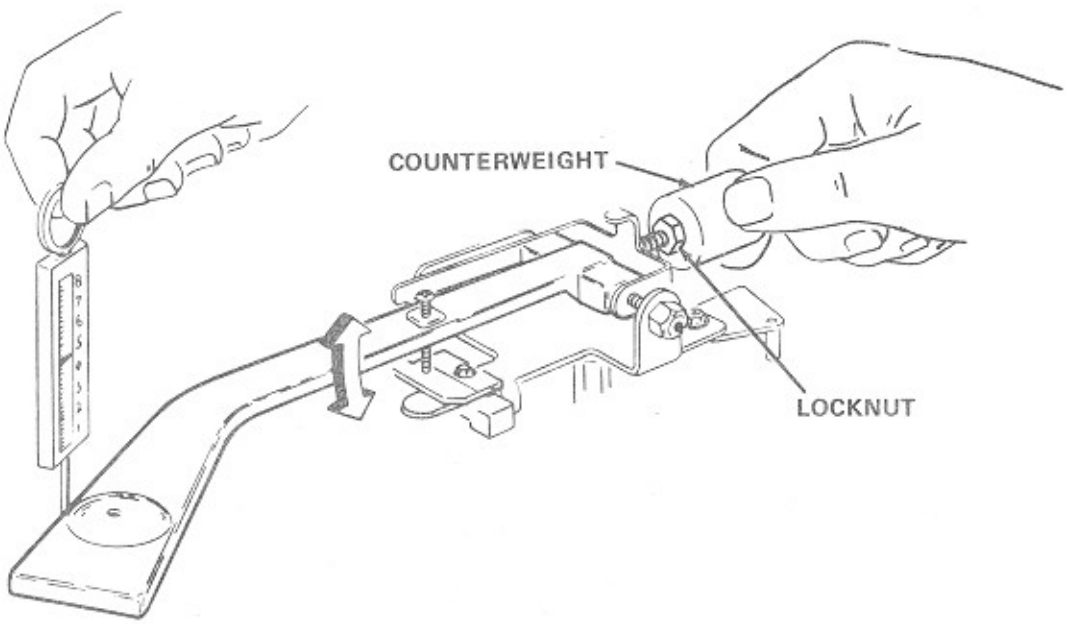


Set Stylus Force

1. Loosen lock nut.

2. Attach a suitable gram gauge to tone arm as shown. Adjust counterweight for 4 to 5 grams pressure.

3. Tighten lock nut against counterweight and recheck adjustment.

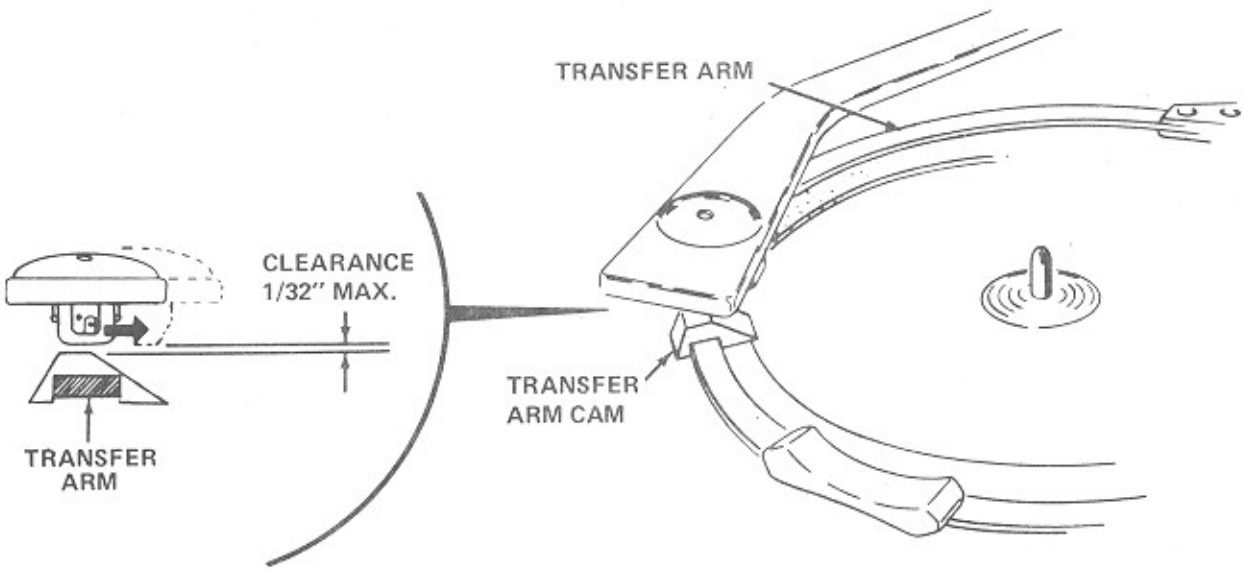


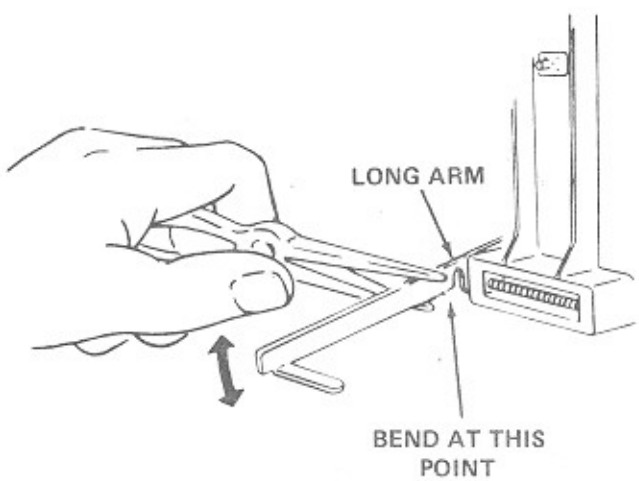
TONE ARM ADJUSTMENTS (CONTINUED)

Set Stylus Clearance

1. Operate transfer assembly to place transfer arm next to tone arm.

2. Stylus must clear trnasfer arm by 1/32" maximum as tone arm swings over it. Adjust clearance by bending long arm of tone arm rest, as necessary, at point shown.

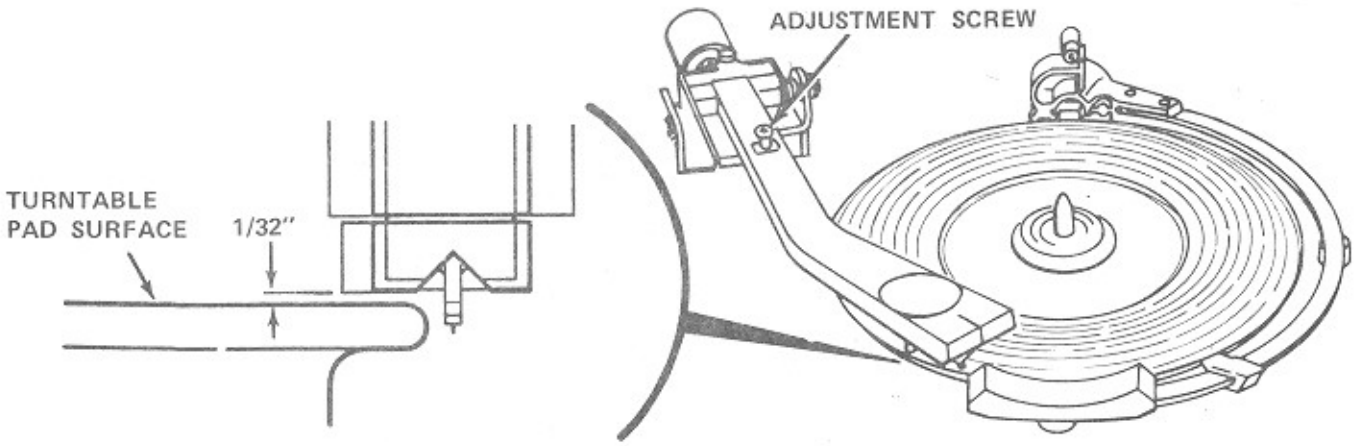




TONE ARM ADJUSTMENTS (CONTINUED)

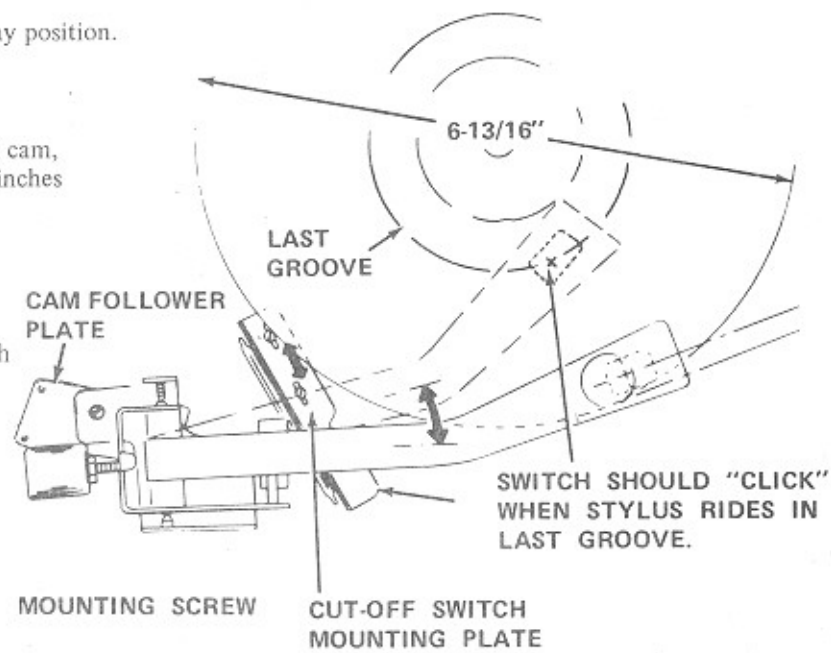
Set Stylus Height

1. Operate transfer assembly to position tone arm over turntable rim.
2. Turn adjustment screw until needle housing is 1/32-inch above turntable pad surface with tone arm in play position.



Set Stylus Setdown Position And Tone Arm Cutoff Switch

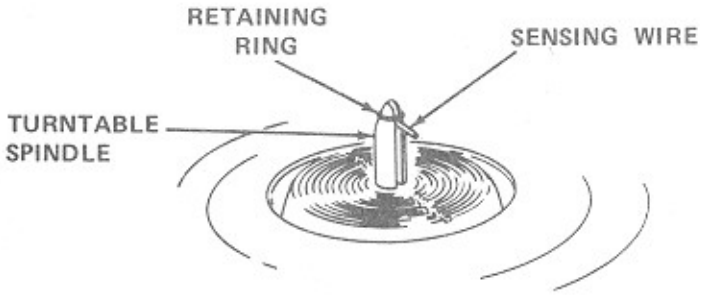
1. Place undersize (6-13/16-inch diameter) record on turntable.
2. Operate transfer assembly to bring tone arm to play position.
3. Loosen mounting screw.
4. While holding cam follower plate against tone arm cam, move tone arm, as required, until stylus is 2-9/16 inches from the turntable hub.
5. Tighten mounting screw and check adjustment.
6. Locate tone arm stylus in record cutout groove.
7. Loosen two mounting screws on cutoff reed switch mounting plate.
8. Position mounting plate, as necessary until reed switch is closed. The magnet on the under side of the tone arm operates before stylus enter "closed" record groove.

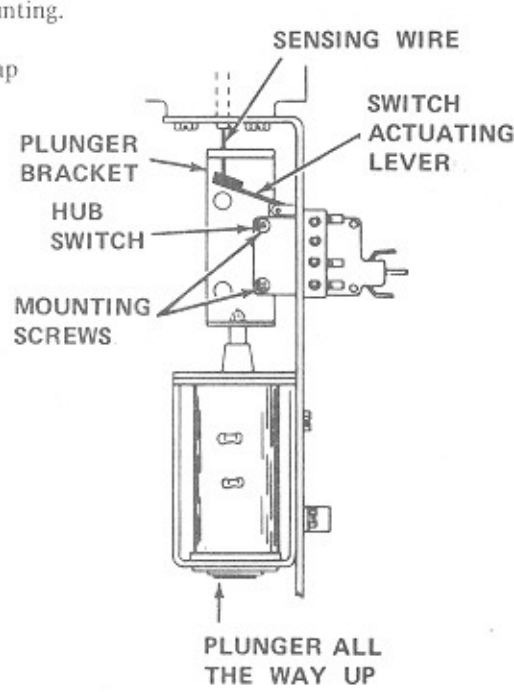


AUTOMIX ADJUSTMENTS (Optional)

Obtain 1/32-inch Gap Between Sensing Wire And Turntable Spindle Retaining Ring

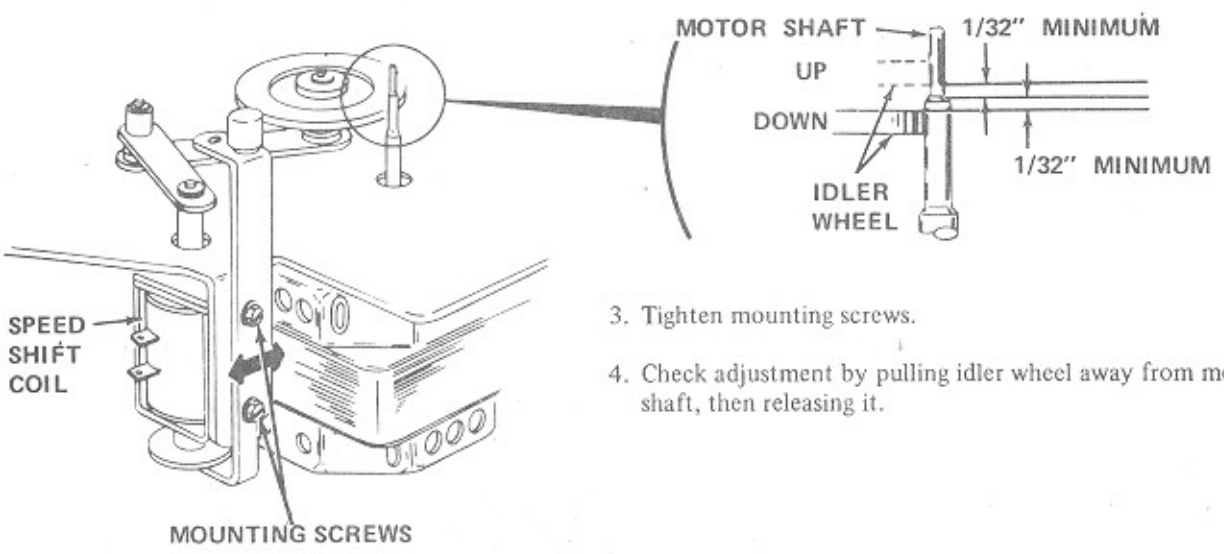
1. Loosen mounting screws and move hub switch down as far as slotted mounting.
2. While holding plunger all the way up, raise hub switch until a 1/32-inch gap exists between sensing wire and turntable spindle retaining ring.
3. Tighten switch mounting screws.





Adjust Speed Shift Coil So That Idler Wheel Rim Clears Motor Shaft Step By At Least 1/32 Inch

1. Loosen speed shift coil mounting screws.
2. Adjust speed shift coil so that idler wheel clears motor shaft step by at least 1/32-inch in both full up and full down coil plunger position. The speed shift coil frame will pivot slightly about the top mounting screw hole, just enough to allow up and down adjustment of the idler linkage.



3. Tighten mounting screws.
4. Check adjustment by pulling idler wheel away from motor shaft, then releasing it.

ENCODER ADJUSTMENTS

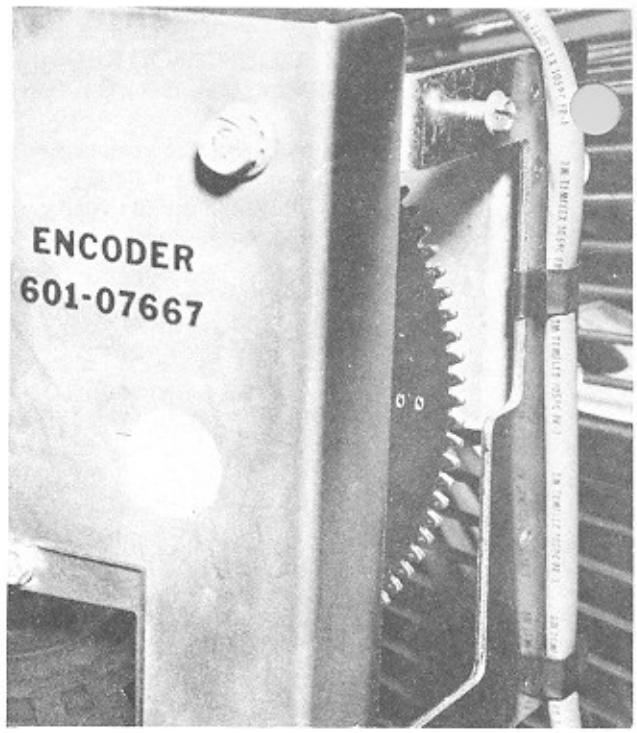
Align Encoder Gear

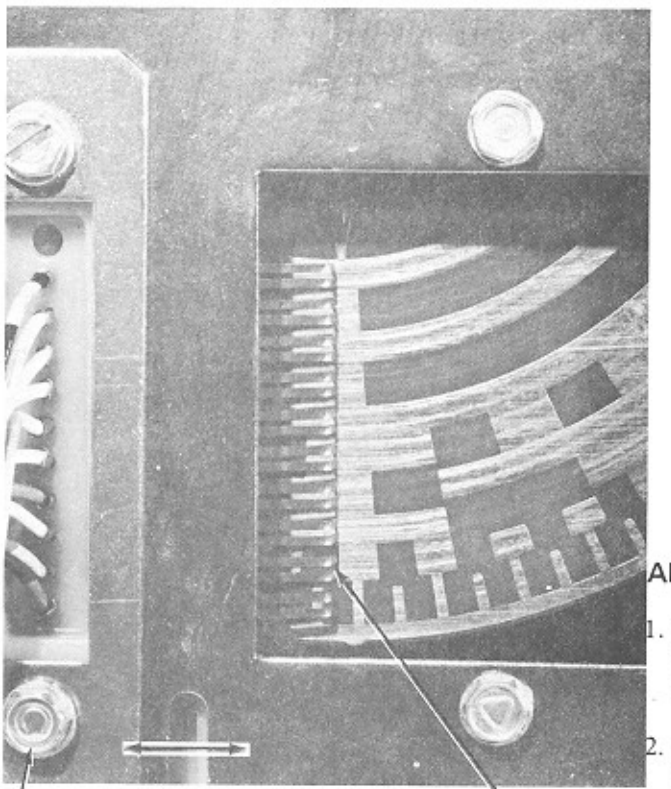
1. Release magazine detent pawl from detent wheel and rotate record magazine until selection 00 is at the top center. Engage the pawl, locking the magazine in place.

2. Loosen three large bolts securing encoder and pull forward 3/16 inch so that the encoder gear disengages the nylon gear.

3. Mesh encoder gear with nylon gear so that 00 index mark on the encoder gear is aligned with the step on the encoder mounting bracket as shown.

4. Tighten three encoder mounting bolts.





Align Wipers

1. With the encoder gear aligned to the 00 mark, loosen the two mounting screws securing wiper assembly to encoder case.

2. Adjust wiper assembly so that the second wiper from bottom is 1/64 inch to the left of the segment as shown.

3 Tighten screws securing wiper assembly.

Contact Force

Replace wiper assembly if contact force is not as shown below: