37 ANSWER-BACK UNIT

ADJUSTMENTS

CONTENTS

1. GENERAL

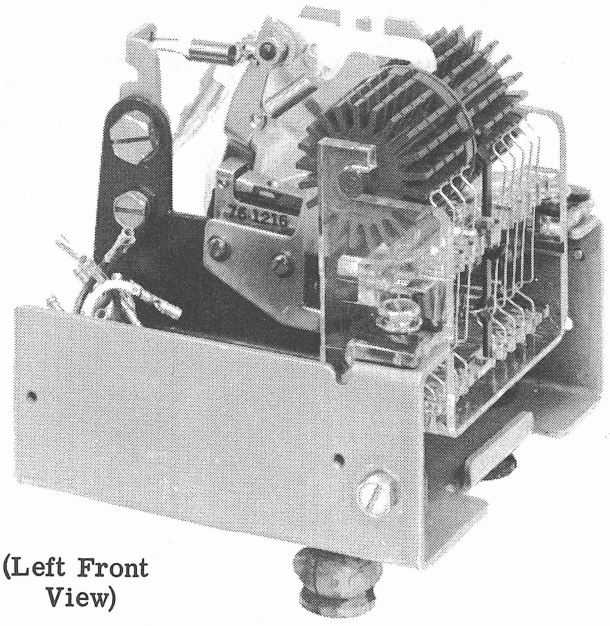
1.01 This section provides the mechanical requirements and adjustments for the early design 37 answer-back unit (Figure 1) which are required for field maintenance. The section is reissued to include the latest engineering changes and additions, indicated by marginal arrows and to add answer-back drum coding information.

1.02 The tools and test equipment required to check the clearances, spring tensions, and make the adjustments are not supplied with the equipment, but are listed separately in Section 570-005-800.

1.03 The adjustments are arranged in a sequence that should be followed if a complete readjustment of the unit is undertaken.

1.04 A complete adjusting procedure should be read before attempting to make the adjustment. The adjusting illustrations indicate the locations of clearances, positions of moving parts, and angles at which spring scales should be applied. After an adjustment is completed, tighten any nuts or screws that may have been loosened. Springs which do not meet requirement and for which no adjustment procedure is given should be discarded and replaced with new springs.

1.05 Reference made to front or rear, left or right, or top or bottom applies to the answer-back unit in its normal operating position as viewed by the operator in front of the unit. In this position, the answer-back unit is resting on its base with the contact assembly in the front.



(Left Front View)

Figure 1 - 37 Answer-Back

Prepared for American Telephone and Telegraph Company by Teletype Corporation

1.06 For information concerning the removal of the answer-back unit from the electrical service unit, refer to the disassembly and reassembly sections 574-301-702 for the KSR and 574-302-702 for the ASR sets.

CAUTION: DISCONNECT ALL AC POWER CORDS BEFORE PERFORMING ANY PROCEDURE.

1.07 A special brace is provided on the contact assembly to facilitate the removal and replacement of the code drum. The brace, when deflected downward, will hold the detent and contact wires away from the code drum. To remove the code drum:

(a) Deflect brace extension downward until brace is detented in position.

(b) Lift feed pawl and withdraw code drum from plastic block.

CAUTION: DO NOT OVEREXTEND FEED PAWL SPRING.

To replace code drum:

(a) Lift feed pawl while depressing the switch actuator arm.

(b) Insert and properly seat the code drum.

Note: Code drum will not seat properly in plastic block if put in backwards.

(c) Restore brace to normal position.

1.08 The installation of a replacement code drum may require remaking the following adjustments:

(a) FEED PAWL — ADVANCED (2.02)

(b) FEED PAWL — RELAXED (2.03)

(c) FEED BAIL SPRING (2.05)

(d) OFF-NORMAL SWITCH (2.06)

1.09 Gold-plated contacts are used in this equipment. The recommended cleaning interval for gold-plated contacts in special low-level applications (less than 250 microwatts and having an average weekly use of 60 hours) should not exceed 90 days. This interval may be reduced dependent on the signal circuit configuration, usage, and environment.

1.10 Use twill jean cloth (KS2423) to clean gold-plated contacts. Do not use burnishers, files, etc, which will remove the gold plating.

CAUTION: DO NOT USE GOLD-PLATED CONTACTS ALTERNATELY IN HIGH- AND LOW-LEVEL CIRCUITS BECAUSE HIGH-LEVEL OPERATION MAY DAMAGE THE GOLD PLATING AND IMPAIR THE OPERATION OF THE CONTACTS WHEN USED IN LOW-LEVEL CIRCUITS.

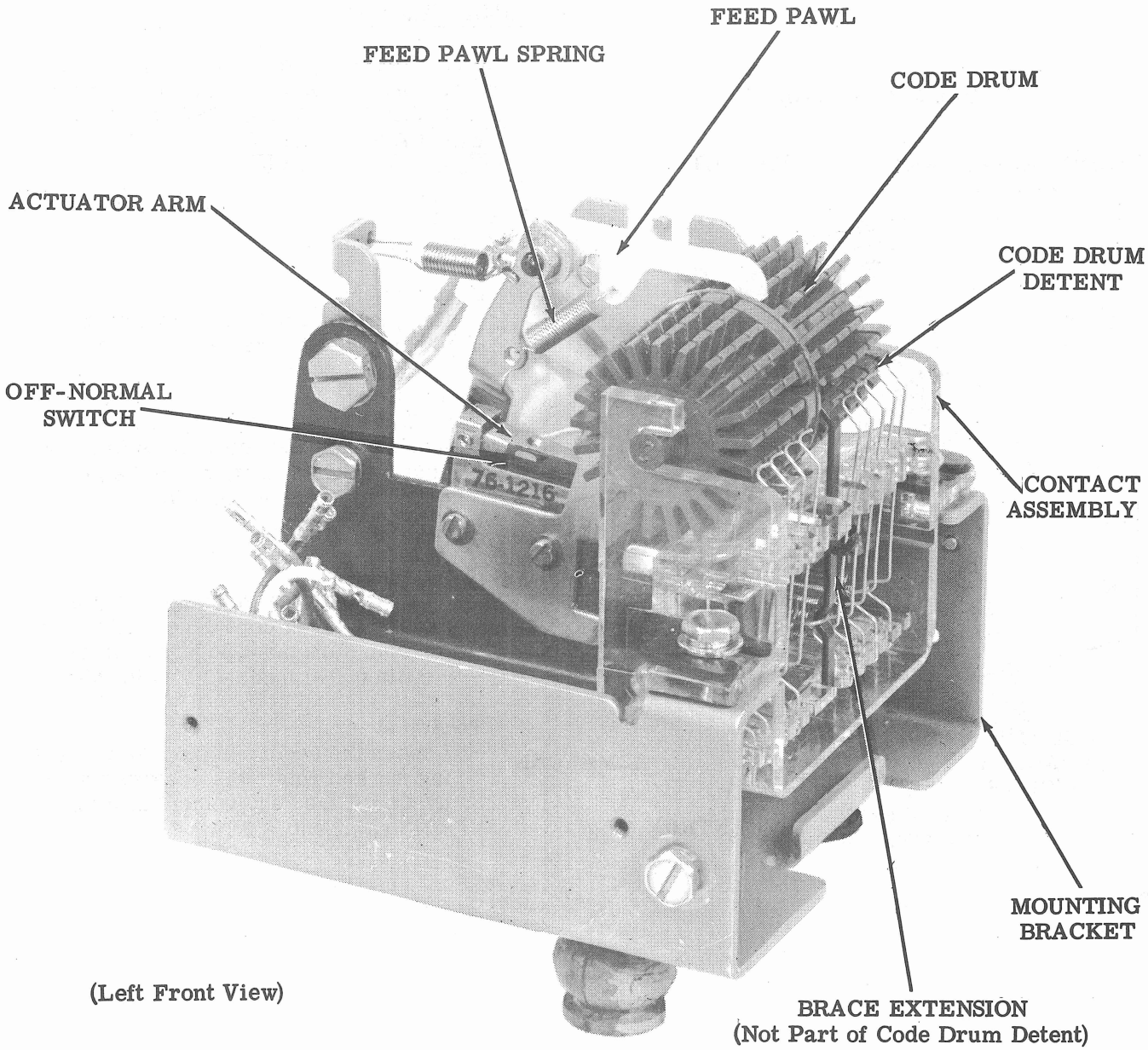


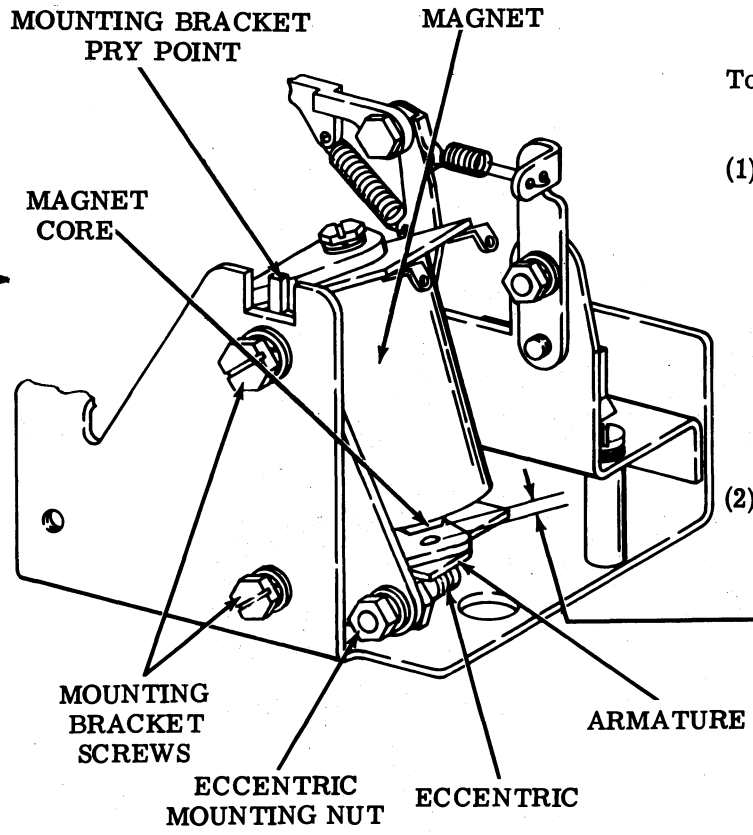
Figure 2 - 37 Answer-Back Mechanism

2. BASIC UNIT

Note: Position contact block to its rearmost position in retaining slots to facilitate performing the adjustment procedures.

2.01 Feed Mechanism

(Right Rear View)



ARMATURE GAP

Note: This is a preliminary adjustment. Final armature gap is achieved after the FEED PAWL — ADVANCED (2.02) and FEED PAWL — RELAXED (2.03) adjustments are made.

To Check
Magnet de-energized.

(1) Requirement
The pry point on the magnet assembly should be at the center of its range.

To Adjust
With the upper mounting bracket screw loosened and the lower mounting bracket screw friction tight, move the pry point to the center position. Tighten screws.

(2) Requirement
The gap between the armature plate and the magnet core edge furthest from the armature pivot point should be
—Min 0.040 inch --- Max 0.050 inch

To Adjust
Loosen the eccentric stop post mounting nut and rotate the eccentric stop post until the requirement is met. Tighten mounting nut.

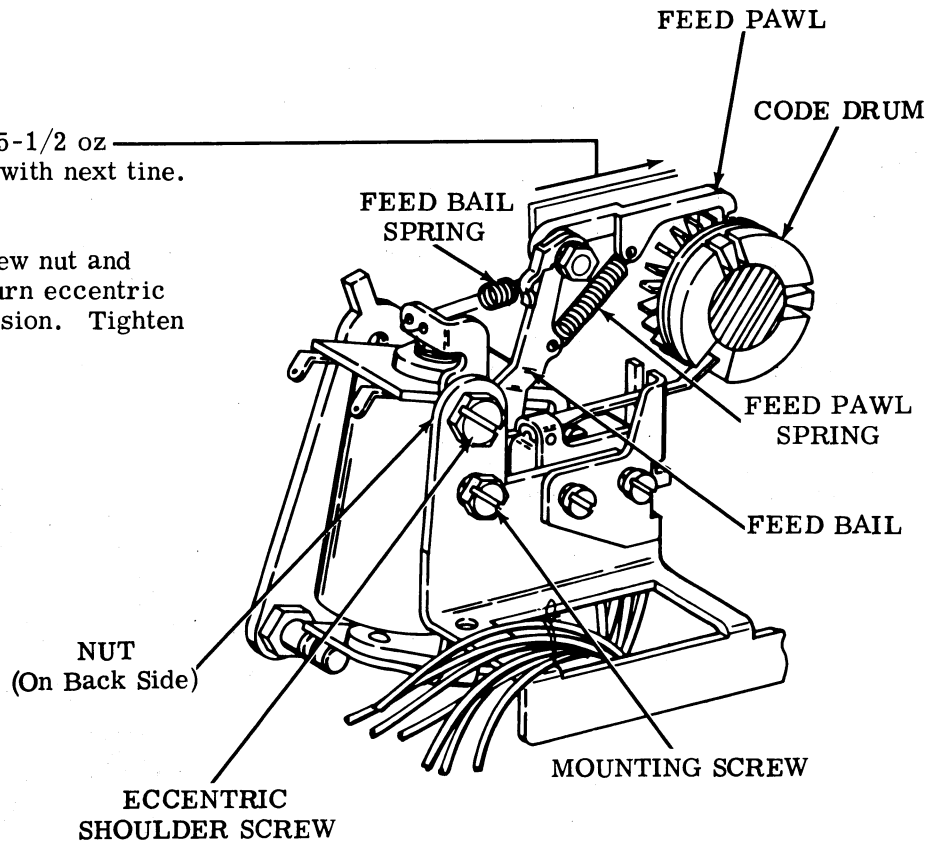
2.02 Feed Mechanism (continued)

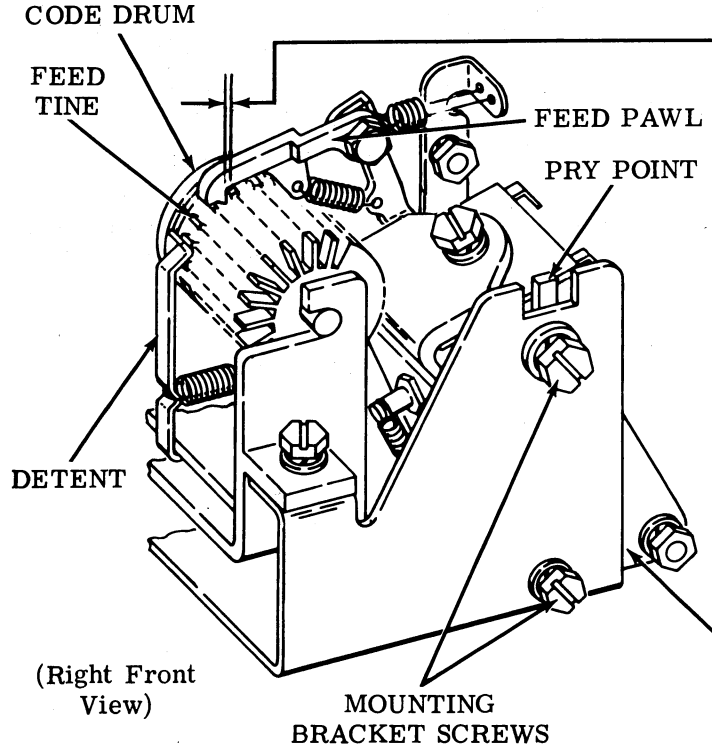
FEED BAIL SPRING --- PRELIMINARY

To Check
Feed bail fully retracted.

Requirement
Min 14-1/2 oz --- Max 15-1/2 oz to engage feed pawl surface with next tine.

To Adjust
With eccentric shoulder screw nut and mounting screw loosened, turn eccentric shoulder screw to adjust tension. Tighten nut and mounting screw.





FEED PAWL --- ADVANCED

To Check
Code drum in home position (ST). Magnet continuously energized and armature fully attracted.

Requirement
Clearance between feed pawl and feed tine to be advanced should be Min 0.010 inch --- Max 0.020 inch (if power is not available, manually hold the armature plate against the magnet core. Check clearance.)

To Adjust
With mounting bracket screws friction tight, adjust feed pawl position by use of pry point. Tighten screws and recheck.

2.03 Feed Mechanism (continued)

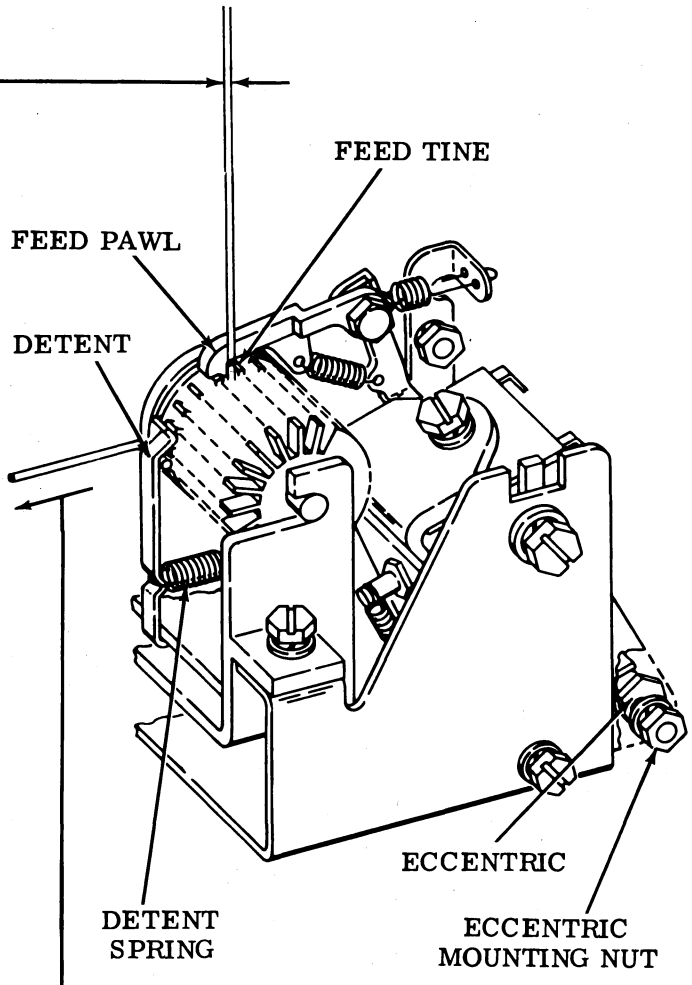
FEED PAWL - RELAXED

To Check
Magnet de-energized and code drum fully detented (in home position — ST).

Requirement
Clearance between tip of feed pawl and feed tine should be
Min 0.005 inch---Max 0.015 inch

To Adjust
With eccentric mounting nut loosened, turn eccentric. Tighten nut.

Note: Final armature gap is achieved after making this adjustment.



(Right Front View)

2.04 Contact Assembly

DETENT SPRING

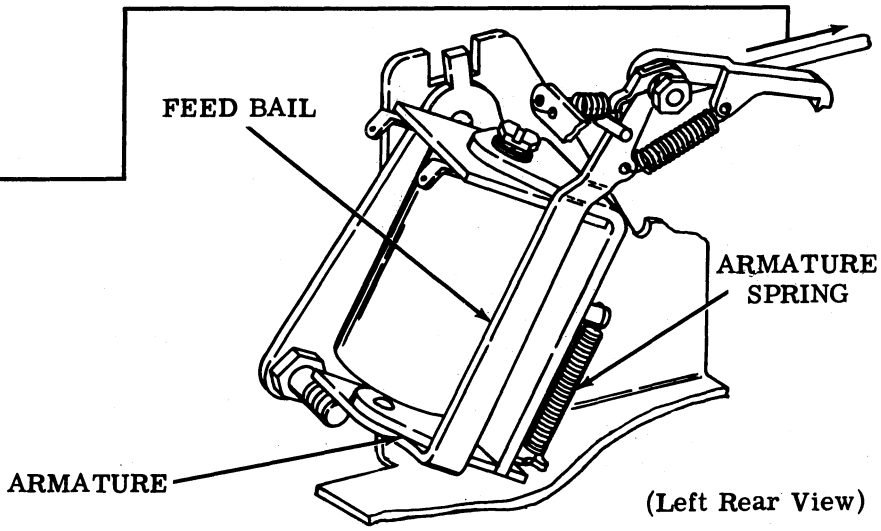
Requirement
With code drum fully detented and held in position by feed pawl
Min 5 oz---Max 7 oz
to start detent moving away from drum.

2.05 Feed Mechanism (continued)

ARMATURE SPRING

To Check
Remove code drum.

Requirement
Min 1 oz --- Max 2-1/2 oz
to start feed bail moving.
Replace code drum.



(Left Rear View)

FEED PAWL SPRING — FINAL

To Check
With the feed bail fully retracted, apply the pull end of a 32 ounce spring scale to the feed pawl pivot screw head and pull horizontally toward the code drum until the feed pawl engages the next tine.

(1) Requirement
The code drum should advance one step at a time.

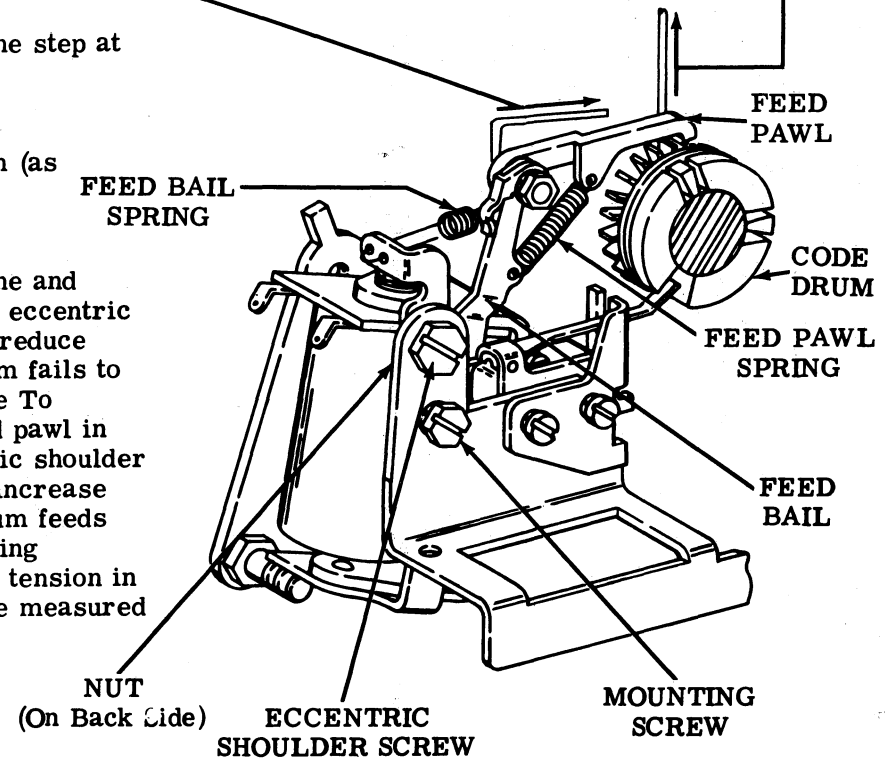
(2) Requirement
Spring tension should be optimum (as described in To Adjust).

To Adjust
With the unit operating (set on line and HERE IS button depressed), turn eccentric shoulder screw in a direction to reduce spring tension until the code drum fails to feed. Record spring tension (see To Check) required to place the feed pawl in operated position. Turn eccentric shoulder screw in the opposite direction (increase spring tension) until the code drum feeds erratically, record feed bail spring tension as above. Set the spring tension in the center (optimum) of the range measured above.

FEED PAWL SPRING

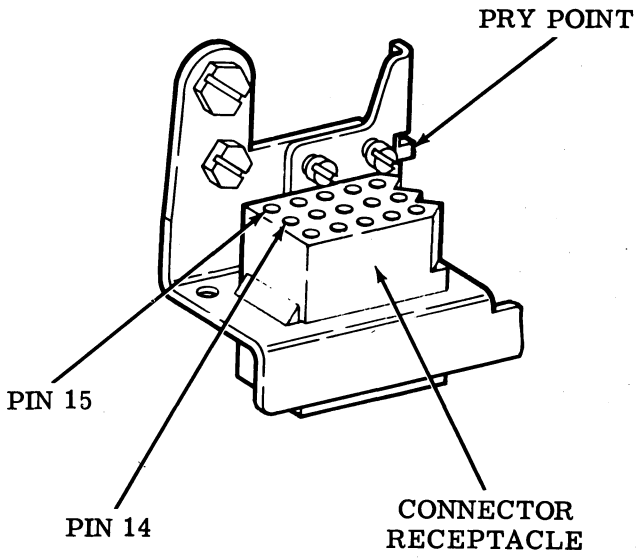
To Check
Code drum fully detented.

Requirement
Min 10 grams --- Max 30 grams
to lift feed pawl from code drum.



(Left Rear View)

2.06 Switch Assembly



(Left Rear View)

OFF-NORMAL SWITCH

To Check

Contact wire sensing START tine, actuator arm is opening where stop cam element is removed, and code drum fully detented. Use volt-ohm meter or other suitable device for checking electrical continuity between the BK and W-R leads.

Note: Check electrical continuity between pins 14 and 15 on answer-back units with the connector receptacle.

(1) Requirement

The tip of the actuator arm must drop freely and completely to the lower surface of the cam when the drum detents and the contacts are sensing the ST row.

(2) Requirement

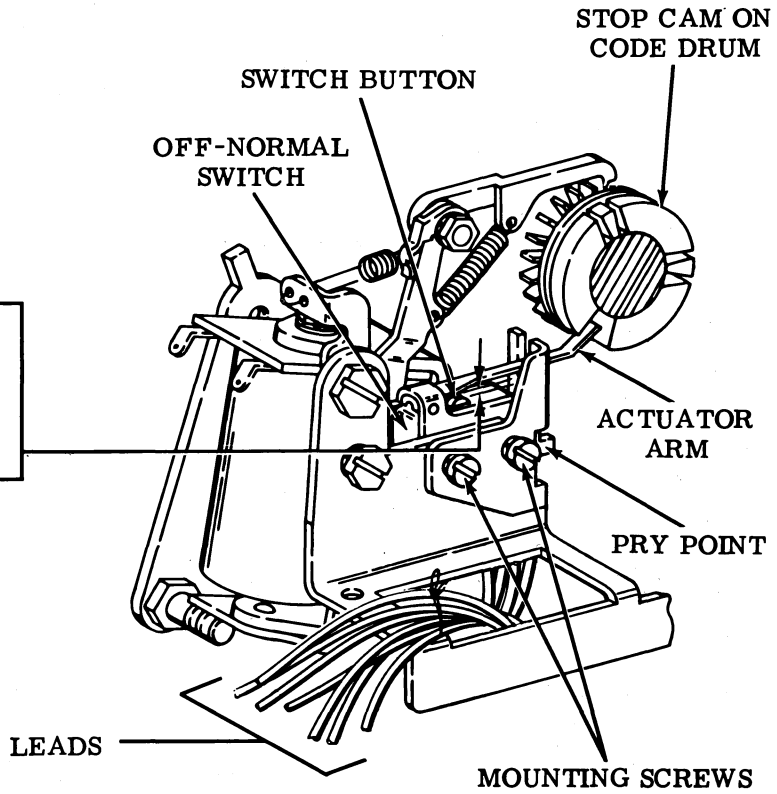
With 0.025 inch gauge between switch button and actuator arm, circuit through leads BK and W-R should be closed.

(3) Requirement

With 0.035 inch gauge between switch button and actuator arm, circuit through leads BK and W-R should be open.

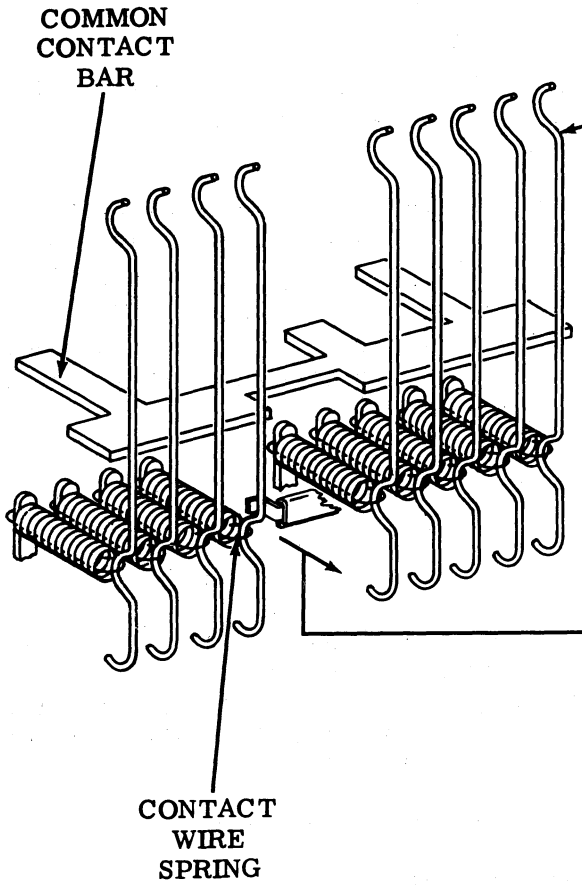
To Adjust

With mounting screws friction tight, adjust position of switch by means of pry point. Tighten screws.



(Left Rear View)

2.07 Contact Assembly (continued)



CONTACT WIRE SPRING

To Check
Remove code drum and restore brace to normal position.

Requirement
Min 14 grams---Max 42 grams to start contact wire moving away from common contact bar. Check all nine (9) springs. Replace code drum.

(Left Front View)

3. ENCODING ANSWER-BACK DRUM

3.01 The answer-back code drum is contained within the answer-back unit (Figure 2).

3.02 Remove the code drum by deflecting the brace extension downward, lifting the feed pawl, and withdrawing the code drum.

CAUTION: DO NOT OVEREXTEND FEED PAWL SPRING.

3.03 Encoding the answer-back drum is performed by removing tines on the drum. The rows of tines are numbered and embossed on the right end of the code drum. The elements in each row are identified in Figure 3, which also described the answer-back drum code chart used for encoding the drum.

3.04 Determine the number of characters in the answer-back message (not to exceed 20). The message should begin with carriage return and line feed to ensure starting the message on a new line. Refer to Figure 4 and determine number of message cycles per revolution of the code drum. One, two, or three stop cam positions are broken out depending on what operation cycle is desired.

3.05 Encode the code drum, referring to Figures 3, 4, and 5. Character sequence starts on the row following home (ST) position. The encoded sequence starts with row 1 for the first character or control function and proceeds to higher numbered rows (counterclockwise). Remove tine for a MARK element and leave tine for a SPACE element. Repeat message sequence if more than one cycle is used. To remove tines and stop cam element(s), use a long-nose pliers or a small screwdriver and proceed as follows.

(1) Grasp tine firmly with long-nose pliers, crack, remove tine.

(2) Place the tip of a small screwdriver at the base of tine in adjacent row; lean top of blade against tine to be removed; break tine off by leaning blade against it (be sure the base of screwdriver touches the base of the adjacent tine).

3.06 Remove suppression tine from unused rows in any given cycle, see Figure 5. Do not remove any tines in the ST position or other home positions.

3.07 With the answer-back drum properly coded, return the drum to the unit as follows.

(1) Lift feed pawl while depressing the switch actuator arm (Figure 2) and insert the code drum.

Note: The code drum will not seat properly in the plastic block if installed backwards.

(2) Place the ST position (row with all tines left in) opposite contact wires.

(3) Restore brace extension to normal position.

3.08 The installation of a different code drum in the answer-back unit may cause abnormal operation and require readjusting the answer-back unit. If adjustments are necessary, refer to the following adjustments:

(a) Feed Pawl — Advanced

(b) Feed Pawl — Relaxed

(c) Off-Normal Switch

(d) Feed Bail Spring — Final

	CODE LEVELS REMOVE TINES
NUL	NONE
SOH	1-8
STX	2-8
ETX	1-2
EOT	3-8
ENQ	1-3
ACK	2-3
BEL	1-2-3-8
BS	4-8
HT	1-4
LF	2-4
VT	1-2-4-8
FF	3-4
CR	1-3-4-8
SO	2-3-4-8
SI	1-2-3-4
DLE	5-8
DC1	1-5
DC2	2-5
DC3	1-2-5-8
DC4	3-5
NAK	1-3-5-8
SYN	2-3-5-8
ETB	1-2-3-5
CAN	4-5
EM	1-4-5-8
SUB	2-4-5-8
ESC	1-2-4-5
FS	3-4-5-8
GS	1-3-4-5
RS	2-3-4-5
US	1-2-3-4-5-8
SPACE	6-8
!	1-6
"	2-6
#	1-2-6-8
$	3-6
%	1-3-6-8
&	2-3-6-8
' (APOS)	1-2-3-6
(	4-6
)	1-4-6-8
*	2-4-6-8
+	1-2-4-6
,	3-4-6-8
-	1-3-4-6
.	2-3-4-6
/	1-2-3-4-6-8
0	5-6
1	1-5-6-8
2	2-5-6-8
3	1-2-5-6
4	3-5-6-8
5	1-3-5-6
6	2-3-5-6
7	1-2-3-5-6-8
8	4-5-6-8
9	1-4-5-6
:	2-4-5-6
;	1-2-4-5-6-8
<	3-4-5-6
=	1-3-4-5-6-8
>	2-3-4-5-6-8
?	1-2-3-4-5-6

	CODE LEVELS REMOVE TINES
@	7-8
A	1-7
B	2-7
C	1-2-7-8
D	3-7
E	1-3-7-8
F	2-3-7-8
G	1-2-3-7
H	4-7
I	1-4-7-8
J	2-4-7-8
K	1-2-4-7
L	3-4-7-8
M	1-3-4-7
N	2-3-4-7
O	1-2-3-4-7-8
P	5-7
Q	1-5-7-8
R	2-5-7-8
S	1-2-5-7
T	3-5-7-8
U	1-3-5-7
V	2-3-5-7
W	1-2-3-5-7-8
X	4-5-7-8
Y	1-4-5-7
Z	2-4-5-7
[	1-2-4-5-7-8
\	3-4-5-7
]	1-3-4-5-7-8
^	2-3-4-5-7-8
—	1-2-3-4-5-7
`	6-7
a	1-6-7-8
b	2-6-7-8
c	1-2-6-7
d	3-6-7-8
e	1-3-6-7
f	2-3-6-7
g	1-2-3-6-7-8
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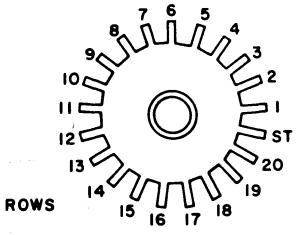
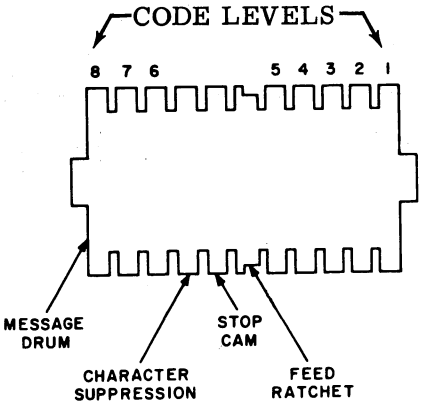
r	2-5-6-7
s	1-2-5-6-7-8
t	3-5-6-7
u	1-3-5-6-7-8
v	2-3-5-6-7-8
w	1-2-3-5-6-7
x	4-5-6-7
y	1-4-5-6-7-8
z	2-4-5-6-7-8
{	1-2-4-5-6-7
!	3-4-5-6-7-8
}	1-3-4-5-6-7
~	2-3-4-5-6-7
DEL	1-2-3-4-5-6-7-8

MESSAGE DRUM





Note 1: Remove tine — marking. Leave tine — spacing.

Note 2: The eighth code level must be coded as shown for even parity operation.

Figure 3 - Answer-Back Drum Code Chart

Message Characters	Cycles	Remove Stop Cam Element From
Up to 6	3	Rows 6, 13, & 20
7 thru 9	2	Rows 6 & 17
10 thru 20	1	Row 6

Figure 4 - Message Cycles per Revolution of Code Drum

Cycles	Home Position (Leave all tines in)	Start Message On	Usable Rows	Remove Character Suppression Tine From
3	Row ST	Row 1	1 thru 6	Unused rows
	Row 7	Row 8	8 thru 13	Unused rows
	Row 14	Row 15	15 thru 20	Unused rows
2	Row ST	Row 1	1 thru 9	Row 10 and unused rows
	Row 11	Row 12	12 thru 20	Unused rows
1	Row ST	Row 1	1 thru 20	Unused rows

Figure 5 - General Coding Instructions