

SIZE	A	E- 610035	
		SHEET 1	TOTAL 2
		AUTOMATIC ELECTRIC CO. NORTH LAKE, ILLINOIS U.S.A.	

CIRCUIT EXPLANATION

M

PRE-PAY COIN TELEPHONE
ADAPTER CIRCUIT
1, 2, OR 3 DIGIT TOLL CODE
REFUNDS INITIAL DEPOSIT
H-610035

(Written specifically for circuit issue 7,
but may also apply to later issues. Refer
to H print for appropriate E issue number.)
*Not updated for NAFM FIGS

FEATURES

- (a) This circuit is used as an adapter between the linefinder and its associated first selector.
- (b) Provides dial tone either before or after coin is deposited.
- (c) Prevents a call from being "set-up" if no coin is deposited.
- (d) Repeats pulses to succeeding switches.
- (e) Minor switch wiring gives 1, 2, or 3 digit switch-through on toll calls. Coin is refunded on this type of call.
- (f) Minor switch wiring provides restricted service.
- (g) Provides time delay for coin collect on trunk calls to prevent collection if flash busy is encountered.
- (h) Controls refund on unanswered calls and coin collect on answered calls.
- (i) Provides battery feed on local calls.
- (j) Associated interrupter insures coin collect or refund, should coins become lodged in the coin telephone coin chute.

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FIGS and
Added
Section B
4/68:jak
Stanley
7/8/68
Issue 3

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Section B
7/68:cjm
JJS
8/8/68
T.L.Snow
Issue 4

WRITTEN BY

APPROVED

ISSUE

DRAWING NO.

4

E- 610035

CIRCUIT OPERATIONA. FIG 1A (NAFM)1. Local Calls1.1 Seizure

The linefinder closes a D.C. loop circuit from the paystation over leads +L and -L to relays A, L, and R in series. Relay L does not operate since its windings are connected differentially, and oppose each other. Relay R is springless and serves to balance the transmission battery feed. Relay A operates, closes B, and closes #1G and #1J in series to leads +SW and -SW. Relay B operates, closes ground to lead C and to #2J, shunts the pulse repeating contacts 4 and 5 of A, and prepares a circuit to C. Battery and ground from the associated selector over leads +SW and -SW close #1G and #1J. Relay G operates. Relay J does not operate since its windings are connected differentially, and oppose each other.

The selector returns dial tone over leads +SW and -SW and returns ground over lead CSW to close #2H through resistor A. This polarizes but does not operate H. If "Z" wiring is provided, dial tone returned from the associated selector is connected to leads +L and -L immediately.

1.2 Calling Party Deposits Coin (Operated: Relays A, B, G and R)

When the calling party deposits a coin, the paystation mechanism closes resistance ground to lead +L shunting #1L. The resulting decrease of current in #1L and the increased current in #2L cause L to operate and close Y. Relay Y operates, locks, removes the shunt from the pulse repeating contacts of A, closes dial tone from the selector to the paystation (if "Z" wiring is not provided), opens #1L and #2L from the loop to reduce the impedance in the dialing circuit to the MS ROT. magnet. Relay L restores. Relay H does not operate since its windings are connected differentially and oppose each other.

1.3 Repeating Pulses (Operated: Relays A, B, G, R, and Y)

Relay A follows the dial pulses. Each time A restores, a circuit is closed to C and the MS ROT magnet in multiple, and the trunk loop is opened and closed to repeat the pulses to the switches ahead. Relay C operates, shunts relay R and removes #1G from the trunk loop to improve dialing. (The #2 winding of relay P prevents the trunk loop from

being opened when spring #2 of C restores after pulsing.) Relay G restores. Relays B and C remain operated during pulsing due to their slow-to-release characteristics.

As the MS takes its first step, the MSON springs operate and prepare circuits to the MS RLS magnet, the MS TOP commutator C, and relay F.

After the last impulse of the first digit, A reoperates. Relay C restores, closes F, and closes ground to the MS TOP commutator C, and transfers the link circuit back to #1G. Relay G re-operates and removes the shunt from R. Relay F operates, locks, opens the MS Stepping circuit, and closes ground to the BOT level of MS.

Succeeding digits are repeated to the switch train only.

1.4 Called Party Answers (Operated: Relays A, B, G, Y, R and F and MSON springs)

When the called party answers, battery polarity over the +SW and -SW leads is reversed, thus reversing the current through #1J and #1H. The two windings of J and H now aid. Relay J operates and prepares a circuit to N. Relay H operates its "X" contacts, locks through #2H, closes S, closes ground through "L" wiring on MS to P. Relay P operates, locks, opens lead TIMER START, disconnects lead TIME PULSE from N, and prepares the COLLECT circuit. Relay S operates and connects a multiple holding ground to #2J, F and P.

The transmission circuit is of the capacitor-inductor type with relays A and R furnishing transmission battery to the calling party. The connector back-bridge relay furnishes transmission battery to the called party and the connector line relay furnishes battery for supervision.

1.5 Release

1.51 Called Party Disconnects First (Operated: Relays A, B, G, Y, F, R, H, J, P and S, and MSON springs)

When the called party disconnects, battery polarity over +SW and -SW is returned to normal by the connector, causing J to release.

Relay J restores since its windings are now in opposition.

When the calling party disconnects, the line loop is opened to A and R. Relay A restores, opens the loop to the associated selector, opens B, and closes C. Relay G restores and prepares the COLLECT circuit. Relay B restores and removes a multiple ground from P and F. The succeeding

switches restore and remove ground from lead CSW. Relay H restores, closes M and opens Y and S. Relay C operates. Relay Y restores and opens C, and prepares a circuit to #2T and #2G. Relay M operates, closes a multiple holding ground to F and P, grounds lead INT. ST. & ALARM, grounds lead C, and closes +110V COLLECT battery thru E to leads +L and -L. After its slow-to-release interval relay C restores. Relay E operates in series with resistance ground from the paystation mechanism and closes #1T. The paystation mechanism operates to collect the coins. Relay T operates, locks, closes ground to light the indicating lamp, closes ground through the 2000 ohm N.I. winding of X in series with condenser A to leads +L and -L, closes lead PU to #1V and closes holding ground to S. (Relay S has not restored because of its slow-to-release characteristics.) Ground of approximately 0.2 second duration on lead PU closes #1V. Relay V operates, locks, opens a holding ground for #1T, and closes lead INT GND to #2G and #2T in multiple. Approximately 0.2 second duration on lead PU closes #1V. Relay V operates, locks, opens a holding ground for #1T, and closes lead INT GND to #2G and #2T in multiple. Approximately 0.4 second after ground is removed from lead PU, ground of 0.4 second duration is placed on lead INT GND. Relay G operates and opens the COLLECT circuit. Relay E restores and opens #1T. Relay T is held by its #2 winding. The paystation mechanism restores.

NOTE: Even though the coins may have been collected before G opens the collect circuit, the paystation mechanism remains operated until G opens its circuit.

When ground is removed from lead INT GND, relay G restores and reconnects +110V. COLLECT battery thru E to leads +L and -L and the paystation mechanism. Relay T remains operated momentarily due to its slow-to-release characteristics. If the coins have been collected, resistance ground was removed from lead +L, when the paystation mechanism restored upon the operation of G. If, however, the coins were not collected for some reason, resistance ground remains on lead +L (thru the paystation mechanism) and relay E and the paystation collect apparatus reoperate. Relay E closes #1T to hold it operated. After approximately 0.6 second ground is again placed on lead INT GND by the interrupter circuit and G reoperates as explained above. This action continues until the coins are collected. However, if the collection is not made within a predetermined time interval, an alarm is given.

When the coins have been collected and +110V COLLECT battery is removed from lead +L by relay G, the paystation mechanism

restores completely. When G restores after ground is removed from lead INT. GND, E cannot reoperate and T restores after a short interval. Relay S restores, opens M, and removes the multiple holding ground from P, F, and V, opens lead INT ST & ALARM, removes ground from lead C, and removes +110V. collect battery from leads +L and -L. Relays P and V restore. Relay F restores and closes the MS RLS magnet. The RLS magnet operates and restores minor switch MS to normal. As MS returns to normal, the MSON springs restore and open the RLS. magnet.

1.52 Calling Party Disconnects First (Operated: Relays A, B, G, Y, F, R, H, J, P and S, and MSON springs)

When the calling party disconnects, the line loop is opened causing relay A to restore and open B, close C and open the loop to the associated selector. The remainder of the circuit releases as explained in section 1.51.

1.6 Restricted Number Dialed as First Digit (Operated: Relays A, B, R, G, Y and F, and MSON springs)

If the first digit dialed causes a selector to rise to a restricted level, ground is closed to #2K thru "R" wiring when C restores after impulsing.

NOTE: "R" wiring is connected to MS terminals which correspond to a restricted first digit.

Relay K operates its "X" contacts which open the trunk loop causing the succeeding switches to restore, and open #1H, #1G, and #1J. Relay G restores, short circuits relay R, and closes -110V REFUND battery to relay E. Relays H and J remain inoperative since they cannot operate on their #2 winding alone.

When ground is removed from lead CSW by the restoring switch train, the shunt is removed from #1K. Battery is returned over lead CSW from the associated first selector. Relay K operates completely, closes ground to lead TONE ST., closes BUSY TONE thru capacitor B to lead -L and thru capacitor N to lead -SW, prepares a direct ground circuit to lead CSW, and opens Y. Relay Y restores, opens the transmission circuit, connects #2L in series with A, removes the shorting ground from relay R, connects #1L in series with R, and grounds lead CSW. Relay K remains operated on its #2 winding since its #1 winding is shunted by direct ground on lead CSW.

The calling party disconnects upon receiving BUSY TONE thus opening the circuit to A, R and L. Relay A restores, opens B and closes C. Relay C operates, prepares a circuit to M,

and closes multiple ground to F. Relay B restores, opens C, removes multiple ground from F, and closes M. Relay C remains operated momentarily because of its slow-to-release characteristics. Relay M operates, closes multiple ground to F, closes ground to lead INT. ST. & ALARM, closes multiple ground to lead C, and closes -110V. REFUND battery thru E to leads +L and -L. Ground thru the paystation mechanism via leads +1 closes relay E and causes the paystation mechanism to refund the coins which were deposited. Relay E operates and closes #1T. Relay T operates, locks, closes ground to light the indicating lamp, closes lead PU to #1V and closes holding ground for M. Relay C restores and removes multiple ground from M. Relay V operates, locks, opens a multiple ground to #1T, closes lead INT GND to #2G and #2T in multiple. The refunding of coins is similar to the collection operation described in section 1.51 except that relays H, J, P, and S are not operated since battery was not reversed over the trunk loop, and -110V. REFUND battery is used.

1.7 Release When Call is Not Completed

If a call is not completed when the calling party disconnects, action will take place similar to that described in section 1.5 except that relays J, H, P, and S will not have operated since battery was not reversed over the trunk loop, and the coins are refunded.

1.8 Calling Party Fails to Deposit Coin (Operated: Relays A, B and G)

If, after the circuit is seized, the calling party fails to deposit a coin and proceeds to dial, relay A will follow the dial pulses, open B intermittently and close C. Relays B and C remain operated during pulsing due to their slow-to-release characteristics. However, since a coin was not deposited, relay Y did not operate to (1) remove the shunt placed across the impulsing springs of relay A by B, and (2) close the circuit to the MS ROT magnet.

If the calling party does not deposit a coin or disconnect promptly, a succeeding switch will cause a "permanent" indication to be given.

When the calling party disconnects, relay A restores, opens B and closes C. Relay B restores after its slow-to-release interval and opens C. Relay C restores and the circuit is normal.

2. Single Digit Toll Call

2.1 Call Is Initiated:

The circuit is seized as explained in section 1.1 and 1.2.

NOTE: "T" wiring is connected to terminals associated with the TOP MS bank which correspond to the first digit to be dialed to reach a TOLL operator.)

Relay A follows the dial pulses and steps the associated selector in unison with MS. When relay C restores after the completion of the digit, ground is closed through "T" wiring to #1X, and through the MSON springs to F. Relay F operates, locks, and opens the MS stepping circuit. Relay X operates, closes #2H to lead CSW, switches through the unbridged talking circuit, opens A, B, R and L, closes ground to lead TOLL P.C., and closes D. Relay H operates, locks, closes a multiple ground to Y, and closes S. Relay A restores.

Relay D operates, closes a bridge across the trunk loop to hold the succeeding switches operated, opens the paystation line loop from the trunk loop, connects -110V REFUND battery thru relay E to leads +L and -L, and connects ground in series with condenser A and the 2000 ohm N.I. winding of relay X to leads +L and -L. Current flows from ground thru the paystation mechanism, over leads +L and -L, thru relay E to -110V. REFUND battery. The paystation mechanism operates to return the coins. Relay E operates. Relay S operates, closes multiple holding ground to X and F, and closes ground to lead TIMER START. Relay B restores (relay B remained operated after its circuit was opened by A due to its slow-to-release characteristics), opens lead TOLL P.C., removes a multiple holding ground from X and F, removes a multiple holding ground from Y, and opens D. Relay D remains operated momentarily due to its slow-to-release characteristics.

Relay D restores, opens the holding bridge from across the trunk loop, removes the -110V. REFUND battery from leads +L and -L, and opens ground through #2X in series with condenser A from leads +L and -L. Relay E restores. The paystation coin mechanism returns to normal.

NOTE: The coin return circuit is only operated once in this instance (see section 1.51). If the coin fails to be returned, the operator can cause re-operation of the coin return mechanism.

After approximately 3 to 6 seconds after lead TIMER START was grounded by relay S, a ground pulse is placed on lead TIME PULSE closing #2N. Only the "X" contacts of N operate. The #1 winding of N remains shunted as long as ground

remains on lead TIME PULSE to relay P. Approximately 3 seconds after the end of the first ground pulse, a second pulse is placed on lead TIME PULSE. Relay P operates, locks, opens lead TIMER START, opens N, and prepares an automatic collect circuit which operates in the event that the operator fails to make a collection or refund at the completion of a call. Relay N restores.

2.2 Re-Ring (Operated: Relays F, H, Y, S, X, P, and MSON springs)

Since there are at times delays in placing long distance calls, it may be desirable for the calling party to disconnect and be recalled. The CLR trunk circuit holds ground on lead CSW thereby retaining the switch train and holding H operated. Relay H holds S and Y and relay S holds F, P, and X.

The operator can rering the paystation directly by placing ringing current on the trunk loop since the paystation line loop and the trunk loop are connected directly together (except for relay J).

2.3 Coin Control

Control over refund and collection of coins rests with the operator initially. Operation of the COLLECT KEY or the REFUND KEY at the operator's position circuit closes coin control battery over lead +SW to lead +L to operate the paystation coin relay. In the event that the operator fails to make a collection or refund, the circuit will automatically collect the coins upon release.

2.4 Release (Operated: Relays F, H, Y, S, X, P, and MSON springs)

The CLR operator has control over release of this adapter.

When the call is completed and the parties have disconnected, the operator disconnects. This removes ground from lead CSW which opens #2H. Relay H restores, opens S, closes M and opens Y. Relay Y restores. Relay M operates, closes multiple holding ground for P, X, and F, closes ground to lead INT. ST & ALARM, grounds lead C and connects +110V. COLLECT battery thru E to leads +L and -L.

NOTE: If the CLR operator has forgotten to collect the coins at the termination of the call, they will automatically be collected at this time. (See section 1.51.)

Relay P was caused to operate previously in order to establish this automatic "collect test" upon release of the circuit.

If the collection (or refund) has been made, E cannot operate and the circuit will continue to release as explained below.

Relay S restores, opens M, and removes a multiple holding ground from P, X, and F. Relay M restores after its slow-to-release interval, removes +110V. COLLECT battery through E from leads +L and -L, removes ground from lead C to mark this line idle, opens lead INT. ST. & ALARM, and opens P, X, and F. Relays P and X restore. Relay F restores and closes the MS RLS magnet. The MS RLS magnet operates and restores minor switch MS. The MSON springs open the circuit to the RLS magnet as the switch returns to normal.

3. Two Digit Toll Call

The circuit is seized as explained in sections 1.1 and 1.2.

Relay A follows the dial pulses of the first (#1) and causes MS to rotate its wipers to the first bank contact. When relay C restores after the completion of the first digit, ground is closed to F and U. Relay U operates, locks, and prepares the circuit to W. Relay F operates and closes the circuit to the MS RLS magnet. The minor switch restores and opens the circuit to F through the MSON springs. Relay F restores.

Relay A follows the dial pulses of the second digit (#6) and causes MS to rotate its wipers to the 6th bank contact. When relay C restores after the completion of the digit, ground is closed to F and W. Relay W operates, locks, and closes #1X. Relay F operates, locks, and opens the MS stepping circuit. Relay X operates, closes #2H to lead CSW, switches through the unbridged talking circuit, opens A, B, R, and L, closes ground to lead TOLL P.C., and closes D to refund the coins.

Further operation is the same as described for single digit switch through (see section 2) with the exception that relay Y, in restoring, opens U and W.

4. Three Digit Toll Call

The circuit is seized as explained in sections 1.1 and 1.2.

Relay A follows the dial pulses of the first digit (#1) and MS rotates its wipers to the first bank contact. Relay C restores after the completion of the first digit and closes

ground to F and U. Relay U operates and locks. Relay F operates and closes the MS RLS magnet. The minor switch restores and opens F. Relay F restores.

Relay A follows the dial pulses of the second digit (#1) and MS rotates its wipers to the first bank contact. Relay C restores after the completion of the second digit and closes ground to F. Relay F operates and closes the MS RLS magnet. The minor switch restores and opens F. Relay F restores.

Relay A follows the dial pulses of the third digit (#0) and MS rotates its wipers to the 10th bank contact. Relay C restores after the completion of the digit and closes ground to F and #1X. Relays F and X operate and the circuit functions as previously explained for single digit switch-through (see section 2).

5. Flash Busy Encountered

Sometimes calls are placed over "free service trunks" (vacant positions on MS) to nearby exchanges which utilize both flash busy and busy tone together. Since flash busy is given by means of reversing the battery over the trunk loop by certain switch trains, it is important that the adapter differentiate between this condition and reverse battery answer supervision. If it did not, even a momentary reversal of battery (as is encountered with flash busy) would cause P to operate and establish an improper collect circuit.

When battery is reversed over the trunk loop, H and J operate. Relay H closes S, and relay J connects lead TIME PULSE to relay N. Relay S operates and closes lead TIMER START. After a delay of from 3 to 6 seconds, a ground pulse placed on lead TIME PULSE causes "X" contacts of N to close and when this pulse is removed by the timer circuit, N will operate completely, lock, and transfer lead TIME PULSE to relay P. Approximately 3 seconds later, a second ground pulse on lead TIME PULSE will operate P and prepare the collect circuit. The total time involved to establish a collect circuit after reversal of battery is from 6 to 9 seconds.

A flash busy indication consists of a series of polarity reversals having only a duration of a fraction of a second. Since the timing cycle cannot be completed in such a short time, refund will be made as described in section 1.7 when the calling party disconnects.

B. FIG 2A1. Local Calls1.1 Seizure

Upon seizure, ground via lead C closes relay CW and connects ground to lead CSW to seize succeeding equipment. Relay CW operates and connects lead PS TONE to lead CSW via capacitor C to indicate this call is from a coin telephone. The Line-finder closes a D.C. loop circuit from the coin telephone over leads +L and -L to relays A and L in series. Relay L does not operate since its windings are connected in magnetic opposition. Relay A operates, closes relay B and closes #1G across leads -SW and +SW via diodes CR1 and CR2, respectively. Relay J does not operate due to the low resistance of diodes CR1 and CR2 to normal current flow. Relay B operates, opens CW, connects resistance (resistor R4) battery (in multiple) with relay CW to lead CSW, disconnects lead C from lead CSW, connects ground to lead C, shunts the pulsing springs of relay A. Relay G operates. Relay CW does not restore due to the shunt of resistor R4. The Selector returns dial tone over leads +SW and -SW to leads +L and -L ("Z" wiring, see NOTE 12;H-610035) and grounds lead CSW to close CW before it restores.

1.2 Calling Party Deposits Coin (Operated: Relays A,B,CW,G)

When the calling party deposits a coin, the coin telephone mechanism connects resistance ground to lead +L shunting #1L. The resulting decrease of current in #1L and the increased current in #2L cause relay L to operate and close relay Y. Relay Y operates, locks, via diode CR3, closes #1H via resistor A, removes the shunt from the pulsing springs of relay A, connects dial tone to the coin telephone via capacitors C1 and P, and C2 and N, respectively, ("Z" wiring not used), disconnects #2L from the dialing loop, and removes the shunt from #2H. Relay L restores. Relay H does not operate since its windings are closed in magnetic opposition.

1.3 Dialing (Operated: Relays A, B, G, CW and Y)1.31 Repeating Pulses

Relay A follows the dial pulses via leads +L and -L, and when at normal, opens relay B, closes relay C and ROT magnet MS minor switch, and disconnects lead -SW from lead +SW opening #1G and #2H. ROT magnet MS operates, advances its wipers to bank contact #1, and restores its ON springs. Relay C operates, and short-circuits resistor R6. Dial tone is removed from leads -SW and +SW. Relay G restores. Relay A follows the dial pulses of the first digit, and when operated, opens relay C and ROT magnet MS, closes relay B, and closes the loop to lead -SW to lead +SW via diodes CR1 and CR2. ROT magnet MS restores. Relay A follows the dial

pulses in a similar manner to that previously described. Relays B and C remain operated during pulsing due to their slow-to-release characteristics.

After the last pulse of the first digit, relay A re-operates, opens relay C and MS ROT magnet, and closes relay B. After its slow-to-release interval, relay C restores, closes relay F via MS ON springs, connects ground to TOP wiper of MS (see NOTES 10 and 77, H-610035), disconnects leads -SW from +SW, and connects leads -SW and +SW to #1G and #2H in series, closing #1G and #2H via battery and ground from succeeding switches. Relay G operates. Relay H does not operate since its windings are closed in magnetic opposition. Relay F operates, locks, removes resistance (resistor R4) battery from lead CSW or transfers lead CSW from resistance (resistor R4) battery to resistance (resistors R4 and R3) battery ("Y" strapping is employed, see NOTE 76; H-610035), disconnects ROT magnet MS from relay C and connects ground to BOT wiper of MS (see NOTE 10; H-610035), as described in Section 1.32.

Succeeding digits are repeated to the switch train in a manner similar to that described previously in this section, except that ROT magnet MS will not operate.

1.32 Restricted Number Dialed as First Digit

Operation is the same as that described in Section 1.31 except the first digit dialed corresponds to a restricted Selector level, and relay K is closed via BOT bank of MS "R" wiring used (see NOTE 10; H-610035) upon operation of relay F.

Relay K operates to its "X" contacts, opens the loop to the succeeding equipment via leads +SW and -SW opening relay G and releasing the succeeding equipment, operates fully, grounds lead TONE ST and connects lead BUSY TONE to lead -L via capacitor B. Relay G restores. Relay H cannot operate via its #2 winding alone. When the succeeding equipment restores, relay CW is opened via lead CSW. Relay CW restores and disconnects lead PS TONE from lead CSW.

Upon receiving BUSY TONE, the calling party disconnects, opening the loop to relay A and #1L. Relay A restores, opens relay B and closes relay C. Relay C operates. After its slow-to-release interval, relay B restores, opens #1H via resistor R1, and opens relay Y. Relay Y restores, opens relay C, disconnects resistance (resistors R4 and R3) battery from lead CSW ("Y" WRG is employed; see NOTE 76 on H-610035) and closes relay M. Relay M operates, grounds lead INT ST & ALARM, disconnects lead -L from lead BUSY TONE, and connects -110V (REFUND) battery via relay E to leads -L and +L.

Ground via the coin telephone mechanism to lead +L closes relay E and refunds the coins deposited. Relay E operates, and closes #1T. After its slow-to-release interval, relay C restores, and opens relay M. After its slow-to-operate interval, relay T operates, locks, connects ground to light the indicating lamp, closes relay V via lead PU, and closes relay M before it restores.

Relay V operates, locks, and connect lead INT GRD to #2G and #2T. Ground back via lead INT GRD closes #2G and #2T. Relay G operates, opens relay E and disconnects lead -110V (REFUND) battery from leads -L and +L. Relay E restores and opens #1T. Ground is removed from lead INT GRD opening #2G and #2T. Relay G restores, and connects lead -110V (REFUND) battery to leads -L and +L via relay E. Relay E will not operate now since the ground has been removed by the coin mechanism (unless stuck coin condition exists, see Section 2.32). Relay T restores, extinguishes the indicating lamp, and opens relay M. After its slow-to-release interval, relay M restores, disconnects -110V (REFUND) battery from leads -L and +L, removes ground from lead C, opens relays F and V, connects lead BUSY TONE to lead -L, and disconnects ground from lead INT ST & ALARM. Relay V restores, and disconnects lead INT GRD from #2G and #2T. Relay F restores, connects lead CSW to lead C, connects resistance (CW) battery to lead C, closes RLS magnet of MS, and opens relay K. Relay K restores, disconnects lead BUSY TONE from lead -L, and disconnects ground from lead TONE ST. The RLS magnet operates, restores TOP and BOT wipers of MS, operating MS ON springs to the RLS magnet. The RLS magnet restores. This circuit is now at normal.

1.4 Testing the Called Line (Operated: Relays A, B, G, Y, CW, and F)

1.4.1 Called Line Idle

When the called party answers, battery polarity over the +SW and -SW leads is reversed, thus reversing the current through #2H via leads +SW and -SW, and closes #1 and #2J, since the reverse current produces a high resistance in diodes CR1 and CR2. Relay J operates, and connects lead TIME PULSE to #2N. Relay H operates to its "X" contacts, short-circuits resistor R1, locks via #1H, operates fully, closes relay S, transfers leads -L and +L from relay A and #1L to #1 and #2R, respectively, connects #1H to lead CSW, and closes #1P (Using "L" wiring; see NOTE 10 and 77, H-610035). Relay R operates and opens relay B. Relay P operates to its "X" contacts, locks, operates fully, and

disconnects lead TIME PULSE from #2N. Relay S operates. Relay A restores. After its slow-to-release interval, relay B restores. The transmission circuit is of the capacitor-inductor type with relay R furnishing transmission battery to the calling party.

1.4.2 Called Line Busy

When the called line is busy, battery is reversed via leads +SW and -SW at the rate of 60 or 120 IPM, thus closing #1 and #2H aiding; however, battery polarity is returned to normal before H operates, closing #1 and #2H in magnetic opposition. Relay H does not operate. At the same time busy tone is returned from the succeeding equipment via leads +SW and -SW, indicating the busy condition to the calling party.

1.5 Release

1.51 From A Completed Call (Operated: Relays G, Y, F, R, H, J, P, S, and CW)

1.51.1 Called Party Disconnects First

When the called party disconnects, battery polarity via leads +SW and -SW is returned to normal, since diodes CR1 and CR2 have a low resistance to normal current flow relay J is opened, and reverses the polarity across #2H closing #1 and #2H in magnetic opposition. The #1 winding of relay H is of higher resistance than #2 winding of relay H; consequently, an unbalanced condition results and relay H remains operated. Relay J restores.

When the calling party disconnects, the loop is opened to #1 and #2R. Relay R restores, opens the loop to leads +SW and -SW to release the succeeding equipment, opens #1G and #2H, and closes relay C. Relay G restores. Relay C operates. The succeeding equipment restores and removes ground from lead CSW, opening relay CW. Relay CW restores, removes lead PS TONE from lead CSW, and opens #1H. Relay H restores, connects resistance (#1L) ground to lead +L, closes relay M, and opens relays Y and S. Relay Y restores, opens relay C, and disconnects resistance (resistor R4 and R3) battery from lead CSW ("Y" WRG is employed; see NOTE 76 on H-610035). Relay M operates, grounds lead INT ST & ALARM, and connects +110V (COLLECT) battery via relay E to leads +L and -L. Ground through the coin telephone mechanism via lead +L, closes relay E and refunds the coins deposited. Relay E operates, and closes #1T. After its slow-to-release interval, relay S restores. After its slow-to-release interval, relay C restores, and opens relay M. After its slow-to-operate interval, relay T operates, locks, connects ground to light the indicating

lamp, connects relay V to lead PU, and closes relay M before it restores. Further operation is similar to that described in Section 1.32 paragraph 4, with the following exceptions. When relay M restores, #1P is opened and #110V (COLLECT) battery is removed from lead -L. Relay P restores.

1.51.2 Calling Party Disconnects First

When the calling party disconnects, the loop is opened to #1 and #2R. Relay R restores, opens the loop to leads +SW and -SW to release the succeeding equipment, opens #1 and #2J, #1G and #2H, and closes relay C. Relay J restores. Further operation is the same as that described in Section 1.51.1.

1.52 From An Uncompleted Call (Operated: Relays A, B, G, Y, CW, and F)

When the calling party disconnects, the loop is opened to leads +L and -L, opening A. Relay A restores, closes relay C, opens relay B and #1G, and opens the loop to the succeeding equipment via leads +SW and -SW. Relay G restores. When the succeeding equipment restores, relay CSW is opened. Relay CSW restores and disconnects lead PS TONE from lead CSW. Relay C operates and further operations are similar to Section 1.32 with the exception that relay K is not operated.

1.6 Calling Party Fails to Deposit Coin (Operated: Relays A, B, CW, G, and MS ON springs)

If, after the circuit is seized, the calling party fails to deposit a coin and proceeds to dial, relay A will follow the dial pulses and open B intermittently. Relay B remain operated during pulsing due to its slow-to-release characteristics. However, since a coin was not deposited, relay L did not operate, therefore, relay Y did not operate to remove the shunt placed across the pulsing springs of relay A by B, or close relay C and MS ROT magnet.

If the calling party does not deposit a coin or disconnect promptly, a succeeding switch will cause a "permanent" indication to be given.

When the calling party disconnects, relay A restores, opens relay B, opens the loop via leads +SW and -SW to open #1G and release the succeeding equipment. Relay G restores. When the succeeding equipment restores, relay CW is opened via lead CSW. Relay CW restores and disconnects lead PS TONE from lead CSW. After its slow-to-release interval, relay B restores, removes ground from lead C, transfers lead CSW from resistance (resistor R4) battery to lead C and connects lead C to resistance (CW) battery. This circuit is now at normal.

2. Single Digit Toll Call

2.1 Call Is Initiated ("T" wiring; see NOTE 10 on H-610035)

This circuit is seized as explained in Sections 1.1 and 1.2.

Relay A follows the dial pulses and steps the succeeding equipment in unison with ROT magnet of MS. After the completion of the first digit and relay C restores, relay Z is closed via LEV TOP of MS and relay F is closed via MS ON springs. Relay F operates, locks, and opens the MS ROT magnet stepping circuit. Relay Z operates, short-circuits the pulsing springs of relay A to hold the succeeding equipment, and closes relay D. Relay D operates, opens the transmission circuit to the succeeding equipment, opens relay A, closes #1X, and connects -110V(REFUND) battery through relay E to leads -L and +L. Ground through the coin telephone mechanism via lead +L closes relay E and refunds the coins deposited. Relay X operates, locks, grounds lead TOLL PC, short-circuits resistor R1, closing #1H in magnetic opposition to #2H, and opens relay B. The #1 winding of relay H is of a higher resistance than the #2 winding of relay H; consequently, after a short time interval an unbalance condition occurs which allows relay H to operate on its #1 winding. Relay H operates to its "X" contacts, locks, operates fully, and closes relay S. Relay A restores. Relay E operates. Relay S operates, and grounds lead TIMER START. After its slow-to-release interval, relay B restores, opens relay D, and removes ground from lead TOLL PC. After its slow-to-release interval, relay D restores, closes #1 and #2R via leads -L and +L, connects leads -L and +L to leads -SW and +SW via capacitors N and C1, and P and C2, respectively, the coin telephone now has a transmission circuit to an Operator's position, disconnects -110V (REFUND) battery from leads -L and +L opening relay E, and opens relay Z. Relay R operates. Relay E restores. After its slow-to-release interval, relay Z restores.

Conversation with the Operator may now take place. If the Operator extends a call for the coin telephone and the called party answers, the polarity across leads -SW and +SW is reversed closing #1 and #2J. Relay J operates, and connects lead TIME PULSE to #2N. After approximately 3 to 6 seconds after lead TIMER START was grounded by relay S, a ground pulse is connected to lead TIME PULSE closing #2N. Relay N operates to its "X" contacts only. The #1 winding of relay N remains shunted as long as ground remains on lead TIME PULSE. When the ground pulse is removed, windings #1 and #2N operate in series causing relay N to operate completely, and connect lead TIME PULSE to #1P. Approximately 3 seconds after the end of the first ground pulse, a second pulse is placed on lead TIME PULSE, closing #1P.

Relay P operates, locks, disconnects lead TIME PULSE from #1P, opens #1 and #2N, and prepares an automatic collect circuit which operates in the event that the Operator fails to make a collection or refund at the completion of a call. Relay N restores.

2.2 Release (Operated: Relays F, H, Y, S, X, R, P, J, G, and CW)

When the called party disconnects, normal battery polarity is returned to leads +SW and -SW, opening #1 and #2J, and closing #1 and #2H in magnetic opposition. Relay H remains operated due to the unbalanced condition produced by #1H (as described in Section 1.51.1). Relay J restores.

When the calling party disconnects, the loop to lead +L and -L is opened, opening #1 and #2R. Relay R restores, opens #1G and #2H, and opens the loop to leads -SW and +SW (opening #1 and #2J if the calling party has not disconnected). Relay J (if operated) restores. Relay G restores. This circuit remains in this condition until the CLR Operator disconnects to release this circuit.

When the CLR Operator disconnects, ground is removed from lead CSW, opening relay CW. Relay CW restores, disconnects lead PS TONE from lead CSW, and opens #2H. Relay H restores, opens relay S, closes relay M and opens relay Y. Relay Y restores, short-circuits #2H, disconnects leads -SW and +SW from leads -L and +L, via capacitors N and P, respectively, and disconnects resistance (resistors R4 and R3) battery from lead CSW ("Y" WRG is employed; see NOTE 76 on H-610035). Relay M operates, grounds lead INT ST & ALARM, and connects +110V (COLLECT) battery thru relay E to leads +L and -L. Ground through the coin telephone mechanism via lead +L closes relay E and collects the coins deposited. Relay E operates, and closes #1T. After its slow-to-release interval, relay S restores, and opens relay M. After its slow-to-operate interval, relay T operates, locks, connects ground to light the indicating lamp, closes relay V to lead PU, and closes relay M before it restores. Further operation are similar to that described in Section 1.32 paragraph 4 the difference being when relay M restores relays X and #1P is then opened. When relay G restores, +110V (COLLECT) battery is removed from relay E, and relays P and X restore following the release of relay F.

3. Two Digit Toll Call

The circuit is seized as explained in Sections 1.1 and 1.2.

Relay A follows the dial pulses and steps the succeeding equipment in unison with MS ROT magnet. When relay C restores after the completion of the first digit (#1), ground is closed through TOP MS banks, and closes relays U and F. Relay U operates, and locks. Relay F operates, and closes MS RLS magnet. The minor switch restores its wipers to normal operating its ON springs, opening relay F and MS RLS magnet. MS RLS magnets restores. Relay F restores, and connects relay C to MS ROT magnet.

Relay A follows the dial pulses of the second digit (#6) and causes MS to rotate its wipers to the 6th bank contact. After its slow-to-release interval, relay C restores after the completion of the digit, ground is closed to relays F and W. Relay W operates, locks, and closes relay Z. Relay F operates, locks, and opens the MS stepping circuit. Relay Z operates, short-circuits the pulsing springs of relay A to hold the succeeding equipment, and closes relay D. Further operation is the same as that described in Section 2.2, except that when relay Y restores relays U and W are opened. Relays U and W restore.

4. Three Digit Toll Call

The circuit is seized as explained in Sections 1.1 and 1.2.

Relay A follows the dial pulses and steps the succeeding equipment via leads -SW and +SW in unison with MS ROT magnet. When relay C restores after the completion of the first digit (#1), ground is closed through TOP MS banks, and closes relay U and F. Relay U operates and locks. Relay F operates and closes MS RLS magnet. The minor switch restores its wipers to normal operates its ON springs, opening relay F and MS RLS magnet. MS RLS magnet restores. Relay F restores, and connects relay C to MS ROT magnet.

Relay A follows the dial pulses of the second digit (#1) and MS ROT magnet steps its wipers to the first bank contact. When relay C restores after the completion of the second digit, ground is closed through TOP MS banks, and closes relay F. Relay F operates, and closes MS RLS magnet. The minor switch restores its wipers to normal operates its ON springs, opening relay F and MS RLS magnet. MS RLS magnet restores. Relay F restores, and connects relay C to MS ROT magnet.

Relay A follows the dial pulses of the third digit (#0) and MS ROT magnet steps its wipers to the tenth bank contact. When relay C restores after the completion of the third digit, ground is closed through TOP MS bank, and closes relay F. Relay F operates, locks, and opens the MS stepping

circuit. Relay Z operates, short-circuits the pulsing springs of relay A to hold the succeeding equipment, and closes relay D. Further operation is the same as that described in Section 2.2 except that when relay Y restores, relay U is opened. Relay U restores.

5. Re-Ring (Operated: Relays F, H, Y, S, X, R, G, and CW)

Since there are time delays in placing long distant calls, it may be desirable for the calling party to disconnect and be recalled. When the calling party disconnects, the loop is opened to #1 and #2R via leads -L and +L. Relay R restores and opens #1G and #2H. Relay G restores. Relay C operates. The CLR trunk circuit returns ground via lead CSW, thereby retaining the switch train and holding relay CW operated.

The Operator can re-ring the coin telephone directly by placing ringing current on the trunk loop since the coin telephone line loop and the trunk loop are connected directly together. When the calling party answers, the loop is closed to #1 and #2R via leads +L and -L. Relay R operates and closes #1G and #2H. Relay G operates.

6. Coin Control

6.1 Operator Control (Operated: Relay F, H, Y, S, X, CW, and G)

Control over refund and collection of coins rests with the Operator initially. Operation of the COLLECT KEY or the REFUND KEY at the Operator's Position circuit connects coin control battery over lead +SW to lead +L to operate the coin telephone coin relay. In the event that the Operator fails to mark a collection or refund, the circuit will automatically collect the coins upon release, as described in Section 2.1 Paragraph #3.

6.2 Stuck Coin (Operated: Relays M, T, G, F, V, and P)

If the coins were not collected for some reason, resistance ground remains on lead +L from the coin telephone mechanism.

When the pulsing ground is removed from lead INT GRD #2G and #2T are opened. Relay G restores, and connects +110V (COLLECT) or -110V (REFUND) if relay P is unoperated battery through relay E to leads -L and +L, closing relay E. Relay E operates, and closes #1T before relay T restores. After approximately 0.6 seconds, ground is again connected to lead INT GRD closing #2G and #2T. Relay G operates, and disconnects +110V (COLLECT) battery from

relay E and leads +L and -L opening relay E. Relay E restores, and opens #1T. When the pulsing ground is removed from lead INT GRD the action continues until the coins are collected; however, if the collection is not made within a predetermined time interval, an alarm is given.

When the coins have been collected and +110V (COLLECT) battery is removed from leads +L and -L by the operated G relay, the coin telephone mechanism restores completely. When relay G restores after ground is removed from lead INT GRD, relay E cannot operate. After its slow-to-release interval, relay T restores, extinguishes the indicating lamp, and opens relay M. After its slow-to-release interval, relay M restores, removes ground from lead C, opens relays P, F, and V, and disconnects ground from lead INT ST & ALARM. Relay P restores. Relay V restores, and disconnects lead INT GRD from #2G and #2T. Relay F restores, connects lead CSW and resistance (CW) battery to lead C, and closes RLS magnet of MS. RLS magnet operates, restores TOP and BOT wipers of MS, and operates MS ON springs, opening RLS magnet. The RLS magnet restores. This circuit is now at normal.

7. Flash Busy Encountered

Sometimes calls are placed over "free service trunks" (vacant positions on MS) to nearby exchanges which utilize both flash busy and busy tone together. Since flash busy is given by means of reversing the battery over the trunk loop by certain switch trains, it is important that the adapter differentiate between this condition and reverse battery answer supervision. If it did not, even a momentary reversal of battery (as is encountered with flash busy) would cause P to operate and establish an improper collect circuit.

When battery is reversed over the trunk loop, #2H is closed magnetically aiding #1H and #1 and #2J are closed via leads -SW and +SW, respectively. Relay H operates to its "X" contacts, locks via #1H, operates fully, closes relay S and transfers leads -L and +L from relay A and #1L to #1 and #2R, respectively. Relay J operates, connects lead TIME PULSE to #2N. Relay S operates, and grounds lead TIMER START. After a delay of from 3 to 6 seconds, a ground pulse via lead TIME PULSE closes #1N. Relay N operates to its "X" contacts, and short-circuit #1N. When the ground is removed from lead TIME PULSE #1 and #2N are closed in series. Relay N operates completely, and connects lead TIME PULSE to relay P. Approximately 3 seconds later, a ground pulse closes #1P. Relay P operates, and prepares the collect circuit. The total time involved to establish a collect circuit after reversal of battery is from 6 to 9 seconds.

A flash busy indication consists of a series of polarity reversals having only a duration of a fraction of a second. Since the timing cycle cannot be completed in such a short time, refund will be made as described in Section 1.5.2 when the calling party disconnects.

8. Test Facilities

The TEST JACKS 1-4 are provided to enable a Testman to duplicate all the functions of this Adapter circuit with the aid of a test coin telephone.

A busy key is provided to indicate this circuit busy to the preceding equipment. A shorting Plug can be inserted into TEST JACKS 3 & 4 to mark this circuit busy.

DRAWING STOCK LIST

AMT	U/M	PART NUMBER		ITEM	G/P	DESCRIPTION
1.00	PC	H 885244	4	1		TEST JK
1.00	PC	H 885854	3	2		PANEL BK
1.00	PC	H 885901	4	3		FRONT COVER
1.00	PC	H 885901	7	4		COVER
1.00	PC	H 886258	2B	5		MOUNTING STRIP
1.00	PC	H 886259	2B	6		MOUNTING STRIP
1.00	PC	H 886281	14	7	SI	SI MOUNTING PARTS
2.00	PC	H 886439	2	8		BACKING STRIP
2.00	PC	D 17195	E	9		WHR-SPG LCK.17X.31X.047
3.00	PC	D 1724	A	10		WHR-PLAIN .149X.312X.032
7.00	PC	D 1742	A	11		WHR-PLAIN .173X.438X.032
1.00	PC	D 284053	A *	12		RESISTOR 6K 1W NI
1.00	PC	D 282128	A	13		RESISTOR 200 NI 2 W
1.00	PC	D 42775	A	14		JACK ASSEM-LAMP
24.00	PC	D 44469	A	15		INSULATOR
1.00	PC	D 44867	A	16		INSULATOR
1.00	PC	D 555000	CKD	17		SWITCH-MINOR 2LV 10 PTS
1.00	PC	D 59311	AM	18		TURN KEY
1.00	PC	D 660332	D	19		TERM BLK
1.00	PC	D 68271	A	20		CAPACITOR .02MF
1.00	PC	D 68273	A	21		CAPACITOR .01MF
1.00	PC	D 68564	A	22		CAPACITOR 2MF
4.00	PC	D 68762	A	23		CAPACITOR 2.15MF
2.00	PC	D 731993	C	24		COVER GUIDE
2.00	PC	D 731993	B	25		COVER GUIDE
2.00	PC	D 732011	A	26		MOUNTING BRACKET
1.00	PC	D 732012	A	27		TERM BLK MOUNTING BRKT
52.00	PC	D 75321	A	28		BUSHING
50.00	PC	D 760642	A	29		WHIMS 8-32X9/32
8.00	PC	D 760985	A	30		RHSMS W/WHIS.164-32X1/4
9.00	PC	D 7700	A	31		HEX NUT 8-32
4.00	PC	D 7701	A	32		NUT-H(DC)S .138-32
1.00	PC	D 78886	A	33		PLATE
1.00	PC	D 94005	A	34		LAMP-48C
1.00	PC	D 67660	B	35		CAP-LP RED
2.00	PC	D 762008	B	36		82FHSLT SMS.164-32X1/4
1.00	PC	D 762047	R	37		PHSLT SMS .138-32X1-1/2
1.00	PC	D 762047	BM	38		PHSLT SMS .138-32X2-3/4
4.00	PC	D 761056	E	39		PHSLT S MS.164-32X7/16
2.00	PC	D 762051	A	40		PHSLT SMS .190-32X1/4
4.00	PC	D 762052	A	41		PHSLT SMS .216-24X1/4
1.00	PC	GR 8290	A6	42		RELAY
1.00	PC	GR 8290	A4	43		RELAY
1.00	PC	GR 50376	A1	44		RLY-HORIZ
1.00	PC	GR 5002	A4	45		RLY HORIZ
1.00	PC	GR 8594	A2	46		RELAY
1.00	PC	GR 5746	A8	47		RLY-HORIZ

ISSUE	DATE	SHEET TOTAL	DESCRIPTION	PART NUMBER
005	8-13-71	1 OF 2	TEL ADPT EQPT	DH 610035 70A
<small>CONFIDENTIAL - NOT FOR PUBLICATION THIS DRAWING IS THE PROPERTY OF AUTOMATIC ELECTRIC COMPANY. ITS USE IS CONDITIONED UPON THE USER'S AGREEMENT NOT TO COPY OR REPRODUCE THE DRAWING IN WHOLE OR IN PART, OR TO USE THE DRAWING TO REPRODUCE THE MATERIAL DESCRIBED THEREIN, OR FOR ANY OTHER PURPOSE, WITHOUT WRITTEN PERMISSION FROM AUTOMATIC ELECTRIC COMPANY. THIS NOTICE DOES NOT APPLY TO THE U. S. GOVERNMENT TO THE EXTENT THAT IT IS INCONSISTENT WITH ANY CONTRACT WITH THE GOVERNMENT UNDER WHICH THIS DRAWING IS DELIVERED.</small>				A AUTOMATIC ELECTRIC COMPANY NORTHLAKE, ILL., U. S. A.

DRAWING STOCK LIST

AMT	U/M	PART NUMBER			ITEM	G/P	DESCRIPTION
1.00	PC	GR	964	E4	48		RLY HORIZ
2.00	PC	GR	5308	A3	49		RELAY
1.00	PC	GR	8668	A1A	50		RELAY
1.00	PC	GR	5126	K1B	52		RLY-HORIZ
1.00	PC	GR	50284	A5	53		RLY-HORIZ
1.00	PC	GR	60506	A1	54		RLY-HORIZ
1.00	PC	GR	9082	A2	55		RLY-HORIZ
1.00	PC	GR	50010	A5	56		RLY-HORIZ
1.00	PC	GR	8064	A5	57		RELAY
1.00	PC	GR	7064	A5	58		RELAY
1.00	PC	GR	5490	A3A	59		RLY-HORIZ
1.00	PC	GR	5174	A1	60		RELAY
1.00	PC	GR	5080	R7A	61		RLY HORIZ
1.00	PC	GR	8916	A5	62		RELAY
1.00	PC	GR	6308	A2	63		RELAY
1.00	PC	NL	18971	A	64		NUT
1.00	PC	NL	18972	A	65		LOCKWASHER
2.00	PC	D	77358	A	66		NUT 4-36
3.00	PC	FD	1029	DG	67		DIODE
1.00	PC	D	731988	A	68		BRKT
3.00	PC	D	760878	A	69		SPL HHIMS 8-32
2.00	PC	D	760934	A	70		RHSMS W/WSS.164-32X3/8
1.00	PC	GR	5080	T3	71		RELAY
1.00	PC	GR	5032	K2	72		RLY-HORIZ
1.00	PC	D	282638	A	73		RESISTOR 700 NI 2 W
1.00	PC	D	284075	E3	74		RESISTOR 500,10 W
1.00	PC	H	4508	50	75		STUD .138-32 X 3.375
ISSUE	DATE	SHEET TOTAL		DESCRIPTION		PART NUMBER	
005		2 OF 2		TEL ADPT EQPT		DH 610035 70A	
THIS DRAWING IS THE PROPERTY OF AUTOMATIC ELECTRIC COMPANY. ITS USE IS CONDITIONED UPON THE USER'S AGREEMENT NOT TO COPY OR REPRODUCE THE DRAWING IN WHOLE OR IN PART, OR TO USE THE DRAWING TO REPRODUCE THE MATERIAL DESCRIBED THEREIN, OR FOR ANY OTHER PURPOSE, WITHOUT WRITTEN PERMISSION FROM AUTOMATIC ELECTRIC COMPANY. THIS NOTICE DOES NOT APPLY TO THE U. S. GOVERNMENT TO THE EXTENT THAT IT IS INCONSISTENT WITH ANY CONTRACT WITH THE GOVERNMENT UNDER WHICH THIS DRAWING IS DELIVERED.					A	AUTOMATIC ELECTRIC COMPANY NORTHLAKE, ILL., U. S. A.	

11-20-69

ISS #8

11-11-69

6/17/72

AH-610035

* DESCRIPTION	MFG. ADJ.	FIELD G.S.P.	EXPLANATION OF TERMS
* GENERAL REQUIREMENTS	100	230-005-703	-* DENOTES APPLICABLE ADJUSTMENTS.
* SW. TEST & SH. JKS., ETC.	101	040-500-706	-#1 - INSIDE OR ARMATURE END WINDING.
* CLASS A & Z	110	040-500-502	-#2 - OUTSIDE OR HEEL END WINDING.
" B	300	040-500-502	-S.L.A.=SHORT LEVER ARMATURE.
" C	301	040-500-502	S.R.=SLOW TO RELEASE. S.O.=SLOW TO OPERATE.
" W	784	040-500-102	A.C.=ALTERNATING CURRENT.
TYPE 10 A.C.	118	040-501-702	O=OPERATE. N.O.=NON-OPERATE. H=HOLD.
TYPE 59 CODEL UNIT	783	040-500-501	R=RELEASE. O.C.=OPEN CIRCUIT.
V. O. N.	120		RESID.=RESIDUAL ADJUSTMENT VALUE.
CUP & SHAFT SPGS.	121		-TEST VALUES ARE FOR INSPECTION ONLY.
CAM SPGS.	122		-READJ. VALUES ARE FOR ADJUSTING ONLY.
NORMAL POST	123		-CURRENT IS SHOWN IN AMPERES.
RLSE. SPGS.	124		-POS.=TEST WITH POSITIVE BAT. THRU RESIST. OF TEST SET.
R. O. N.	126	230-005-703	-NEG.=TEST WITH NEGATIVE BAT. THRU RESIST. OF TEST SET.
VERT. MECH.	130		-RELAYS PREFIXED BY GR OR CT HAVE WIRE WRAP TERMINALS.
DOGS	131		-RELAYS PREFIXED BY R OR RT HAVE SOLDER TERMINALS.
ROT. MECH.	132		THIS ADJUSTMENT APPLIES IN EITHER CASE.
RLSE. MECH.	133		X WIRE WRAP TERM. X SOLDERED TERM.
SHAFTS, WIPERS, ETC.	135		- NOTES -
MINOR SW.	136	230-007-708	1-T TEST WITH BOTH WINDINGS IN SERIES.
TESTING LP PULSED SWS.	144	230-200-504	2--#1 WINDING TO OPERATE #1 SPRING ONLY.
TESTING SX PULSED SWS.	145		3--SPRINGS NEED ONLY MAKE CONTACT ON OPERATE TESTS.
TIMING SWITCHES & RLYS.	146		4--BOTH TESTS MADE ON #1 WINDING.
44 ROT. SW.	163	230-007-706	#1 TEST IS FOR #1 SPRING ONLY.
" "	162	230-007-705	5--CONNECT RESISTANCE ACROSS TEST JACKS 1 & 2.
SHUNT FIELD RELAY	175	040-500-706	6--SHORT LEVER ARM. RESIDUAL MIN. .0015", MAX. .004".
280 POLAR RLY.	201	040-401-701	GEN.: OPERATE BUSY KEY WHILE TESTING.
KEYS	753	032-305-700	
SWITCHBOARD JACKS	754	032-320-700	
<div> <div>SWITCH STAND ROT. SWITCH TEST POSITION</div> <div>PRE-PAY COIN TELEPHONE ADAPTER CKT. 1,2 OR 3 DIGIT TOLL CODE REFUNDS INITIAL DEPOSIT.</div> </div>			<div>REF. G.S.P.-108-104-102</div> <div>APPD: RBK</div> <div>ENG: RAF</div> <div>CIRCUIT OR SWITCH ADJUSTMENT</div> <div>CKT:H-610035</div> <div>10 SHEETS 1</div> <div>AH-610035</div>

AUTOMATIC ELECTRIC COMPANY
NORTH LAKE, ILLINOIS, U.S.A.

FM-1460 (REV. 9/69)

11-20-69
TSS #8

AH-610035

RELAYS		SPRING GAUGING										TEST FOR:		RESIST. AT 50V.		CURRENT		SEE NOTE	TESTING INSTRUCTIONS
														READJ.		TEST			
D FIGS. 1&2 GR-8290-A4 D-280054-E #1-800 Ω	SR											0	1650	1480	.0204	.0219	6	POS. TO SPG. 11 OF RLY. B.	
												NO	1920	2140	.0184	.0170			
												NO. 2							
												NO. 2							
E FIG. 1 GR-5035-C9 D-281194-E #1-12 Ω	SHORT LEVER ARM.											0	860	780	.057	.063		INS. SPGS. 1 & 2 OF RLY. G. INS. SPGS. 1 & 2 OF RLY. D. GRD. TO SPG. 3 OF RLY. M. NEG. TO SPG. 2 OF RLY. G.	
												NO	1100	1210	.045	.041			
												NO. 1							
												NO. 2							
F FIGS. 1&2 GR-7064-A5 D-280028-E #1-1300 Ω												0	1150	930	.0204	.0224		POS. TO SPG. 2 OF RLY. W.	
												NO	1570	1840	.0174	.0159			
												NO. 1							
												NO. 2							
G FIG. 1 GR-701-C1 D-281138-E #1-500 Ω #2-1000 Ω												0	1110	970	.031	.034		GRD. TO LOWER SPG. 1 OF RLY. Y. NEG. TO LOWER SPG. 7 OF RLY. Y.	
												NO	1340	1570	.0271	.0242			
												NO. 1							
												NO. 2							
H GR-5192-B9 D-281089-F #1-100 Ω #2-2700 Ω												0	650	600	.066	.071	2	IN OPERATING EXCHANGE REMOVE "Y" STRAP, IF EQUIPPED, WHILE TESTING. INS. LOWER SPGS. 1 & 2 OF RLY. Y. GRD. TO LOWER SPG. 1 OF RLY. Y. NEG. TO LOWER SPG. 2 OF RLY. Y. INS. SPGS. 3 & 4 OF RLY. F.	
												NO	780	830	.057	.054			
												NO. 1							
												NO. 2							
												0	770	570	.0144	.0153		INS. SPGS. 3 & 4 OF RLY. K. POS. TO UPPER SPG. 5 OF RLY. X.	
												NO	1330	1650	.0124	.0115			
												NO. 1							
												NO. 2							

THIS RELAY SUPPLIED PRIOR TO ISSUE 5.

AUTOMATIC ELECTRIC COMPANY
NORTHLAKE, ILLINOIS, U.S.A.

CIRCUIT OR SWITCH ADJUSTMENT

CKT:H-610035 10 SHEETS 3
AH-610035

AH-610035

61-10035

11-20-69 1-20-71
ISS. #8 INS. #9

AH-610035

RELAYS	SPRING GAUGING				RESIST. AT SOV.				CURRENT		SEE NOTE	TESTING INSTRUCTIONS
					READJ.	TEST	READJ.	TEST	READJ.	TEST		
U & W FIGS. 1&2 GR-5308-A3 D-280028-F #1-1300 Ω												POS. TO SPG. 5 OF RLY. UNDER TEST.
					0	3370	2940	.0107	.0118			
					NO	3900	4450	.0096	.0087			
					NO. 2							
V FIG. 1 GR-5239-C1 D-282546-F #1-1300 Ω #2-250 Ω NI					0	2500	2170	.0132	.0144			INS. SPGS. 5 & 7 OF RLY. V. POS. TO SPG. 7 OF RLY. V.
					NO	3370	3800	.0107	.0098			
					NO. 2							
					NO. 2							
V GR-5239-A5 D-280028-B #1-1300 Ω					0	1750	1400	.0164	.0184			THIS RELAY SUPPLIED PRIOR TO ISSUE 6. POS. TO SPG. 7 OF RLY. V.
					NO	2300	2600	.0139	.0128			
					NO. 2							
					NO. 2							
X GR-60015-A1 D-282655-B #1-1300 Ω #2-2000 Ω NI					0	1540	1280	.0176	.0194			THIS RELAY SUPPLIED BEGINNING WITH ISSUE 6. INS. UPPER SPGS. 2 & 4 AND 3 & 4 OF RLY. X. POS. TO UPPER SPG. 4 OF RLY. X.
					NO	1970	2300	.0153	.0139			
					NO. 2							
					NO. 2							
												DOUBLE ARM. RELAY
X GR-6867-A1 D-282655-B #1-1300 Ω #2-2000 Ω NI					0	1950	1700	.0154	.0167			THIS RELAY SUPPLIED PRIOR TO ISSUE 6. POS. TO SPG. 12 OF RLY. X.
					NO	2600	3050	.0128	.0115			
					NO. 2							
					NO. 2							

AUTOMATIC ELECTRIC COMPANY
NORTHLAKE, ILLINOIS, U.S.A.

CIRCUIT OR SWITCH ADJUSTMENT

CKT: 610035

10 SHEETS 7

AH-610035

RELAYS		SPRING GAUGING				RESIST. AT SOV.				CURRENT				TESTING INSTRUCTIONS	
						TEST FOR:		READJ.		TEST		READJ.		TEST	
						NO. 1		NO. 2		NO. 1		NO. 2		NO. 1	
C	FIG. 2 GR-8064-A5 D-282224-B #1-231 Ω (300-1000 Ω NI) SR					0		1280		1100		.0330		INS. SPGS. 5 & 6 OF RLY. F. POS. TO SPG. 6 OF RLY. F.	
E	GR-5002-A4 D-281194-B #1-12 Ω					0		870		780		.057		INS. SPGS. 1 & 2 OF RLY. C. INS. SPGS. 1 & 2 OF RLY. D. GRD. TO SPG. 3 OF RLY. M. NEG. TO SPG. 2 OF RLY. G.	
G	GR-964-E4 D-281138-B #1-500 Ω #2-1000 Ω					0		1110		970		.031		GRD. TO LOWER SPG. 1 OF RLY. Y. NEG. TO LOWER SPG. 7 OF RLY. Y.	
J	GR-5080-R7A D-283998-B #1-195 Ω #2-195 Ω					0		3280		2960		.0136		INS. SPGS. 4 & 5 OF RLY. C. CONNECT RESISTANCE ACROSS COIL TERM. NEAREST SPGS. AND LOWER COIL TERM. GRD. TO UPPER COIL TERM. NEG. BAT. TO COIL TERM. FARTHEST FROM SPGS.	
L	GR-5746-A8 D-281203-B #1-435 Ω #2-435 Ω					0		7900		6800		.0060		NEG. TO UPPER SPG. 10 OF RLY. H.	

11-20-69 1-20-12 ISS. #6 ISS. #9									
AH-610035									
RELAYS		SPRING GAUGING				RESIST. AT 50V.		TESTING INSTRUCTIONS	
		TEST FOR:		CURRENT					
				</					

APPROVED FOR DR. J. B. SALAMONE
DATE: 3-27-68
SHEET 1 TOTAL 2

SIZE A

DR. J. B. SALAMONE
DATE: 3-27-68
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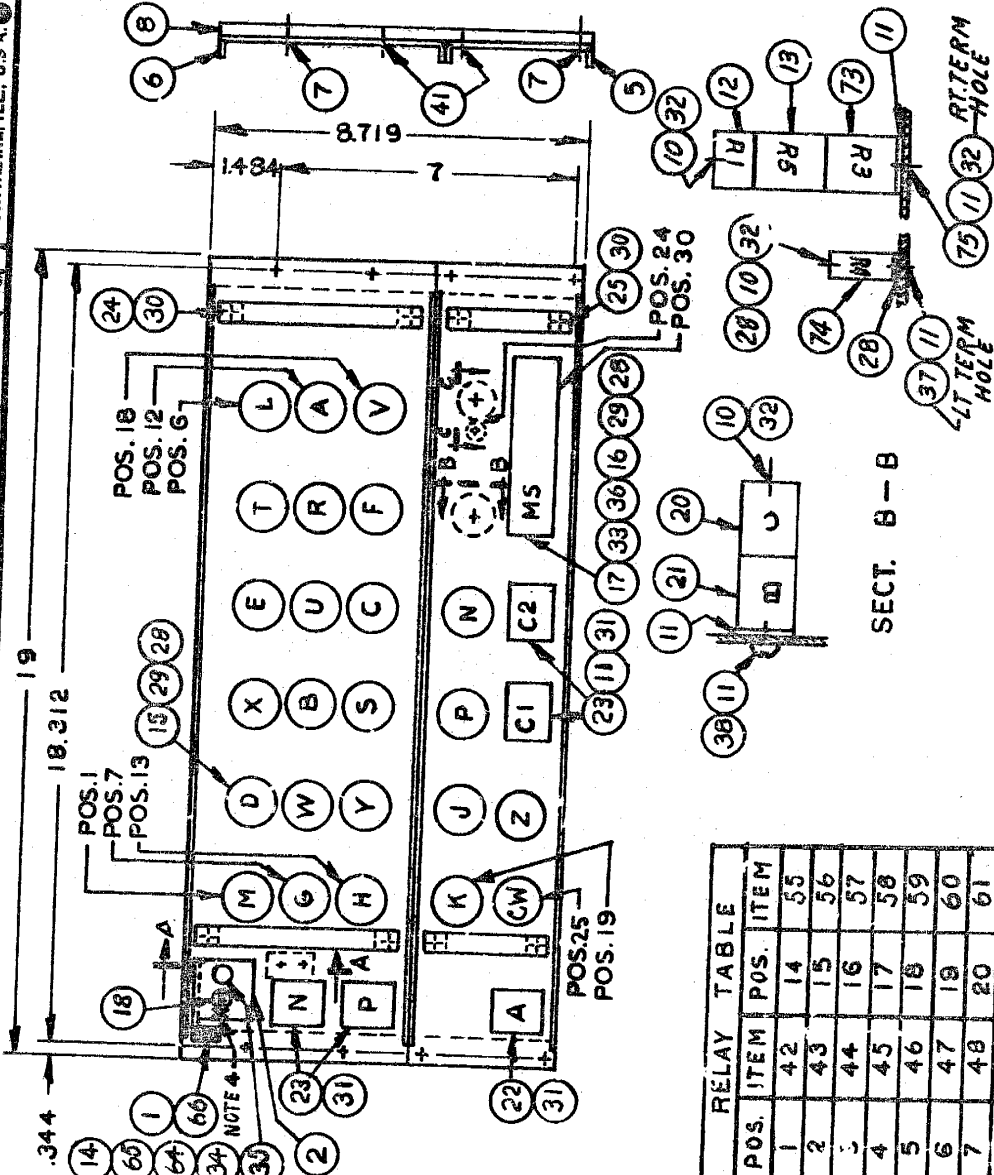
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DATE: 3-27-68
SHEET 1 TOTAL 2

MANUFACTURING NOTES:

- 1-FOR MFG. INF. SEE SPEC. 5296.
- 2-STAMP FUNCTION DESIGNS PER H-43286 FIG. 1, 7, 25, 48 & 59.
- 3-"SI" ITEMS ARE NOT TO BE MTD BY THE FACTORY.
- 4-"X" INDICATES LOCATION OF STAMPING OF TURN KEY DRG. NO. FOR REFERENCE IN MFG.
- 5-FOR LOCATING & WRG. OF RECT. SEE WRG. INSTS. USE D-543040 SLEEVING OVER EXPOSED PIGTAILS.
- 6-FOR WIRING USE D-543299 PVC CL WIRE 24 AWG.



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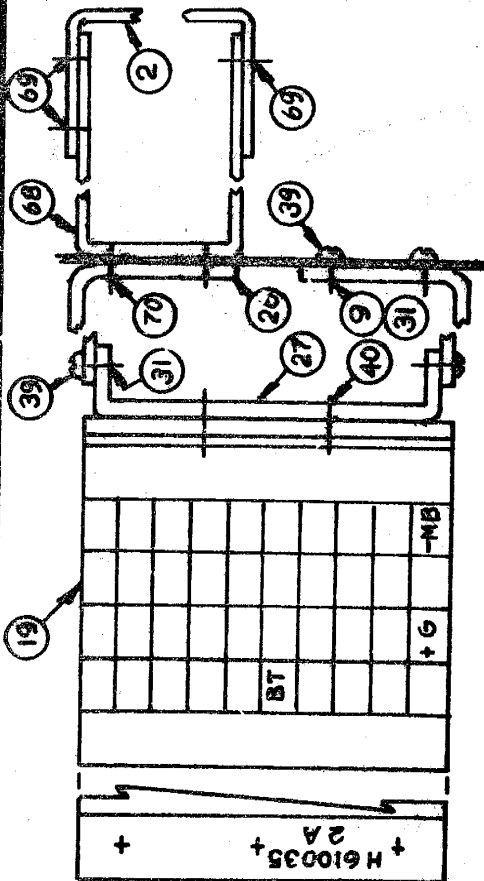
DH-610035-70

PRE PAY COIN TELEPHONE
ADAPTER EQUIPMENT
SERIES "RK" MTG.

H-610035	2A	FIG	PART. NO
155:2	155:3	155:4	155:5

FX-2800-1(2-64)

DH-610035 - 70	
SIZE	A
SHEET	2
TOTAL	2
AUTOMATIC ELECTRIC COMPANY	
NORTH AVE. ILL., U.S.A. 610035 WATERLOO, WIS., U.S.A.	
DATE:	
ISSUE: 1	
155:4	



SECT. A - A
INSTALLER'S SIDE

DH-610035 - 70

PX-250-2 (11-48)

TABLE A											
ISSUE	RELAY A	RELAY H	RELAY J	RELAY K	RELAY R	RELAY S	RELAY V	RELAY X	RELAY Y	RELAY Z	RELAY CW
1-4	200 OHM COIL	100 OHM + 2700 OHM COIL 11 SPRINGS *	200 OHM + 1300 OHM COIL	1300 OHM + 500 OHM COIL 11 SPRINGS *	200 OHM COIL SPRINGLESS	11 SPRINGS *	1300 OHM + 250 NI OHM COIL	19 SPRINGS *	25 SPRINGS *	NOT FURNISHED	NOT FURNISHED
5		1300 OHM + 225 OHM COIL 22 SPRINGS	195 OHM + 195 OHM COIL	1300 OHM COIL 8 SPRINGS	195 OHM + 195 OHM COIL 5 SPRINGS	13 SPRINGS	1300 OHM COIL	12 SPRINGS	22 SPRINGS	1250 OHM COIL 7 SPRINGS	
6											
7	300 OHM COIL										2000 OHM COIL 4 SPRINGS

* SPRING NUMBERS IN PARENTHESES

OPTION TABLE

APP. AND/OR WIRING	ISSUES			NOTES
	FIRST USED	LAST USED	SUPER-SEDED BY	
A	4	4	G	
B	1	4	C	
C	5			
D	1	4	E	
E	5			
F	1	4	G	
G	5			
H	1	4	I	
I	5			
J	1	5	K	
K	6			
L	1			10
M	3	6	O	
N	1	6	O	
O	7			
P				
Q				
R	1			10
S	3			17
T	1			10
U				
V				
W				
X				
Y	4			76
Z	1			12

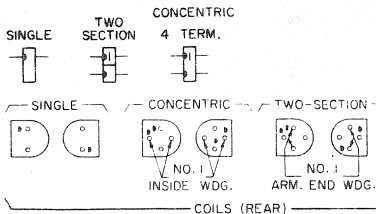
INSTALLING NOTES:

76-ADD STRAP "Y" TO SHELF JACKS 15 & 17 OR TB & CSW IF ASSOCIATED SELECTOR DIRECTLY ACCESSES A TRUNK CIRCUIT HAVING A TONE RELAY REQUIRING 0.070 AMPS. TO OPERATE.

77-IF TIMER LACKS 3 TO 6 SECOND TIME PULSE, AND IF NO SUBSCRIBER DIALED POINT REVERSES BATTERY ON BUSY FLASH, INSTALLER SHALL STRAP LEAD "L" TO TERMINALS CORRESPONDING TO FIRST DIGIT OF ALL SUCH NUMBERS, AND USE "PICK UP 1" PULSE (FROM H-61411-A FIGURE 1A OR EQUIVALENT) BY CONNECTING SHELF JACK 5 & 13 OR PU & TP AND JACK 8 & 19 OR TMS & INT. AT END OF SHELF.

78-REPAIR TO ISSUE 4. FIGURE 1A WAS MANUFACTURED WITHOUT NO. 1 CAPACITORS WITH ISSUE 4. NO APPARATUS FOR FIELD CONVERSION ONLY AND FIGURE 1A IS RATED WAFM.

SYMBOLS



- INDICATES INSIDE TERMINAL (START OF WINDING)
- TERMINAL ON UNIT TERMINAL BLOCK OR JACK TERMINAL
- UNIT TERMINAL BLOCK TERMINAL (COMMON) OR JACK TERMINAL (COMMON)

MANUFACTURING NOTES:

10-WIRE "R" LEAD TO TERMINALS CORRESPONDING TO A 1ST DIGIT TO GIVE RESTRICTION ON THIS DIGIT. WIRE "T" LEAD TO TERMINALS CORRESPONDING TO 1ST DIGIT OF TOLL CALL NUMBER TO GIVE SWITCH THRU ON TOLL CALLS (SINGLE DIGIT) WIRE "L" LEAD TO TERMINALS CORRESPONDING TO 1ST DIGIT OF LOCAL NUMBER TO PREPARE CIRCUIT FOR COLLECT WHEN LOCAL CALL IS ANSWERED, IF FLASH BUSY IS NEVER ENCOUNTERED.

11-"X" CONTACTS OPERATE FIRST.

12-ADD STRAPS "Z" IF DIAL TONE IS TO BE RECEIVED BEFORE COIN IS DEPOSITED. (INSTALLERS WIRING)

13-INTERVAL BETWEEN GROUND PULSES ON TIME PULSE LEAD TO BE APPROXIMATELY 3 TO 6 SECONDS.

14-THE ASSOCIATED SELECTOR TO ACCESS THE TOLL TRUNK CIRCUIT THROUGH THE REVERSE ACCESS. THIS IS NECESSARY AS REVERSE BATTERY MUST BE RETURNED TO THE ADAPTER ON ALL CALLS.

15-SHELF JACKS 9 & 11 MAKE WHEN SWITCH IS REMOVED.

16-TOP BANK CONTACT NUMBER 1 OF MS IS WIRED TO REFUND INITIAL DEPOSIT WHEN "110", "16" OR "0" IS DIALED.

17-PRIOR TO ISSUE 3, "S" WIRING & APPARATUS WAS NOT SHOWN. "S" WIRING & APPARATUS TO BE PROVIDED ON ALL FUTURE ORDERS.

18-STARTING WITH ISSUE 5, CAPACITORS N & P, AND C1 & C2 ARE TO BE MATCHED WITHIN 5%.

19-PRIOR TO ISSUE 5, RESISTOR R1 WAS DESIGNATED A.

20-PRIOR TO ISSUE 10, RESISTOR R1 WAS 5000 OHMS. BEGINNING WITH ISSUE 10, RESISTOR R1 IS 6000 OHMS FOR NEW MANUFACTURE. FOR EQUIPMENT MANUFACTURED PRIOR TO ISSUE 10, RESISTOR R1 TO BE CHANGED TO 6000 OHMS ON A COMPLAINT BASIS AS REQUIRED.

STOCKLIST DH-610035-70 (FIG. 2A)
STOCKLIST DH-610035-40 (FIG. 1A)
RUNNING LIST RL-610035 (MFG. DIS.)
JUMPER LIST JL-610035



ASSOCIATED DRAWINGS

DRAWING NO.	ISS.	DESCRIPTION
AH-610035	9	ADJUSTMENT
E-610035	4	EXPLANATION

CURRENT DRAIN DATA AMPS.
HOLDING CURRENT 0.38

DESIGNED: P. BAKKER	DR. F.S.
APP'D: H. BALZER	CK. J.P.I.
SCALE: DATE 12-9-59	
DO NOT SCALE DRAWING	
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AUTOMATIC ELECTRIC COMPANY NORTHLAKE, ILL., U.S.A. GENOA, ILL., U.S.A. WAUKESHA, WISC., U.S.A.	

PRE-PAY COIN TELEPHONE
ADAPTER CIRCUIT
1,2 OR 3 DIGIT TOLL CODE
REFUNDS INITIAL DEPOSIT

H-610035

SHEET / OF 2

H-610035
5C0019-H

SHEET / OF 2

CHANGES

ISSUE: 3

ISSUE: 4

ISSUE: 5

ISSUE: 6

ISSUE: 7

ISSUE: 8

ISSUE: 9

ISSUE: 10

ISSUE: 11

ISSUE: 12

ISSUE: 13

ISSUE: 14

ISSUE: 15

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FIG. 1A (JACK MOUNTED) NAFM (NOTE 78)
FIG. 2A (UNIT MOUNTED)