"DATASPEED®" TAPE RECEIVER

WITH ERROR DETECTION AND CORRECTION

TYPE 4B

ADJUSTMENTS, LUBRICATION, REMOVAL AND REPLACEMENT OF COMPONENTS

CONTENTS PAGE

1. GENERAL

1.01 This section provides adjustments, lubrication, and removal and replacement of components information for the DATASPEED Tape Receiver 4B. It is reissued to change the title and to include engineering changes and additions. Arrows in the margin indicate changes and additions. Information from TCN951, TCN992, and TCN1020 is included in this issue.

1.02 Refer to the appropriate adjustment, lubrication and disassembly sections for information on the high speed punch unit (DRPE type).

ADJUSTMENTS

1.03 The adjustment procedures are arranged in a sequence that would be followed if a complete readjustment of the equipment were

Prepared for American Telephone and Telegraph Company by Teletype Corporation

undertaken. In following such a procedure, parts or assemblies that are removed to facilitate adjustments should not be replaced until all other adjustments which would be facilitated by the removal of these parts are made. If any adjustment is changed, related adjustments should be checked.

1.04 The spring tension values indicated are scale readings which would be obtained when proper scales are used as specified. Springs that do not meet the specified requirement and for which no adjustment procedure is given should be replaced with new springs.

1.05 Before proceeding with any adjustment, read the applicable portion of the adjustment text carefully. After the adjustment is completed, be sure to tighten any screws or nuts which may have been loosened.

1.06 Check all moving parts to make sure they are free from binds before operating the equipment under power.

1.07 Ordering information for parts and tools can be obtained from the appropriate parts and tool sections.

LUBRICATION

1.08 Specific areas of the receiver requiring lubrication are illustrated. The following designations are used to explain the type and amount of lubrication required:

G - Apply a thin coating of grease
O1 - Apply one drop of oil
SAT - Saturate with oil

1.09 Lubricate the receiver according to the following schedule which is based on operating speed:

Operating Speed (WPM)	*Lubrication Interval (Hours)	*Time (Months)
100	2000	6
500	400	3
1000	200	2
1200	150	1.5

*Whichever occurs first.

1.10 Use oil or grease as specified to lubricate the equipment. Oil both loops of all helical springs that exert a nominal tension of less than 2-1/2 pounds. Apply grease to both loops of helical springs that exert a nominal tension of 2-1/2 pounds or more.

1.11 Use KS7470 oil and TP143484 one pound can or TP145867 four-ounce tube of Mobile #2 grease with minimum 1% Paratac (tacky) additive, when lubricating the equipment.

1.12 Unless otherwise specified, one or two drops of oil or 1/64 inch coating of grease at each of the places indicated should be sufficient.

REMOVAL AND REPLACEMENT

1.13 The removal procedures covered in this section break the equipment down into its major components approximately in reverse order to that normally used to replace them in a new set. The appropriate parts sections illustrate the arrangement of the components and their parts.

1.14 In most cases, except where one part or assembly in a component may interfere with the necessary removal of another, the order of removal is not important. However, any affected adjustments and related adjustments should be checked after replacement.

1.15 Before beginning removal, disconnect external power and signal connections.

1.16 Unless otherwise specified, remount and replace parts in the reverse order of the removal instructions.

1.17 Disassembly of the electronic modules is not ordinarily required and is therefore not included.

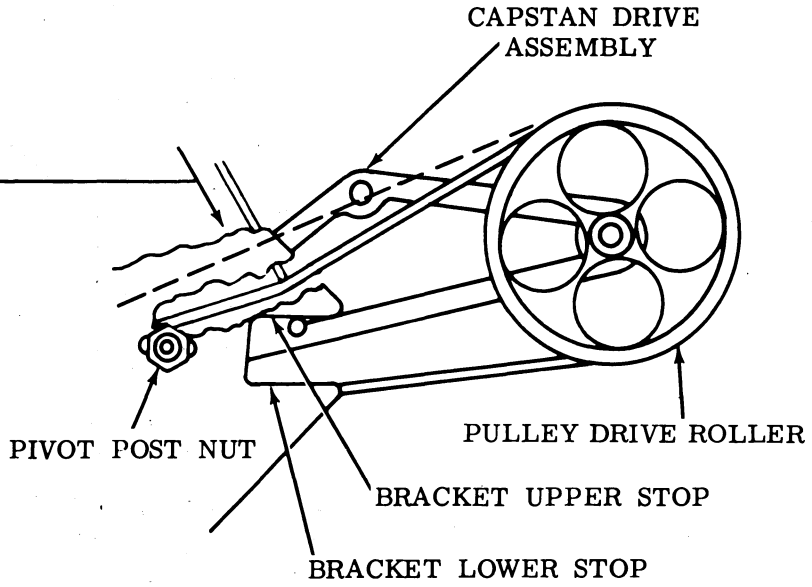
2. ADJUSTMENTS

2.01 Receiver Tape Transport Assembly

V-BELT (DRIVE ROLLER)

Requirement
With capstan drive assembly held against its upper stop, it should require
Min 3 oz---Max 5 oz
applied to top of belt above stop post for belt to deflect 1/4 inch.

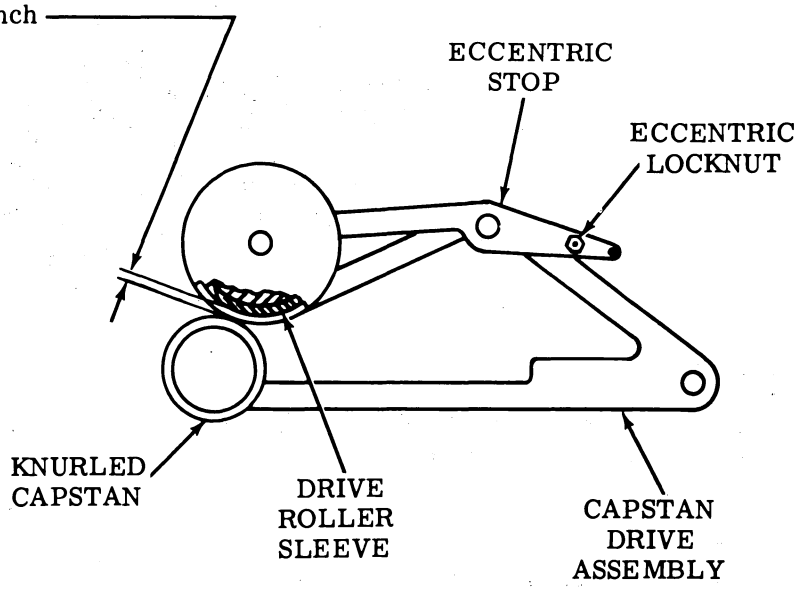
To Adjust
With pivot post nut loosened, position drive assembly to the front or rear.



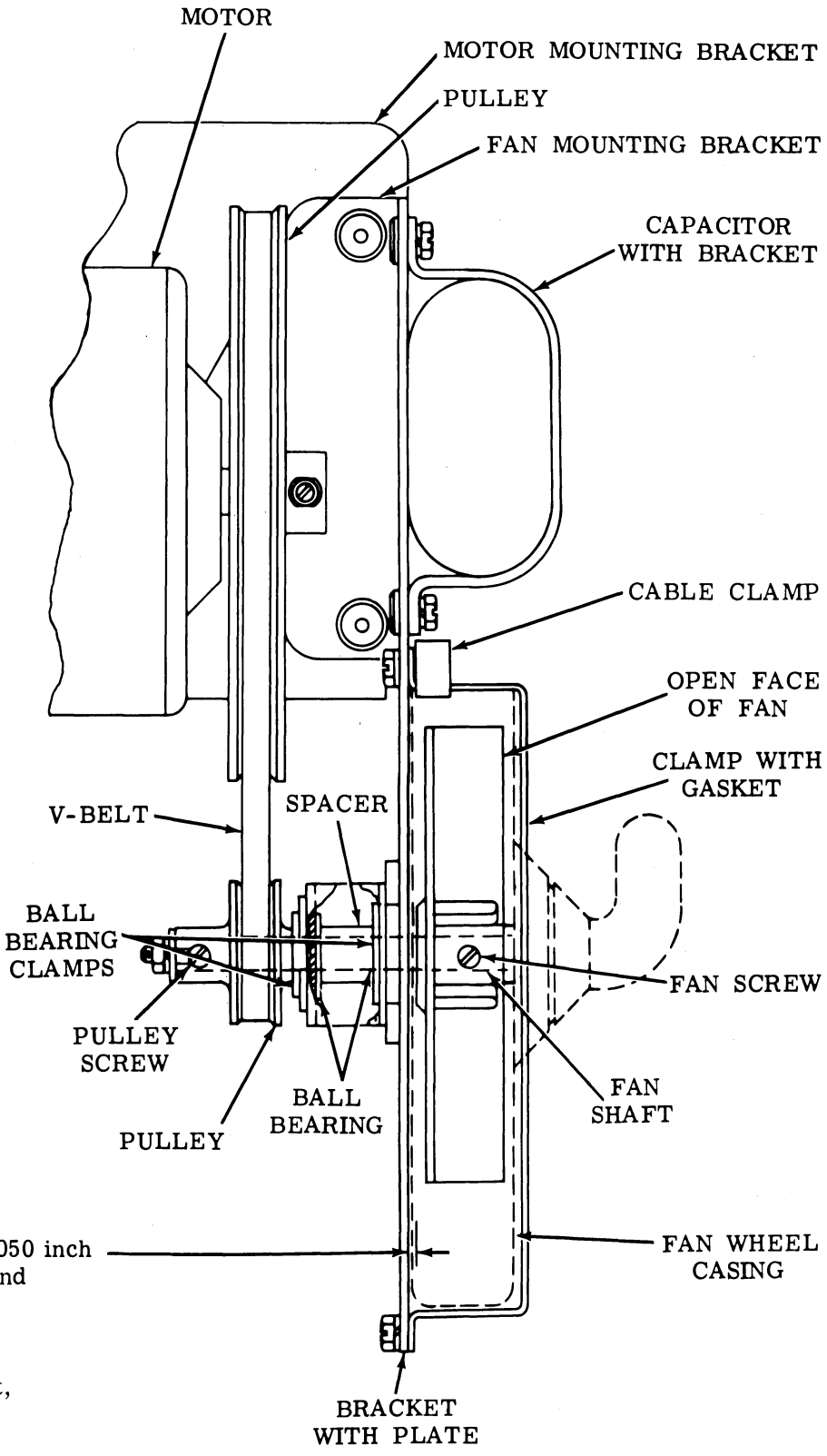
TAPE DRIVE ROLLER AND CAPSTAN CLEARANCE

Requirement
With drive lever against its eccentric stop, there should be
Min 0.040 inch---Max 0.080 inch
gap between drive roller sleeve and knurled capstan.

To Adjust
With eccentric locknut loosened, rotate eccentric.



2.02 Receiver Tape Transport Assembly (continued)



FAN HUB

Requirement

There should be
Min 0.020 inch---Max 0.050 inch
clearance between fan hub and
bracket with plate.

To Adjust

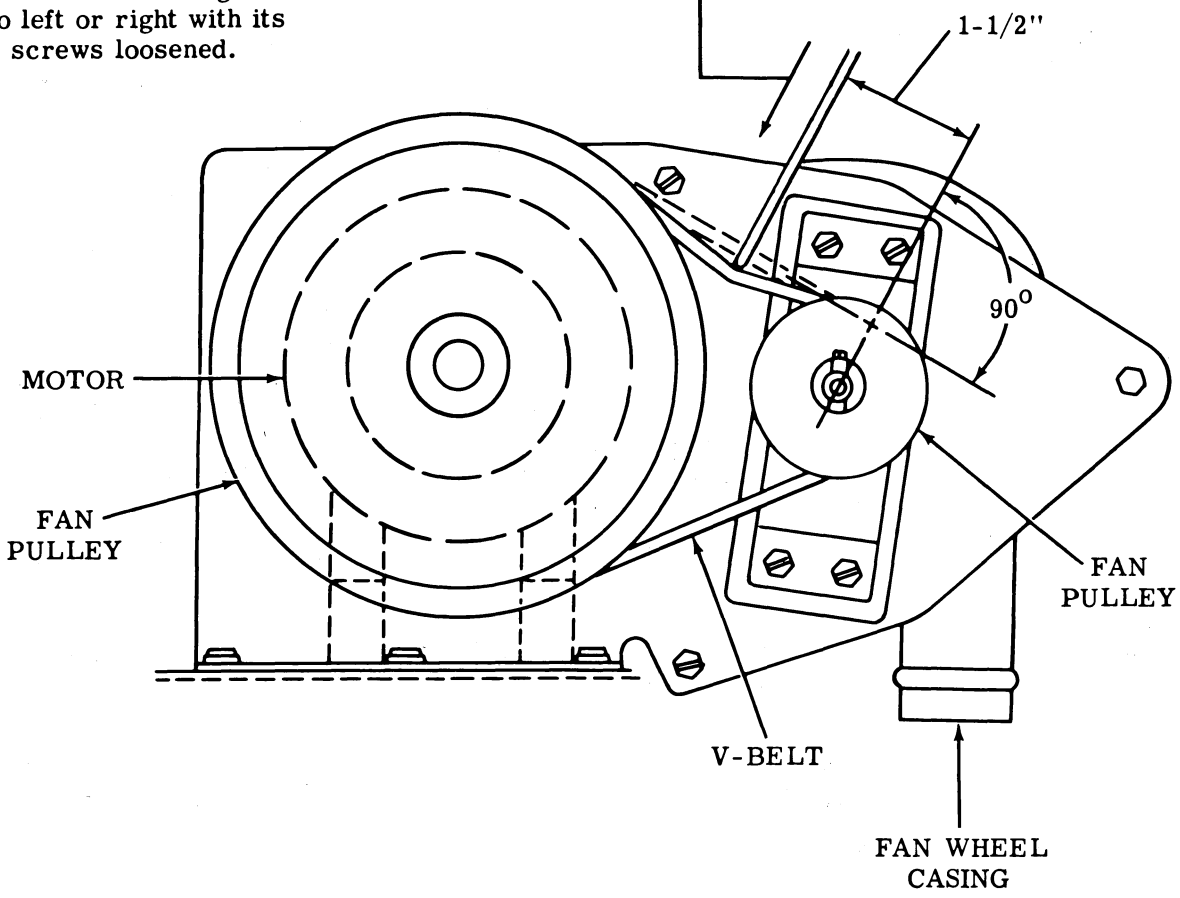
With fan screw friction tight,
position fan.

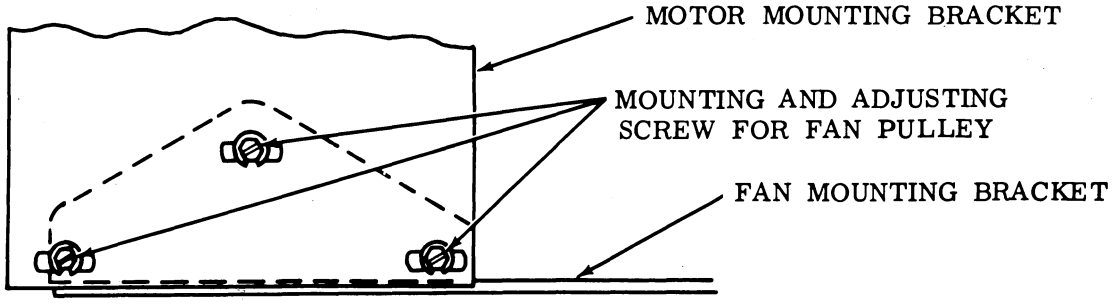
2.03 Receiver Tape Transport Assembly (continued)

V-BELT (FAN PULLEY)

Requirement
It should require
Min 6 oz---Max 10 oz
to deflect V-belt 1/4 inch.

To Adjust
Move fan mounting bracket
to left or right with its
3 screws loosened.





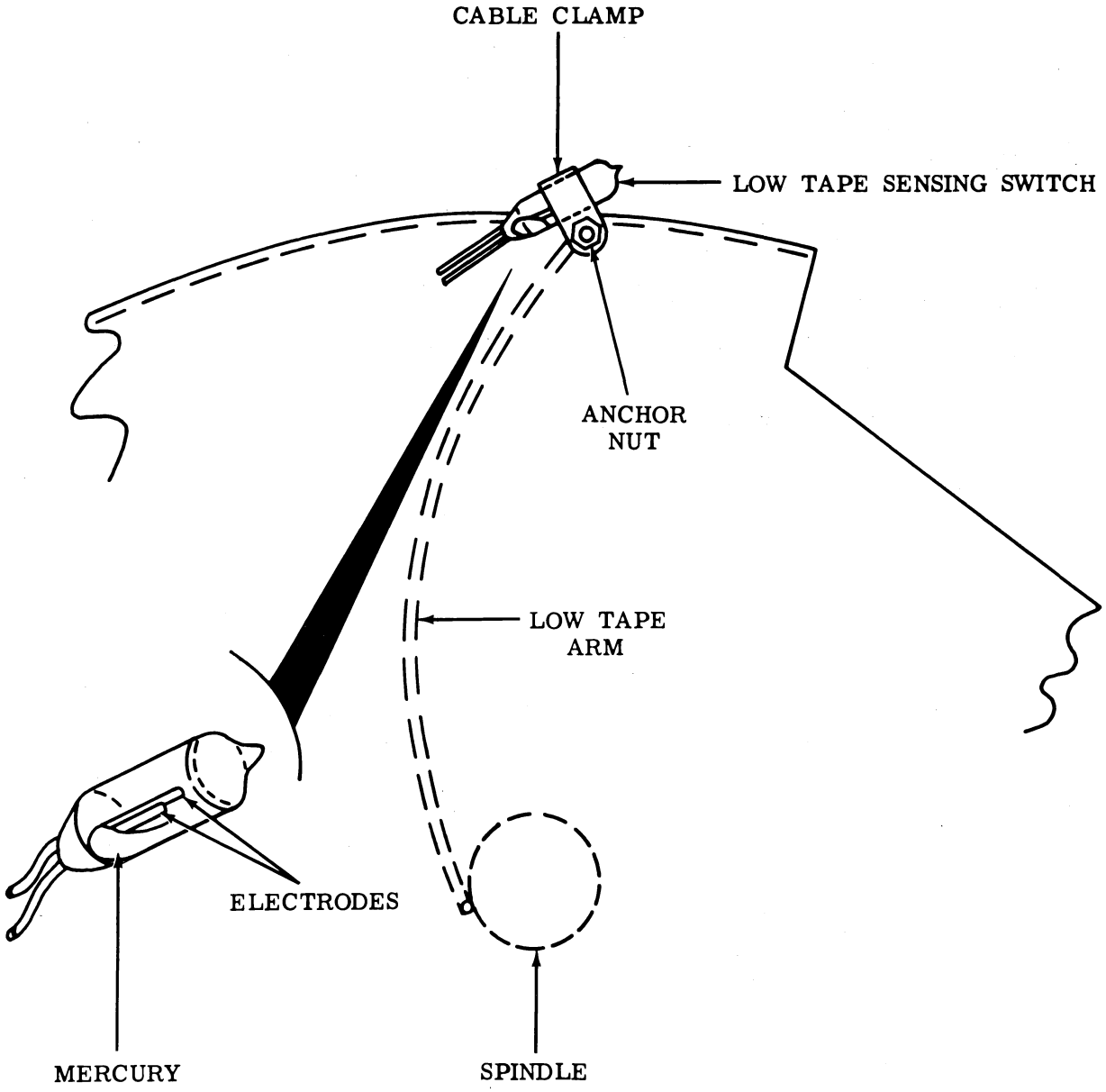
2.04 Receiver Tape Transport Assembly (continued)

LOW TAPE SENSING SWITCH

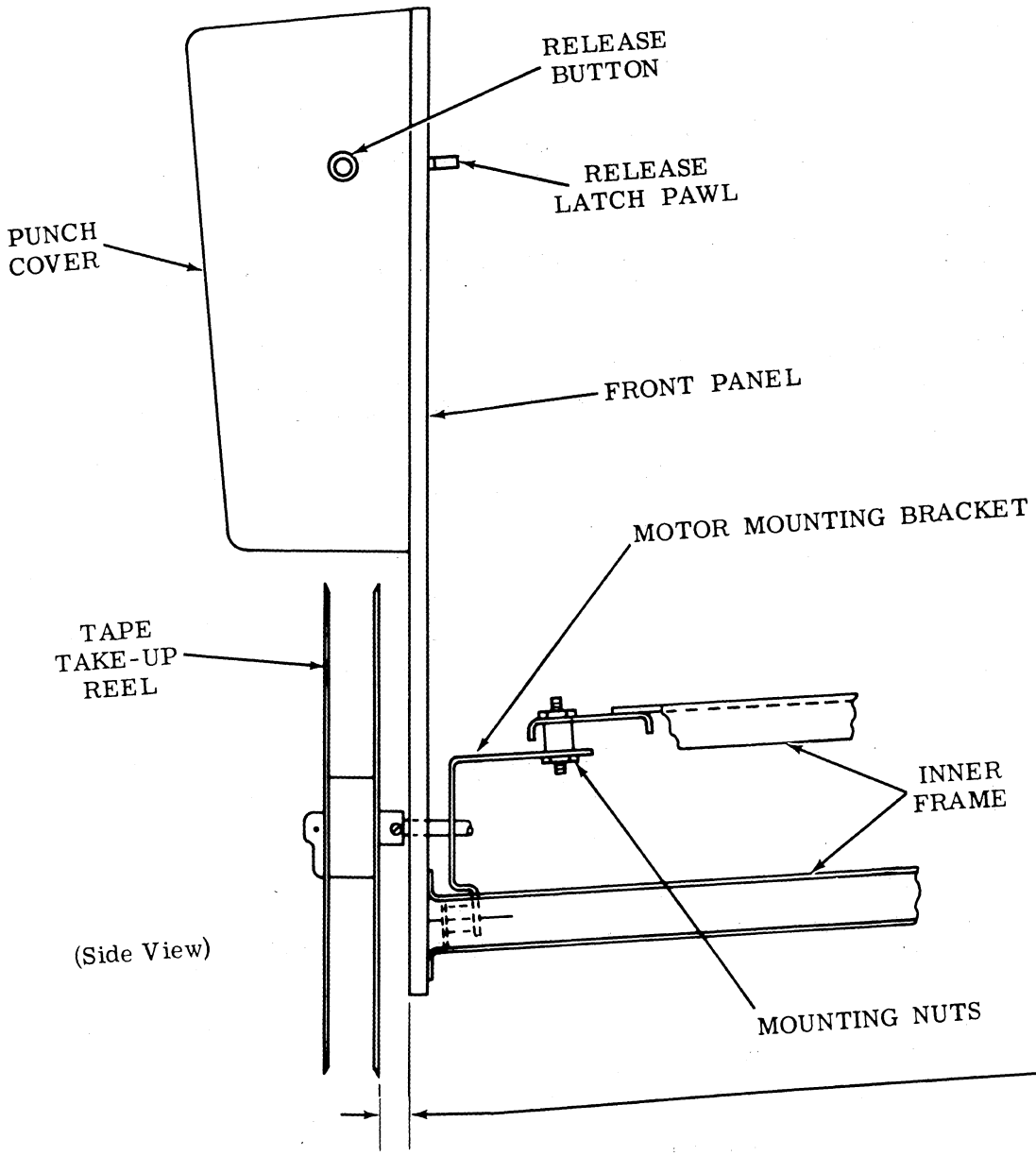
(1) Requirement
Switch should open with 5-inch diameter roll of tape placed on supply post and close with 4-inch diameter roll placed on post.

(2) Requirement
Both switch electrodes should be positioned in same horizontal plane.

To Adjust
With anchor nut loosened, rotate switch within cable clamp and rotate cable clamp about its mounting screw.



2.05 Receiver Tape Transport Assembly (continued)



TAPE TAKE-UP REEL AND FRONT PANEL

Requirement
Tape take-up reel and front panel should be parallel, as gauged by eye, when viewed from side of front panel.

To Adjust
With motor bracket mounting nuts loosened, position bracket.

2.06 Receiver Tape Transport Assembly (continued)

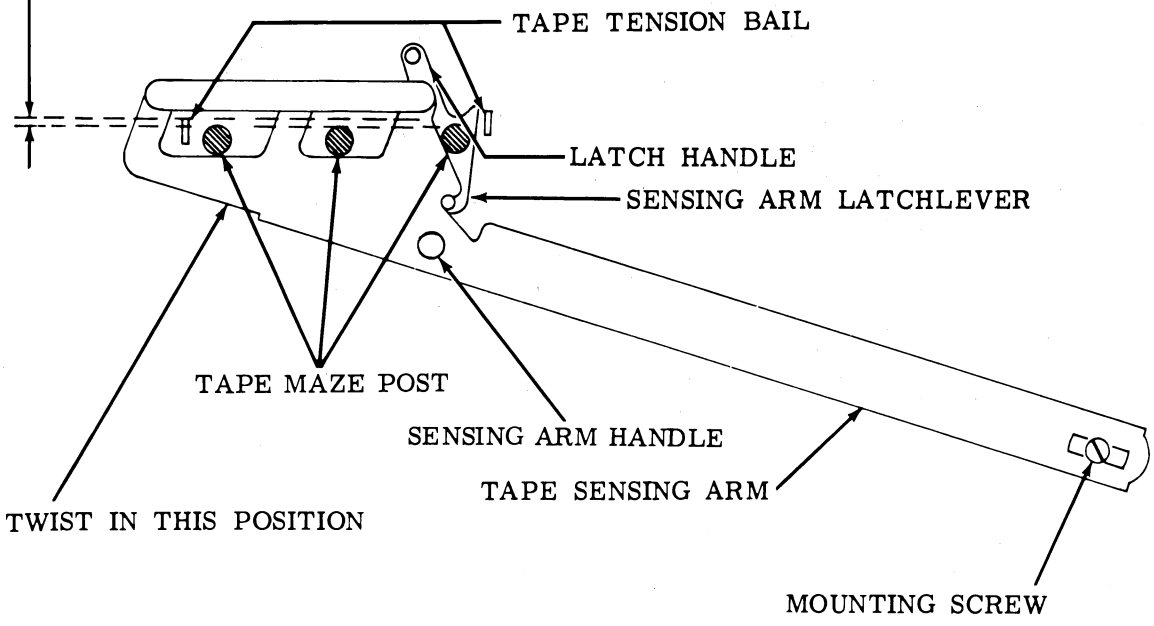
TAPE SENSING ARM

(1) Requirement
With tape sensing arm moved to its latched position, arm should clear tape tension bail and tape maze posts.

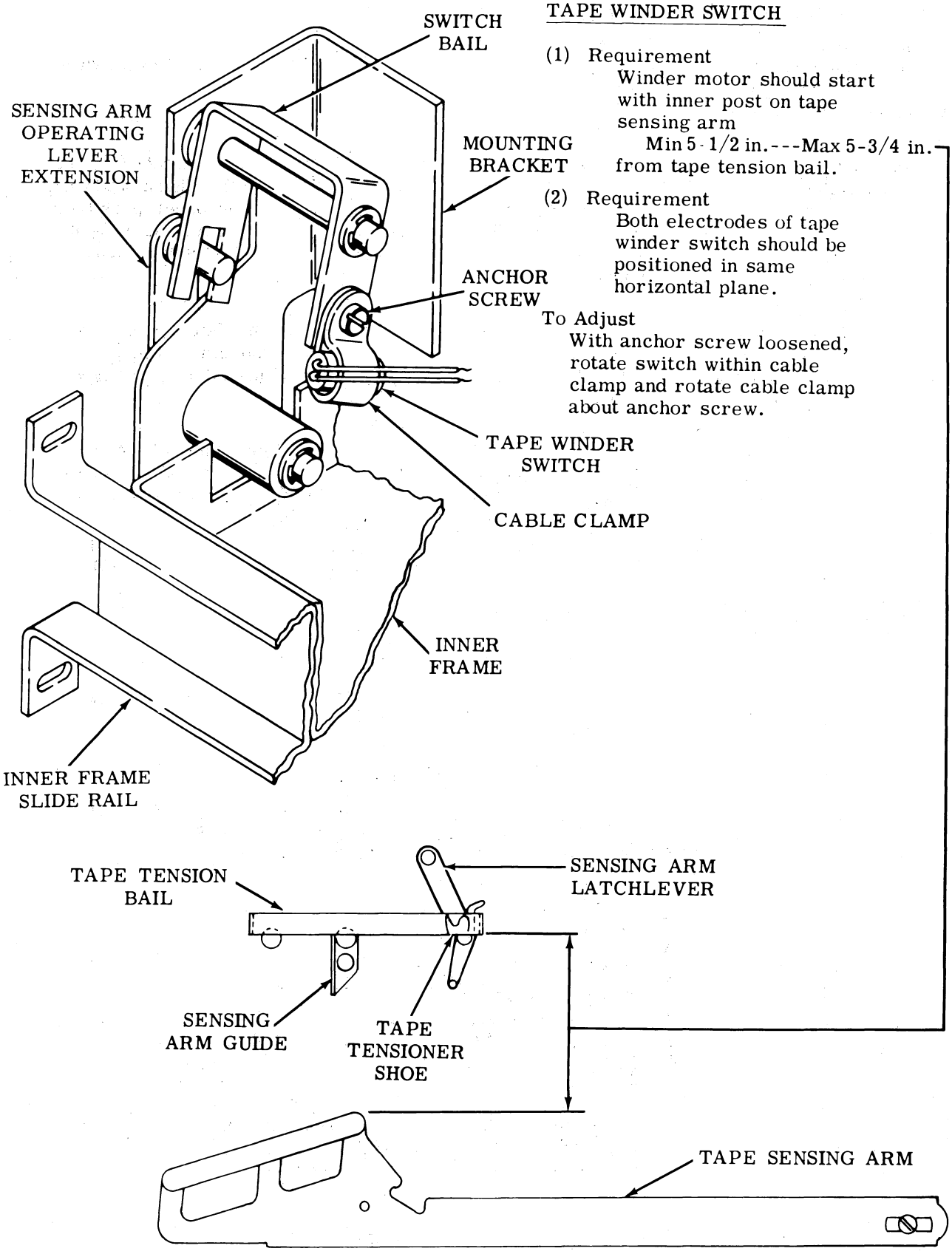
To Adjust
With sensing arm mounting screw friction tight, position arm to left or right.

(2) Requirement
With tape sensing arm moved to its latched position by lifting its handle, opening for tape threading should be approximately 1/8 inch.

To Adjust
Twist tape sensing arm clockwise or counterclockwise in position shown.



2.07 Receiver Tape Transport Assembly (continued)



TAPE WINDER SWITCH

(1) Requirement
Winder motor should start with inner post on tape sensing arm
Min 5-1/2 in.---Max 5-3/4 in. from tape tension bail.

(2) Requirement
Both electrodes of tape winder switch should be positioned in same horizontal plane.

To Adjust
With anchor screw loosened, rotate switch within cable clamp and rotate cable clamp about anchor screw.

2.08 Receiver Tape Transport Assembly (continued)

PUNCH COVER AND FRONT PANEL

Requirement

With punch cover installed, latch pawls should hold punch cover against front panel with Min some---Max 0.015 inch front to rear movement.

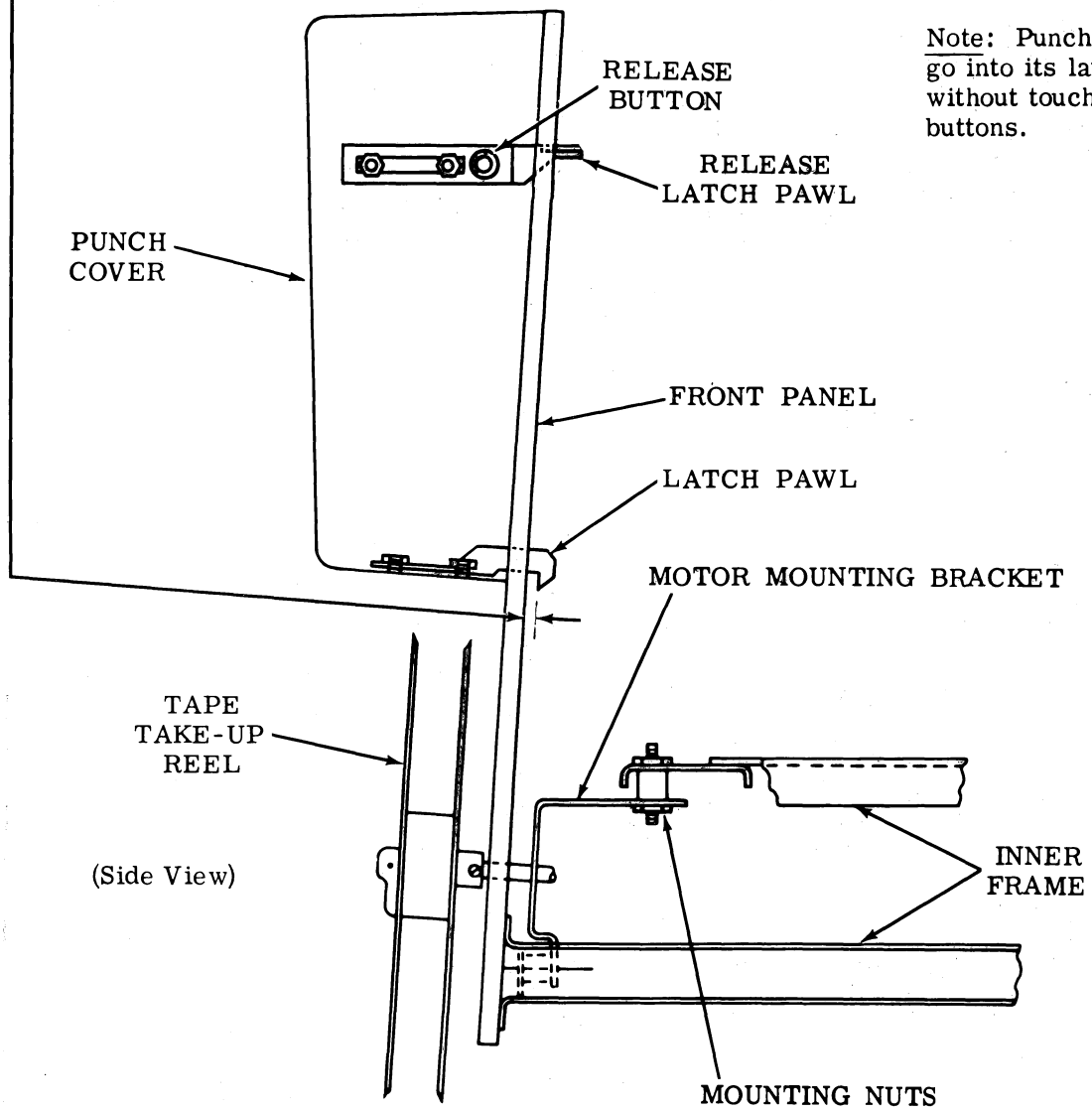
To Adjust (Lower Latch Pawls)

Pull out tape transport assembly until it contacts its positive stops. With lower latch pawl mounting nuts loosened (two on each latch), extend both latch pawls fully. Turn nuts finger tight. Hold punch cover against front panel and, from rear side of front panel, push both latch pawls into contact with inside surface of front panel. Pull punch cover up and out, being careful to avoid upsetting latch pawl position. Tighten mounting nuts and check adjustment by reinstalling punch cover.

To Adjust (Release Latch Pawls)

With mounting nuts on upper latch pawls loosened (two on each latch), hold punch cover against front panel. Adjust each latch pawl to meet front to rear movement requirement as measured between front panel inside surface and latch pawl inside latching surface. Tighten nuts and check adjustment by reinstalling punch cover.

Note: Punch cover should go into its latched position without touching release buttons.

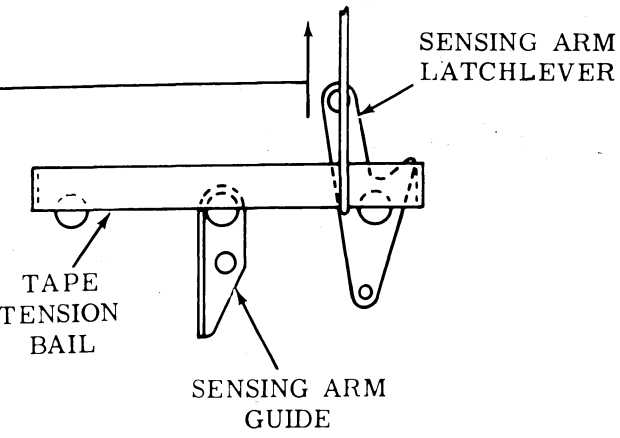


2.09 Receiver Tape Transport Assembly (continued)

TAPE TENSION BAIL

Requirement
It should require
Min 6 oz---Max 8 oz
to lift tape tensioner shoe
off its post.

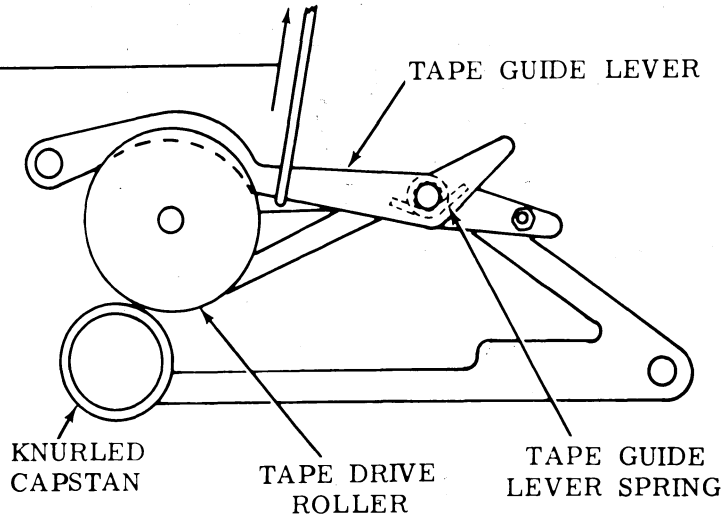
To Adjust
Turn hexagon-shaped spring
latch nut to wind or unwind
spring for correct tension.



TAPE GUIDE LEVER SPRING

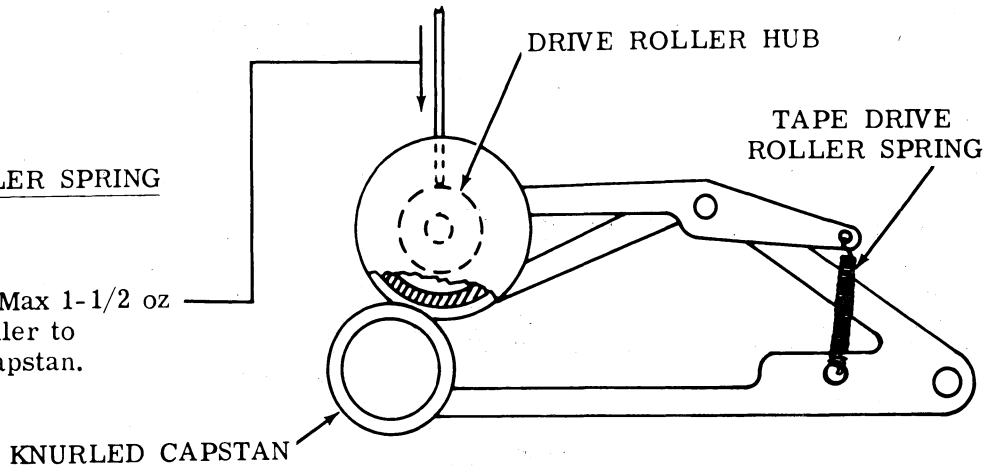
Requirement
It should require
Min 1/2 oz---Max 2 oz
to lift tape guide lever from
tape drive roller.

To Adjust
With one end of spring
unhooked, wind or unwind
spring.



TAPE DRIVE ROLLER SPRING

Requirement
It should require
Min 1/2 oz---Max 1-1/2 oz
for tape drive roller to
engage knurled capstan.



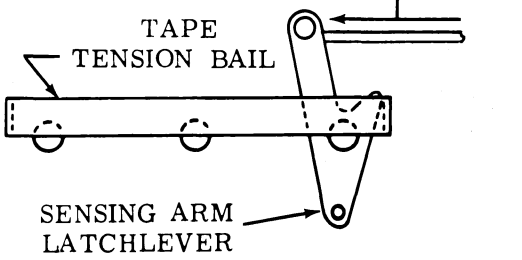
2.10 Receiver Tape Transport Assembly (continued)

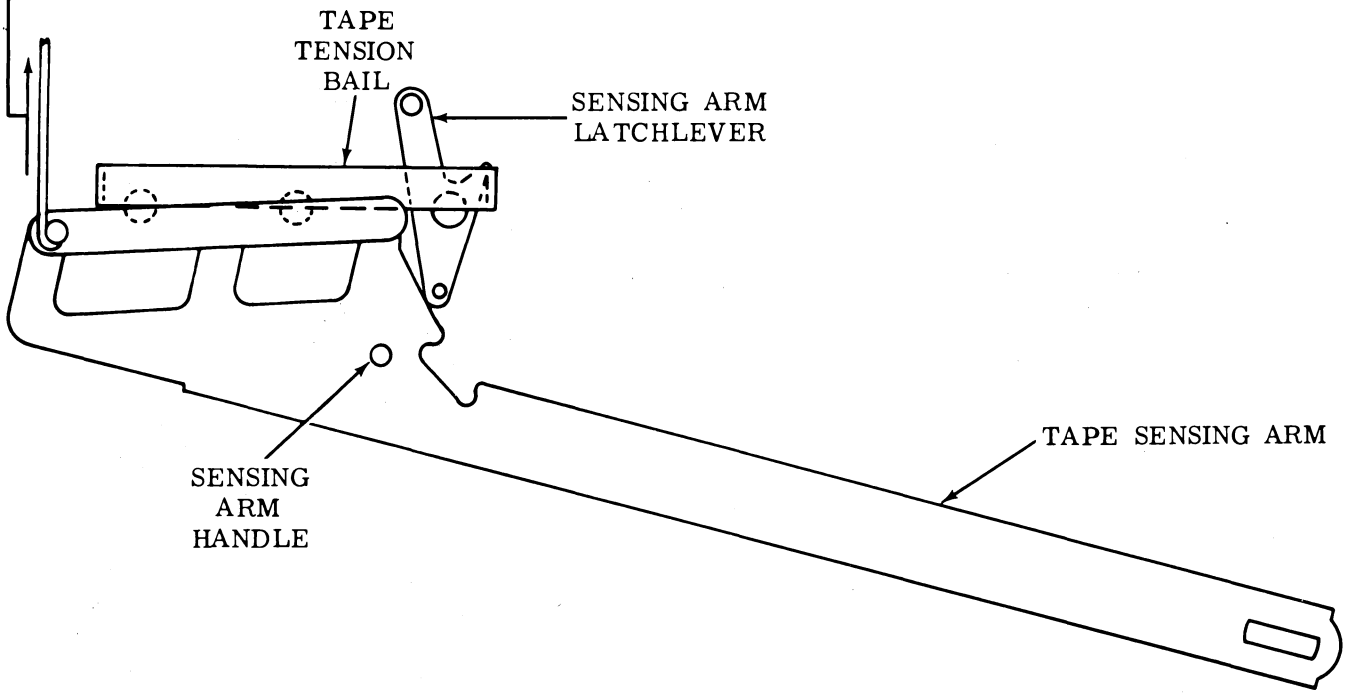
TAPE SENSING ARM SPRING

Requirement
It should require
Min 14 oz---Max 18 oz
to pull tape sensing arm
into contact with sensing
arm latchlever.

SENSING ARM LATCHLEVER SPRING

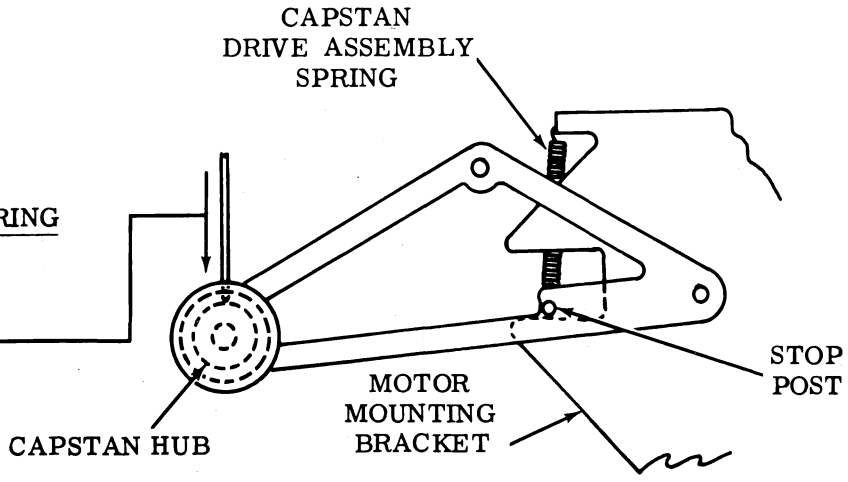
Requirement
It should require
Min 1/4 oz---Max 3/4 oz
to start lever moving.





CAPSTAN DRIVE ASSEMBLY SPRING

Requirement
It should require
Min 25 oz---Max 32 oz
to move assembly to
its lower limit.



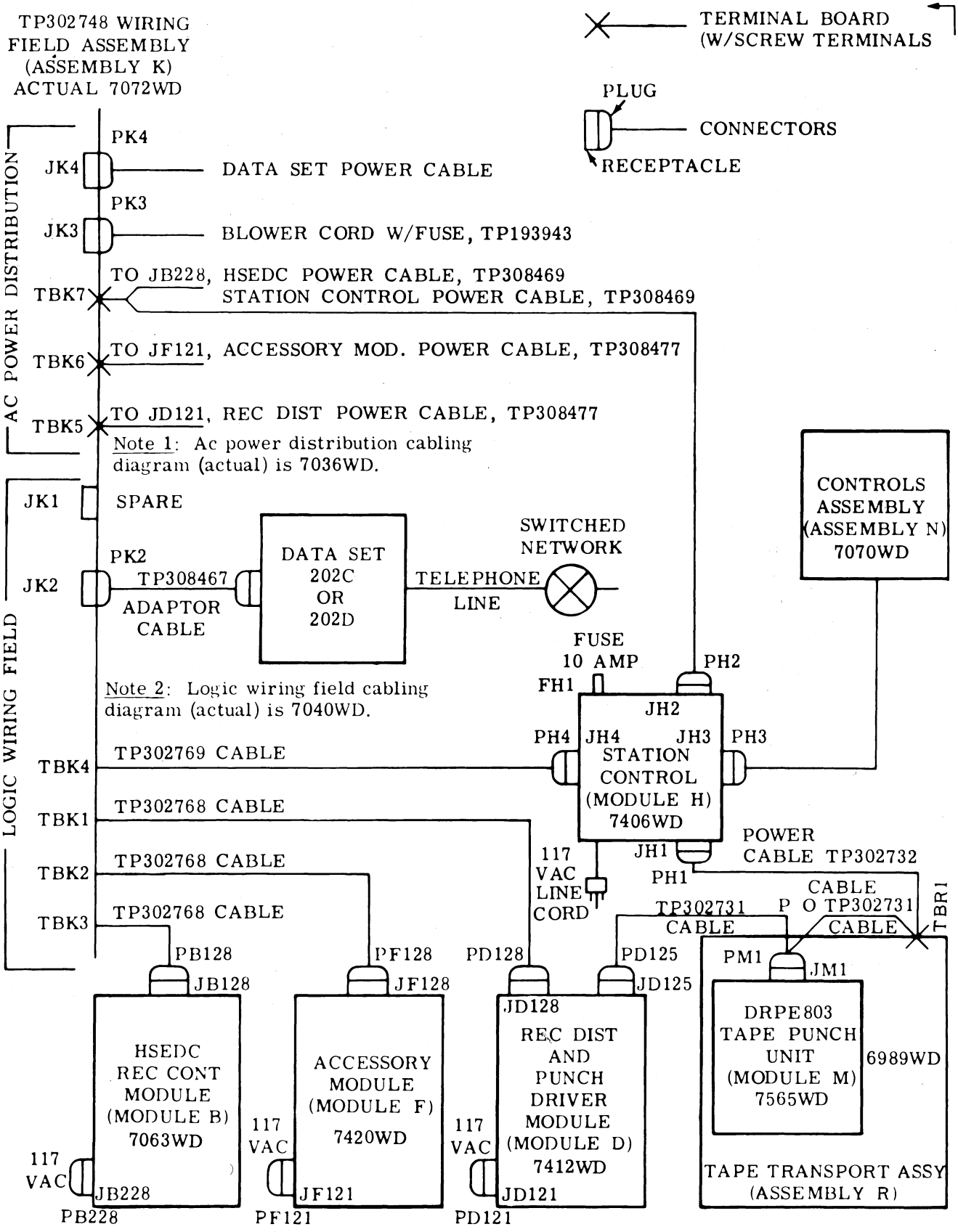
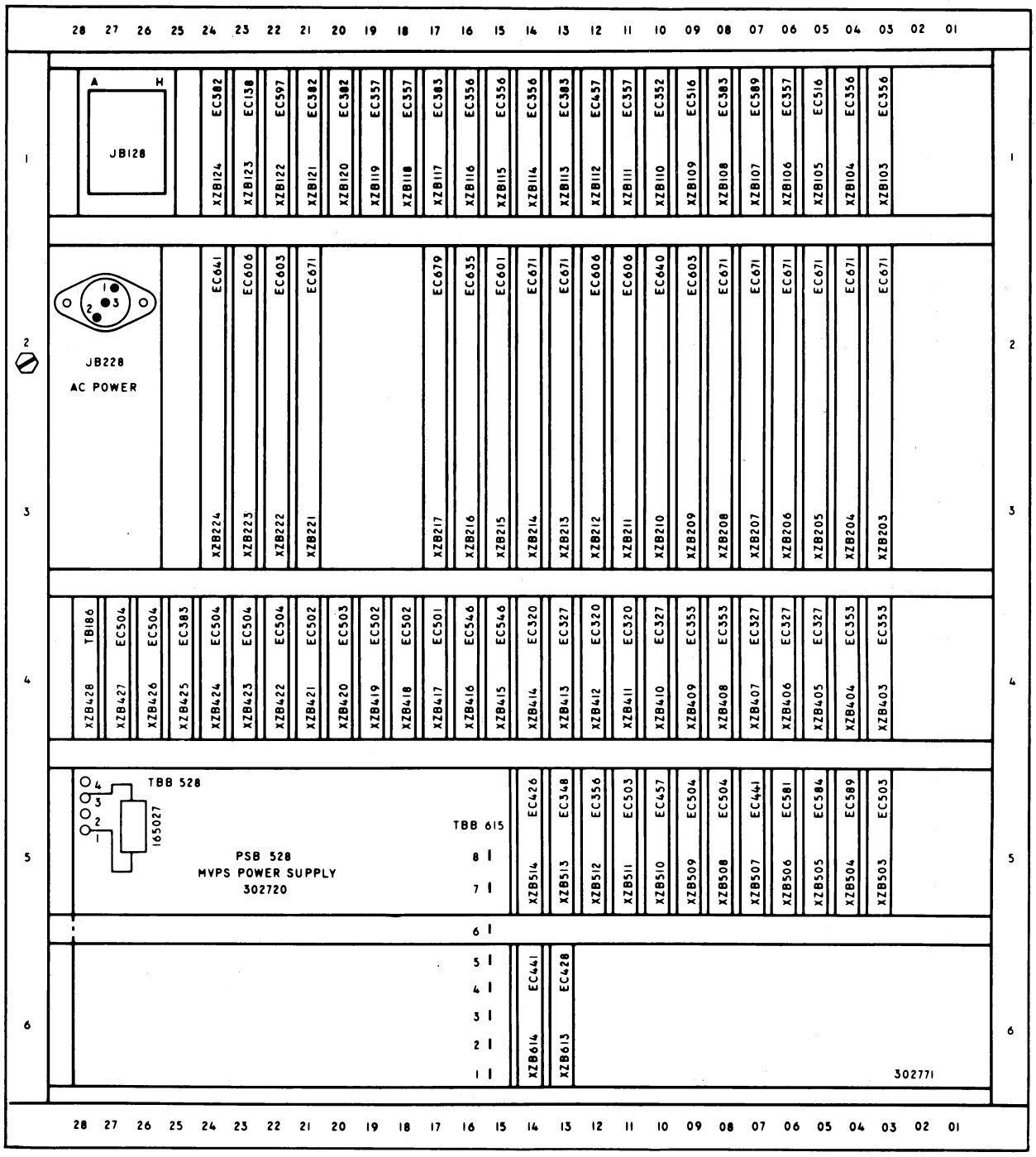


Figure 1 - Receiver Cabling and Schematic Wiring Diagram Reference Numbers



CIRCUIT CARDS

(Left Side View)

Figure 2 - HSEDC Receiver Control Module B

2.11 High Speed Error Detection and Correction Receiver Control Module

Note 1: No mechanical adjustments are required in this module.

Note 2: Use a general purpose oscilloscope, a KS14510-L1 vom meter or equivalent, and a potentiometer adjustment screwdriver for the electrical adjustment of this module.

Note 3: Turn power off when removing or replacing cards and strapping. ←

Note 4: Use small insulated alligator clips on straps and meter leads. ←

RECYCLE TIMER EC546/ZB415

Perform the following:

(1) Remove card EC457 from ZB510.

(2) Strap pin H to pin P of ZB415.

(3) Connect oscilloscope input to pin A of EC546/ZB415 and adjust oscilloscope as follows

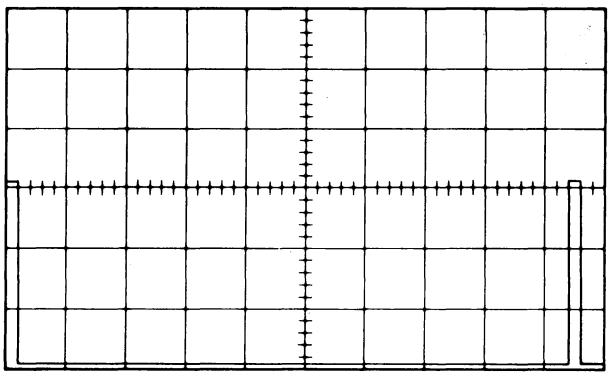
(a) Horizontal . . . 5 ms/div

(b) Vertical . . . . 2 volts/div (If an X10 probe is used, set vertical at 0.2 volts/div.) ←

(c) Trigger. . . . . positive slope

(d) Input. . . . . dc couple ←

(4) Adjust potentiometer R1 on card to obtain time interval of 45 to 50 milliseconds between pulses.



RECYCLE TIMER WITH DC 0V REFERENCE

OSCILLOSCOPE DATA

Vertical	0.2 volts/div
Attenuation	X10
Horizontal	5 ms/div
Magnifier	X1

(5) Remove strap, and oscilloscope connections, and replace card.

2.12 High Speed Error Detection and Correction Receive Control Module (continued)

CLOCK GENERATOR EC546/ZB416

Note: This adjustment must be changed if operating speed is changed.

Perform the following:

(1) Remove card EC357 from ZB118.

(2) Strap pin H to pin P of ZB416.

(3) Connect oscilloscope input to pin A of EC546/ZB416 and adjust it as follows:

(a) Horizontal . . . . 1 ms/div

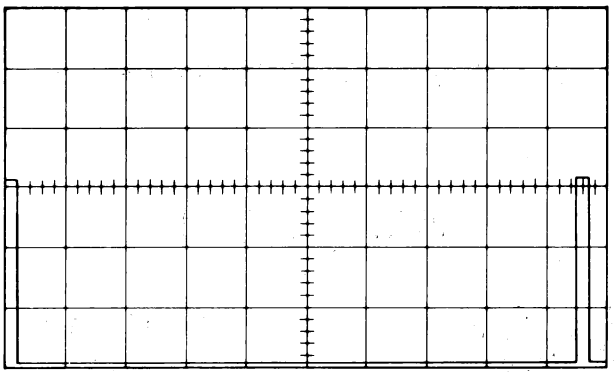
(b) Vertical . . . . . 2 volts/div (If an X10 probe is used, set vertical at 0.2 volts/div.)

(c) Trigger. . . . . positive slope

(4) Operating speed adjustments

(a) For operating speed of 1050 wpm, adjust potentiometer R1 on card to obtain a pulse time interval of 9.52 milliseconds, ±0.01 millisecond.

(b) For operating speed of 1200 wpm, adjust potentiometer R1 on card to obtain a pulse time interval of 8.34 milliseconds, ±0.01 millisecond.



CLOCK GENERATOR AT 1050 WPM

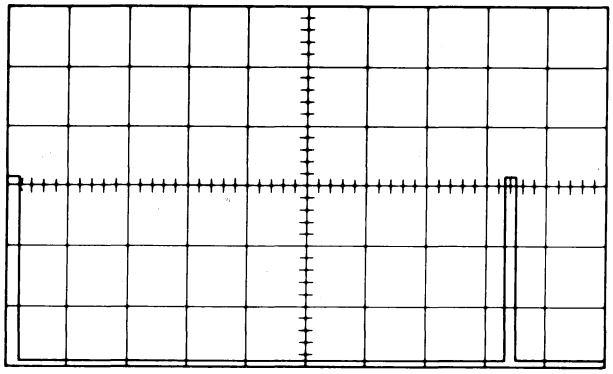
OSCILLOSCOPE DATA

Vertical	0.2 volts/div
Attenuation	X10
Horizontal	1 ms/div
Magnifier	X1

Remove strap and oscilloscope connection, and replace card.

2.13 High Speed Error Detection and Correction Receive Control Module (continued)

CLOCK GENERATOR EC546/ZB416 (continued)



CLOCK GENERATOR AT 1200 WPM

OSCILLOSCOPE DATA

Vertical	0.2 volts/div
Attenuation	X10
Horizontal	1 ms/div
Magnifier	X1

Remove strap and oscilloscope connection, and replace card.

PHOTOELECTRIC READER LIGHT SOURCE AND PAD OUT CIRCUIT

CAUTION: EXERCISE CARE WHEN WORKING WITH THE LIGHT SOURCE TO AVOID CONTACTING THE LIGHT SOURCE COVER WHICH MAY BE HOT OR THE AC POWER IN THIS AREA.

Note 1: The procedure which follows is an outline of the more detailed instructions given in the section covering the high speed punch unit (DRPE type). Check these detailed instructions before adjusting the light source.

Note 2: Before adjusting the light source, make sure the mirror in the mirror chute assembly is free of dirt and lint.

Perform the following:

(1) Feed tape through the punch block by depressing the ALL FEED button. Leave this tape (letters) in the punch block for steps (2) through (5).

(2) Connect a vom meter, type KS14510-L1 or equivalent, as follows:

Turn power OFF
Set the meter to 12 ma dc
Positive lead to JB128-B3 +6 volts
Negative lead to connector plate JB128 terminals
Turn power ON

Feed hole - C2
Level 1 - F1
Level 2 - F2
Level 3 - F3
Level 4 - F4
Level 5 - F5
Level 6 - F6
Level 7 - F7
Level 8 - F8

2.14 High Speed Error Detection and Correction Receiver Control Module (continued)

PHOTOELECTRIC READER LIGHT SOURCE AND PAD OUT CIRCUIT (continued)

(3) Immobilize the light source in the tape transport assembly by loosening its six mobilizing screws.

(4) Adjust the light source for maximum current reading on the meter. Adjust the light so that each level and feed hole give a minimum current reading of 1.3 milliamperes. Record the current for each level.

(5) Mobilize the light source by tightening the six screws and recheck the current readings for each level.

(6) Pull blank tape (no holes punched) into punch block for steps (7) and (8).

(7) Remove the meter leads and reconnect them as follows:

Turn power OFF
Negative lead to JB128-A4 -6 volts
Positive lead to connector plate JB128 terminals
Turn power ON

Feed hole - C2
Level 1 - F1
Level 2 - F2
Level 3 - F3
Level 4 - F4
Level 5 - F5
Level 6 - F6
Level 7 - F7
Level 8 - F8

(8) Use a potentiometer adjusting tool and adjust potentiometers on card EC679/ZB217 for a current reading of one third the reading obtained in step (4) above. Minimum current for this adjustment is 0.7 ma regardless of reading in step (4).

Connections	EC679/ZB217 Potentiometers
Feed hole - JB128 - C2	Top
Level 1 - JB128 - F1	Bottom
Level 2 - JB128 - F2	2nd from bottom
Level 3 - JB128 - F3	3rd from bottom
Level 4 - JB128 - F4	4th from bottom
Level 5 - JB128 - F5	5th from bottom
Level 6 - JB128 - F6	6th from bottom
Level 7 - JB128 - F7	7th from bottom
Level 8 - JB128 - F8	8th from bottom

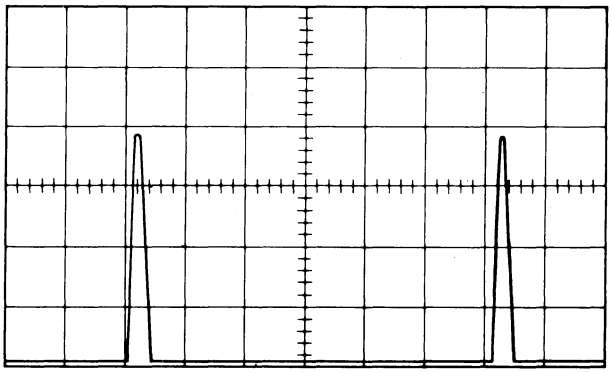
(9) Remove the meter and connect a general purpose oscilloscope to JB128-C2, F1-F8 to monitor the photoelectric reader. Set up the oscilloscope as follows:

Trigger . . . . . Internal Positive
Vertical . . . . . 2 volts/cm
Horizontal . . . . 2 ms/cm
Input . . . . . dc couple

2.15 High Speed Error Detection and Correction Receiver Control Module (continued)

PHOTOELECTRIC READER LIGHT SOURCE AND PAD OUT CIRCUIT (continued)

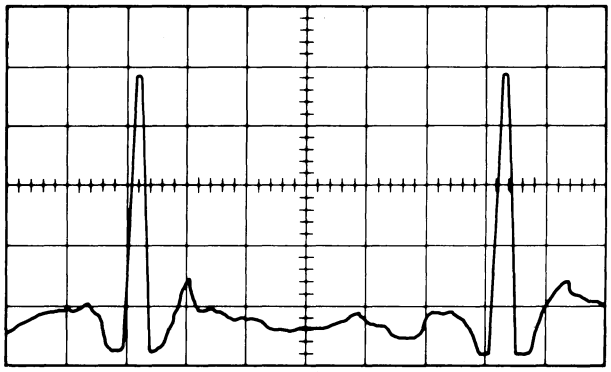
(10) With the punch perforating letters data, observe the waveform on each level. After 5 minutes of operation the -6 volt level must be -6 v ±10% and have no ripple. Top of pulse need not be positive.



PHOTOELECTRIC READER GOOD SIGNAL

OSCILLOSCOPE DATA

Vertical	0.2 volts/div
Attenuator	X10
Horizontal	2 ms/div
Magnifier	X1

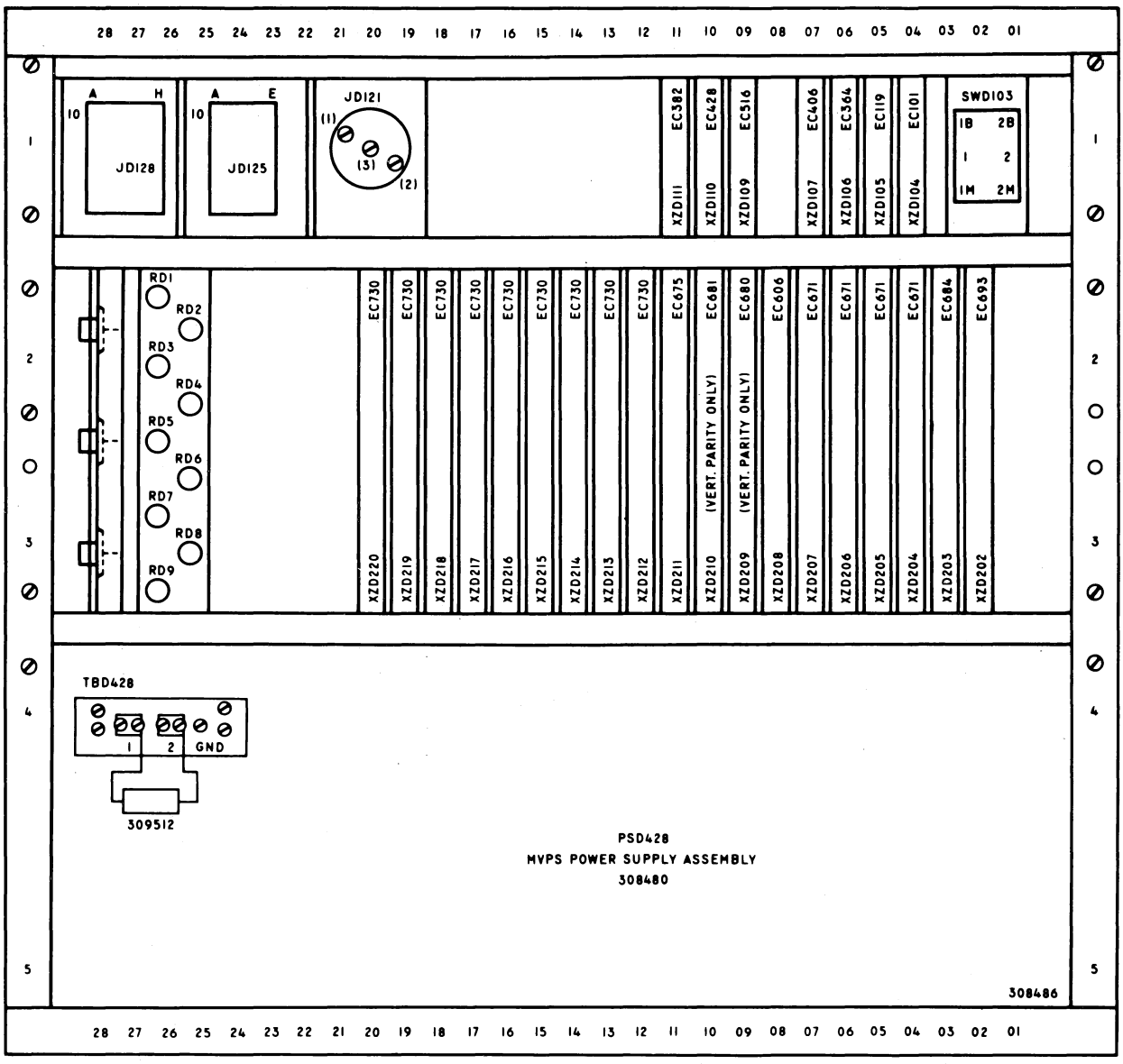


PHOTOELECTRIC READER BAD SIGNAL

OSCILLOSCOPE DATA

Vertical	0.2 volts/div
Attenuator	X10
Horizontal	2 ms/div
Magnifier	X1

(11) With the BLANK FEED button depressed, the same points checked in (10) above (except feed hole) should be +6 v ±10%.



CIRCUIT CARDS

(Left Side View)

Figure 3 - High Speed Receiver Distributor and Punch Driver, Module D

2.16 Receiver Distributor and Punch Driver Module

Note 1: No mechanical adjustments are required in this module.

Note 2: Use any calibrated oscilloscope and a potentiometer screwdriver for the electrical adjustment of this module.

Note 3: Always check adjustment after replacing a circuit card or punch unit.

Note 4: Do not remove or replace circuit card or punch unit with power on.

Note 5: Punch unit should never be operated without tape.

CONTROL CARD EC675/ZD211

Perform the following:

(1) Connect oscilloscope input to pin 13 of EC675/ZD211 and adjust it as follows:

(a) Dc couple scope

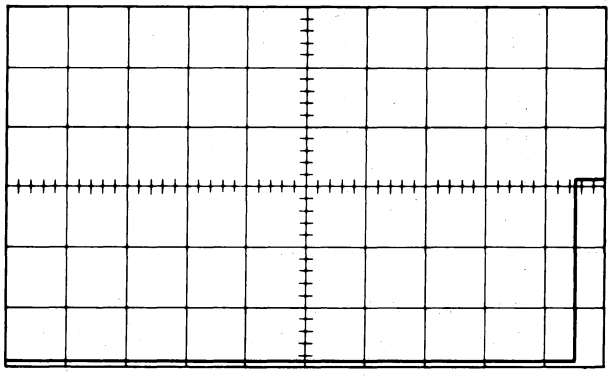
(b) Vertical . . . . 2 volts/div

(c) Horizontal . . . 0.2 ms/div

(d) Trigger. . . . . negative internal

(2) Press BLANK FEED button.

(3) Adjust negative portion of waveform to 1.9 milliseconds, ±0.05 millisecond.



NEGATIVE PORTION OF CONTROL WAVEFORM

OSCILLOSCOPE DATA

Vertical.	0.2 volts/div
Attenuation.	X10
Horizontal	0.2 ms/div
Magnifier.	X1

2.17 Receiver Distributor and Punch Driver Module (continued)

PUNCH DRIVER CARDS EC730/ZD212-ZD220

Note: The earlier TP303672 and later (nonadjustable) TP303730 magnet driver circuit card assemblies are interchangeable.

Turn module power off.

Perform the following:

(1) Connect oscilloscope ground lead to pin 1 and input to pin 32 of card being tested; adjust oscilloscope as follows:

(a) Couple scope . . . . . ac

(b) Vertical . . . . . 5 volts/div

(c) Horizontal . . . . . 0.2 ms/div

(d) Trigger. . . . . positive, external on pin 13 of EC675/ZD211.

Turn power on.

(2) Press ALL FEED button.

FUSE CHART

LEVEL	COIL WIRE COLOR	VOLTAGE	FUSE
FEED = ZD220	S	-55	I
1 = ZD212	BK	-55	A
2 = ZD213	BR	-55	B
3 = ZD214	R	-55	C
4 = ZD215	O	-55	D
5 = ZD216	Y	-55	E
6 = ZD217	G	-55	F
7 = ZD218	BL	-55	G
8 = ZD219	P	-55	H

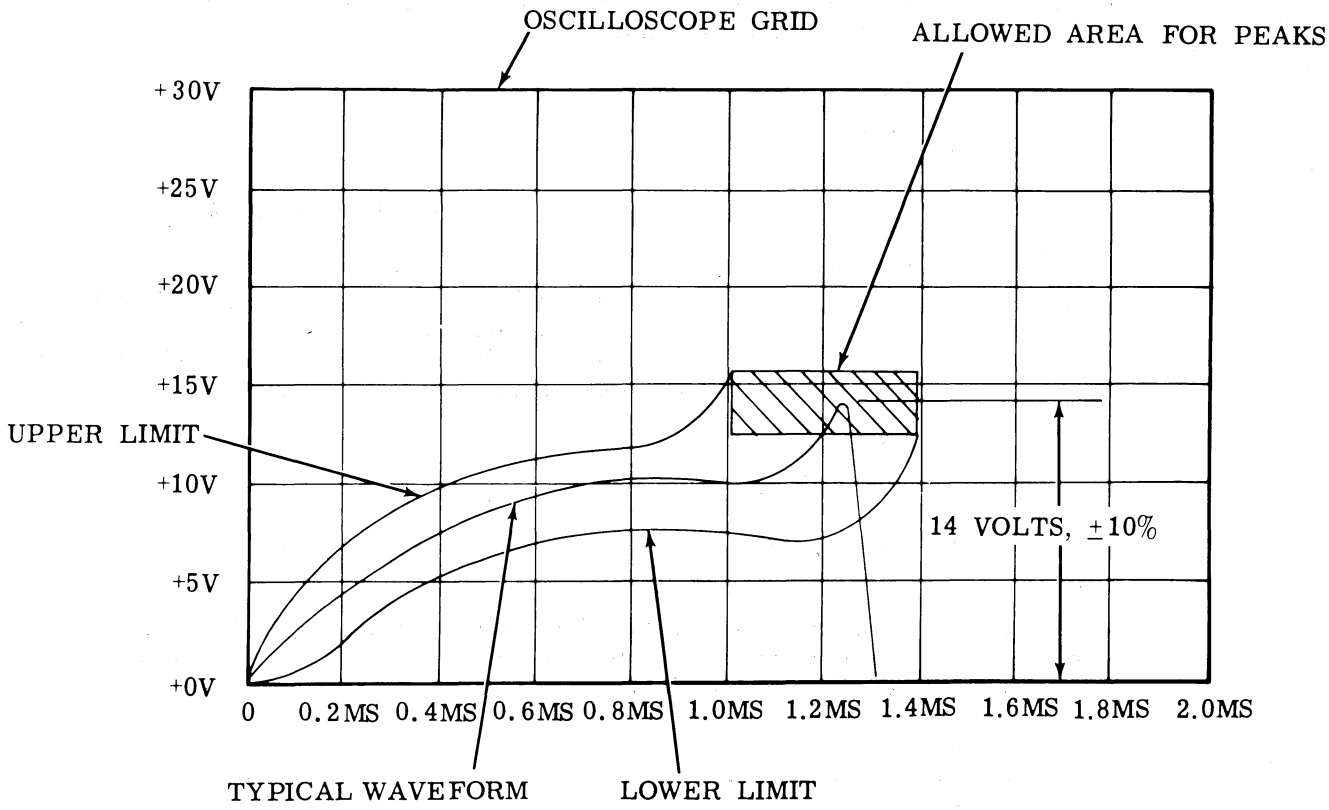
(3) Check peak of waveform for 14 volts, +10%. Peak must occur between 1.0 and 1.4 milliseconds as shown in graph (2.18). (Note that voltage is measured between peak and steady-state voltage).

2.18 Receiver Distributor and Punch Driver Module (continued)

PUNCH DRIVER CARDS EC730/ZD212-ZD220 (continued)

OSCILLOSCOPE DATA

Vertical . . . . . 0.5 volts/div
Attenuation X10
Horizontal. . . . . 0.2 ms/div
Magnifier X1



WAVEFORM PUNCH DRIVERS

(4) If waveform does not fall within limits shown in graph, check gap and bumper adjustment. Refer to the section covering the high speed tape punch unit (DRPE type).

START-STOP OSCILLATOR EC406/ZD107

Perform the following:

(1) Remove EC516/ZD109, EC428/ZD110, and EC382/ZD111.

(2) Strap pin H to pin N on ZD107 to keep oscillator on.

(3) Connect oscilloscope input to pin A of EC364/ZD106 and adjust it as follows:

(a) Vertical . . . . 2 volts/div (If an X10 probe is used, set vertical at 0.2 volts/div.)

(b) Horizontal . . . 50 microseconds/div

2.19 Receiver Distributor and Punch Driver Module (continued)

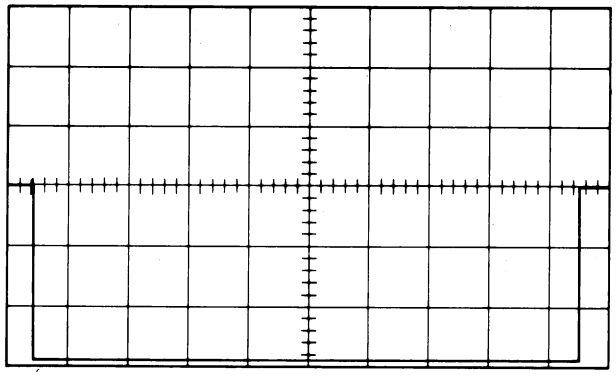
START-STOP OSCILLATOR EC406/ZD107 (continued)

(c) Trigger. . . . . positive internal

(d) Input. . . . . dc

(4) Operating speed adjustments

(a) For operating speed of 1050 wpm, adjust variable inductor on EC406/ZD107 with screwdriver to obtain time interval of 476 microseconds, ±5 u sec, between adjacent peaks. This causes oscillator to run at 2100 Hz.

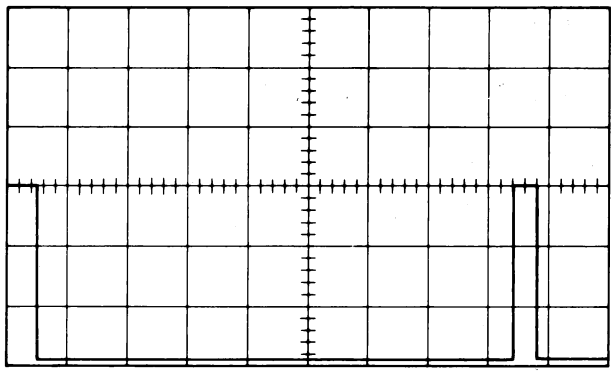


1050 WPM START-STOP OSCILLATOR

OSCILLOSCOPE DATA

Vertical. . . . . 0.2 volts/div
Attenuation. X10
Horizontal . . . . . 50 u sec/div
Magnifier. X1

(b) For operating speed of 1200 wpm, adjust variable inductor on EC406/ZD107 with screwdriver to obtain time interval of 416 microseconds, ±5 u sec, between adjacent peaks. This causes oscillator to run at 2400 Hz.



1200 WPM START-STOP OSCILLATOR

OSCILLOSCOPE DATA

Vertical. . . . . 0.2 volts/div
Attenuation. X10
Horizontal . . . . . 50 u sec/div
Magnifier. X1

2.20 Receiver Distributor and Punch Driver Module (continued)

START-STOP OSCILLATOR EC406/ZD107 (continued)

Note: If oscillation stops during adjustment, adjust potentiometer R6 to restore oscillation.

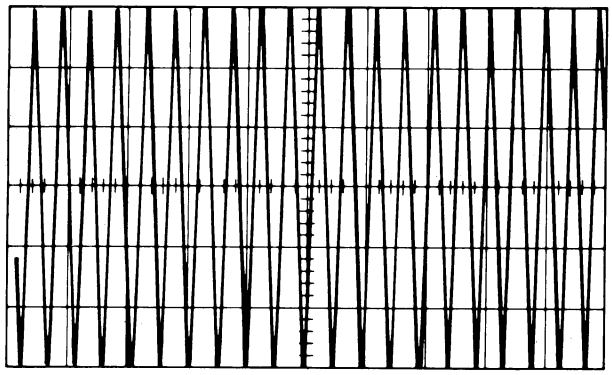
(5) Connect oscilloscope input to pin A of EC406/ZD107 and adjust oscilloscope as follows:

(a) Vertical . . . . . 2 volts/div

(b) Horizontal . . . . 1 millisecond/div

(c) Trigger. . . . . positive internal

(6) Adjust feedback potentiometer R6 for equal amplitude on all cycles.



FEEDBACK EQUAL AMPLITUDE

OSCILLOSCOPE DATA

Vertical.	0.2 volts/div
Attenuation.	X10
Horizontal	1 ms/div
Magnifier.	X1

(7) Remove strap and replace EC516/ZD109, EC428/ZD110, and EC382/ZD111.

For frequency refinement and check of foregoing adjustment, perform the following:

(1) Establish a data connection with any local or remote Tape Sender 4A.

(2) Operate both terminals in the non-EDC mode.

(3) Place a continuous-loop tape (TP303099 test tape) containing only continuous reversals (levels 1, 3, 5, and 7 marking) in the reader. Transmit tape to receiver. Since it is not necessary to punch tape for this adjustment, the punch can be inhibited by grounding pin 31 of EC684/ZD203.

(4) Connect oscilloscope input to pin A of EC364/ZD106 and adjust it as follows:

(a) Vertical . . . . . 2 volts/div

(b) Horizontal . . . . 0.1 ms/div

(c) Trigger. . . . . negative external on pin 13 of EC693/ZD202.

2.21 Receiver Distributor and Punch Driver Module (continued)

START-STOP OSCILLATOR EC406/ZD107 (continued)

(5) Adjust variable inductor L1 with screwdriver to center pulses at center of oscilloscope as shown in graphs A, B, and C.

Note: Jitter in pulses is due to transmission distortions. If oscillation stops during adjustment, adjust potentiometer R6 to restore oscillation.

(6) Connect oscilloscope input to pin A of EC406/ZD107 and adjust it as follows:

(a) Vertical . . . . . 2 volts/div

(b) Horizontal . . . . 2 milliseconds/div

(c) Trigger. . . . . negative external on pin 13 of EC693/ZD202.

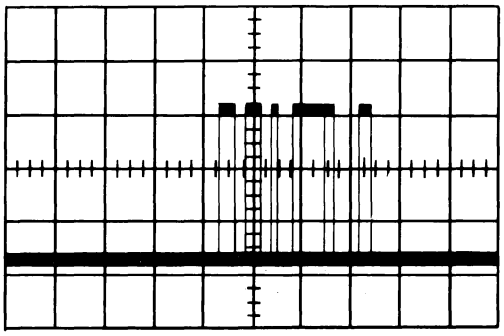
(7) Adjust feedback potentiometer R6 for equal amplitude on all cycles as shown in graph D.

OSCILLOSCOPE ADJUSTMENTS FOR GRAPHS A, B, C AND D

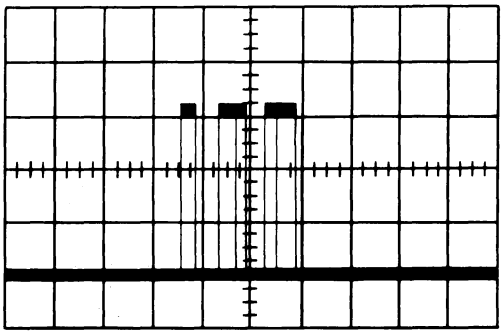
OSCILLOSCOPE DATA

Vertical . . . . . 0.2 volts/div
Attenuation X10
Horizontal . . . . . 2 ms/div
Magnifier X1

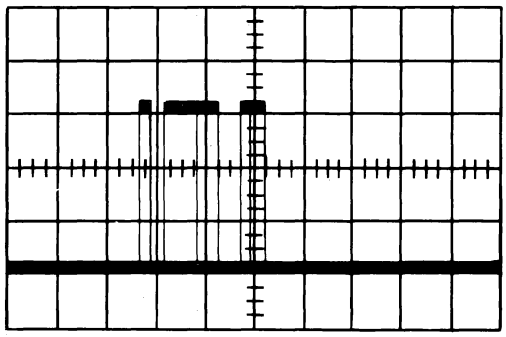
START-STOP OSCILLATOR WAVEFORMS



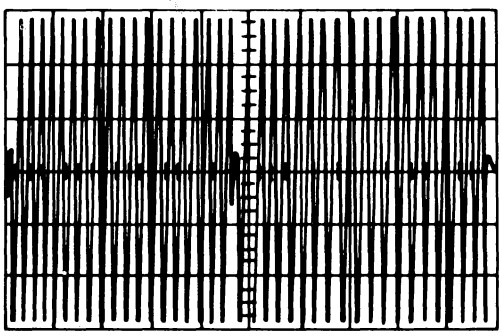
A. FREQUENCY TOO LOW



B. FREQUENCY OK



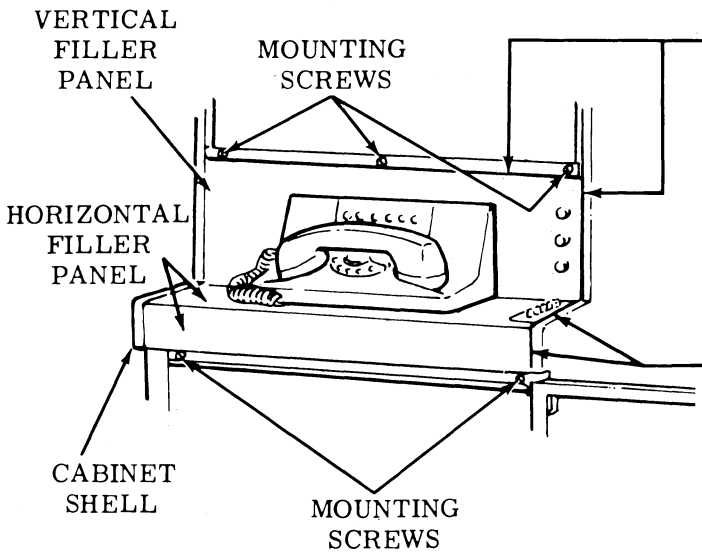
C. FREQUENCY TOO HIGH



D. FEEDBACK EQUAL AMPLITUDE

2.22 Receiver Cabinet

FILLER PANELS



(1) Requirement

Vertical filler panel should be mounted with three no. 6-32 screws so that TP302790 pushbuttons are centered in their holes and equal gap is provided between end of panel and cabinet.

To Adjust

With screws loosened, position panel.

(2) Requirement

With control assembly TP302790 mounted, horizontal filler panel should be mounted with two no. 6-32 screws to provide equal gap between panel and cabinet shell.

To Adjust

With screws loosened, position panel.

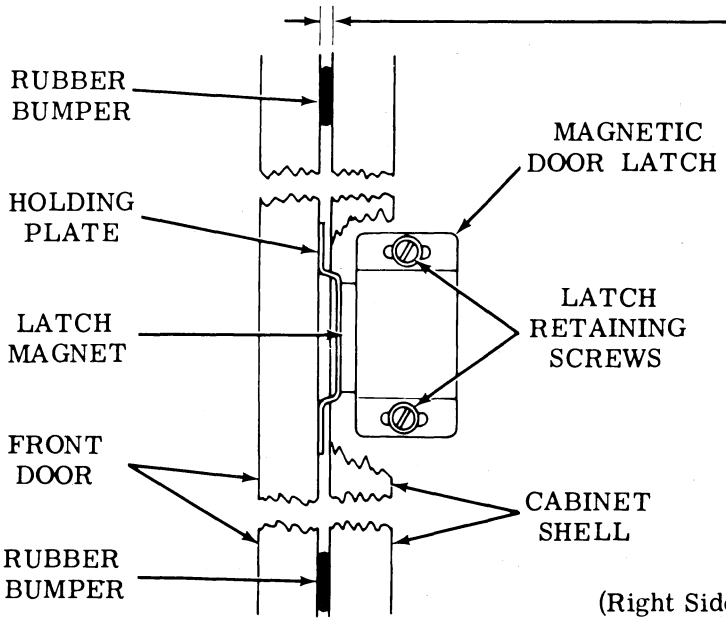
FRONT DOOR

Requirement

Front door is mounted by slipping bottom pin of hinge assembly into bottom keeper hole and by depressing pin of top hinge assembly and slipping pin into top keeper hole. Door should open and close freely without binding; and with door closed there should be a maximum of 1/16 inch gap between door and cabinet shell.

To Adjust

With both magnetic door latch retaining screws loosened, position door latch so that with door closed and rubber door bumpers against cabinet shell, latch magnet completely contacts holding plate on door for maximum retaining force to keep door closed.



(Right Side View)

2.23 Receiver Cabinet (continued)

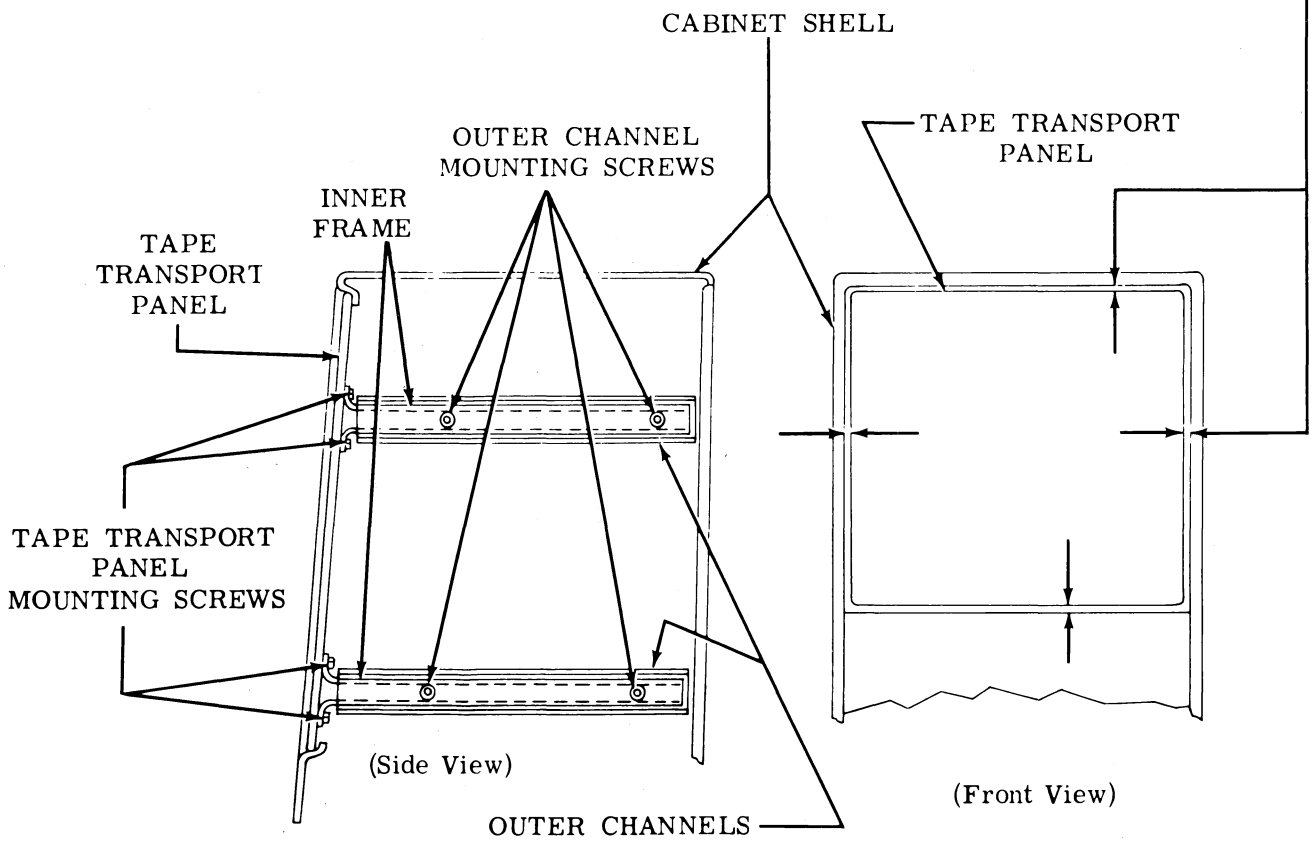
TAPE TRANSPORT PANEL

Requirement

Tape transport panel should be positioned to provide an approximately equal gap between panel and cabinet shell as gauged by eye.

To Adjust

With outer channel mounting screws loosened, move outer channels up or down; and with tape transport panel mounting screws loosened, move panel right or left. If panel cannot be properly centered and wider gap remains between left side of panel and cabinet shell, remove star washers from between cabinet shell and outer channels and place washers between inner surfaces of outer channels and flat washers to facilitate adjustment.



DATA SET RACK SUPPORT

Requirement

Support should retain data set (if required) in correct position within cabinet.

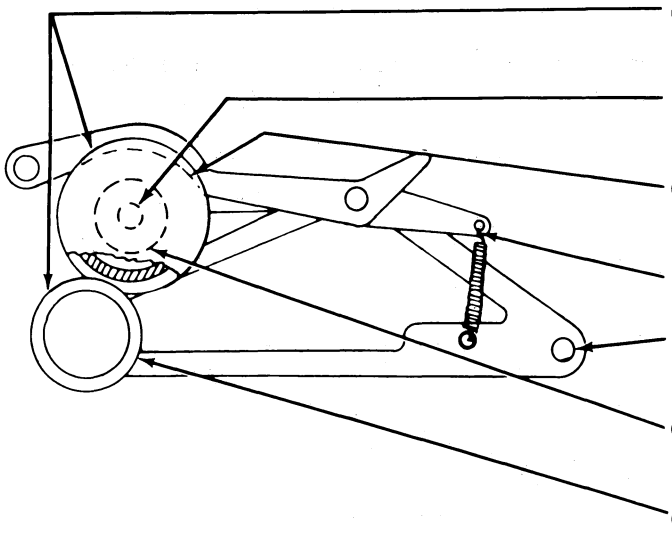
To Adjust

With data set rack support inserted into slot at bottom of station control area, fasten front of support with two no. 8 self-tapping screws in holes provided.

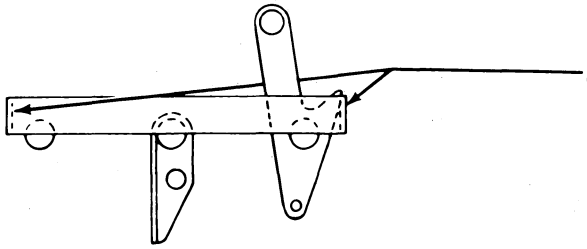
3. LUBRICATION

3.01 Receiver Tape Transport Assembly

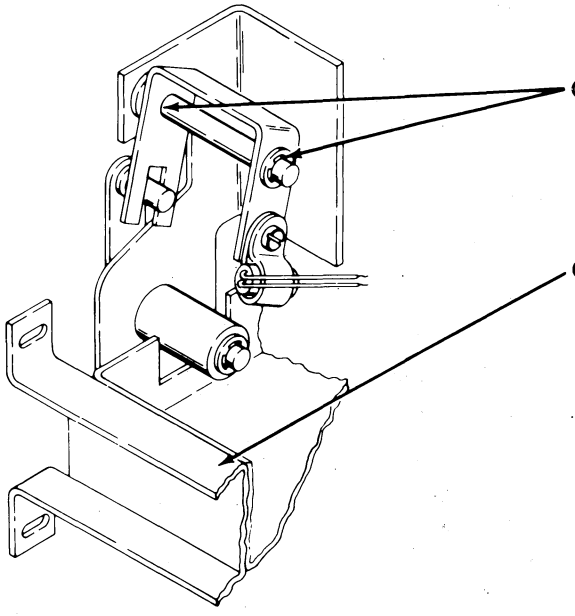
CAUTION: DO NOT OVERLUBRICATE.



SAT	Bearings (Behind Hub)	Bronze Bearings
O1	Bearing Surface	Tape Drive Roller Shaft
O1	Contact Surface	Tape Guide Lever
O1	Hooks - Each End	Springs
O1	Bearing Surface	Capstan Drive Assembly Pivot
O1	Contact Surface	Tape Sensing Arm Hub
O1	Contact Surface	Knurled Capstan Hub



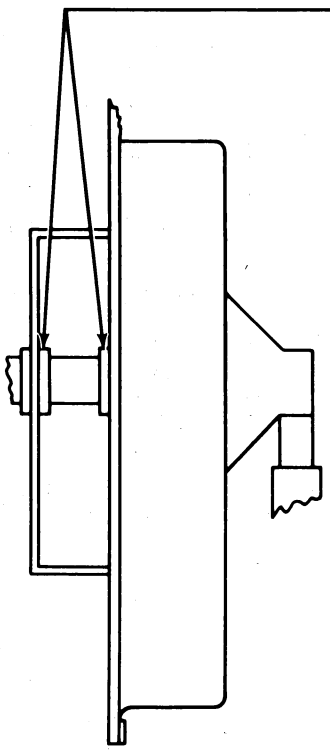
O1	Bearing Holes	Tape Tension Bail



O1	Bearing Holes	Winder Switch Bail
G	Sliding Surfaces	Channels

Note: Refer to the appropriate section for punch unit (DRPE type) lubrication instructions.

3.02 Chad Blower Shaft Assembly



O2	Each Bearing		Ball Bearings

4. REMOVAL AND REPLACEMENT OF COMPONENTS

RECEIVER TAPE TRANSPORT REMOVAL AND REPLACEMENT

4.01 Front Panel: Remove the front panel as follows:

(a) Remove tape from punch and tape winder.

(b) Remove tape winder reel.

(c) Unlatch tape winder arm and remove arm by removing mounting screw from pivot point.

(d) Remove four screws, lockwashers and flat washers securing front panel to inner frame.

(e) Remove front panel.

4.02 Tape Container Door: Remove the tape container as follows:

(a) Remove retainer rings (2) from the ends of pivot posts on door hinges.

(b) Push top of hinge pivot post down until it clears tape container hinge bracket.

(c) Tilt door outward and pull up until lower hinge post clears tape container lower hinge bracket.

4.03 Tape Container: Remove the tape container as follows:

(a) Disconnect BK-O wires from main terminal board (part of mercury switch TP149974).

(b) Remove screws (3) with washers and nuts securing tape container to frame.

(c) Remove container.

4.04 Chad, Tape Puller and Tape Unwinder Mechanism: Remove the mechanism as follows:

(a) Remove chad bag attached to fan casing.

(b) Slide chad tube off at both ends.

(c) Remove three wires from terminal block on mechanism routed to main terminal block of assembly.

(d) Loosen and remove nuts (3) with washers securing tape unwinder mechanism to the three isolation mounts.

(e) Remove the mechanism.

4.05 Punch Unit: To remove the punch unit, proceed as follows:

(a) Remove V-belt from back-up mechanism and driving motor pulley.

(b) Remove screws (2) with lockwashers securing front posts on lower front of punch unit to mounting rails.

CAUTION: BEFORE PROCEEDING, SECURE THE PUNCH UNIT TO PREVENT IT FROM FALLING.

(c) Remove screws with lockwashers and nuts securing U-brackets to mounting rails.

(d) Remove punch unit exercising extreme care not to damage rubber tube between prism assembly and light source assembly.

4.06 Motors (Back-Up and Tape Winder): Remove each motor as follows taking care not to intermix them:

(a) Remove motor wires from the terminal block.

(b) Remove screws (3) with lockwashers securing motor to motor bracket.

(c) Remove the motor.

4.07 To replace the tape transport assembly, reverse the removal procedure. The rubber isolator tube for the verifier should be placed between the light source assembly and the prism assembly before fastening the punch unit to the mounting rails.