*REPLACING PAGE ADDENDUM*
***Filing Instructions:***

1. REMOVE FROM THE SECTION THE PAGES NUMBERED THE SAME AS THOSE ATTACHED TO THIS PINK SHEET.
2. INSERT THE ATTACHED PAGES INTO THE SECTION IN THEIR PLACE.
3. PLACE THIS PINK SHEET AHEAD OF PAGE 1 OF THE SECTION.

# DISCRETE CALLING RECOGNIZER (TP308513)

# FOR

# "DATASPEED"* TAPE SENDER 4A

## 1. GENERAL

1.001 This addendum, which supplements Section 592-811-102, Issue 1, is issued to incorporate engineering changes and to add coverage on Recognizer Features and the KWDT Delay Relay. Arrows in the margins indicate changes and additions.

1.002 Insert the attached pages in accordance with the filing instructions above.

Attached:
Page 1 dated April 1973, revised
Page 2 dated April 1973, revised
Page 7 dated April 1973, revised
Page 8 dated April 1973, revised
Attachment 7029WD, added
Attachment 7030WD, added

*Trademark of AT&TCo

# DISCRETE CALLING RECOGNIZER (TP308513)

# FOR

# "DATASPEED"* TAPE SENDER 4A

CONTENTS PAGE



## 1. GENERAL

1.01 This section provides description, operation, installation, and coding and testing information for the discrete calling recognizer (TP308513) used with "DATASPEED" Tape Sender 4A in the Type 4 Tape-to-Tape System.

1.02 The discrete calling recognizer (Figures 1 and 2) provides an unattended Tape Sender 4A with the protected transmitter start feature. Senders equipped with this feature can transmit only to authorized receivers.

1.03 The discrete calling recognizer provides the necessary recognizer logic to respond to the low speed start-stop signal of discrete coding generated by a Tape Receiver 4B equipped with the discrete calling generator (TP308512). In order for data to be transmitted, the discrete calling units of both the sender and receiver must be coded identically.

1.04 The unit may be used with the TP308514 send-receive feature to establish an unattended send-receive terminal.

1.05 The discrete calling recognizer consists of a discrete calling recognizer logic assembly and a signal generator assembly mounted on an accessory module frame. The module is installed in the space provided for an accessory module in the lower part of the Tape Sender 4A cabinet. Refer to Figure 1.

1.06 The unit is installed in either the factory or the field. No mechanical or electrical changes are required to perform the installation unless set has computer requirements (4.03).

1.07 Wiring diagrams 7029WD, 7030WD, 7421WD and TP303735 circuit card are included at the end of this section.

## 2. METHOD OF OPERATION

2.01 The following procedure is used to set up a Tape Sender 4A for unattended service. The sender may be in either the EDC or NON-EDC mode of operation, depending on the type of transmission desired.

2.02 Depress the DATA button on Data Set 202C. For EDC operation depress the UNATTEND button. If NON-EDC operation is desired, simultaneously depress the UNATTEND and the NON-EDC buttons. Place the tape to be transmitted in the tape reader.

## 3. PRINCIPLES OF OPERATION

### GENERAL OPERATION

3.01 The discrete calling recognizer consists of signal generator assembly (TP199570) and discrete calling logic. Refer to 7421 WD. The signal generator is used to generate three-second, start-stop signal identical to the transmitter start signal of an appropriate receiver terminal. This signal is compared bit by bit with the incoming transmitter start signal. When the incoming signal is in full agreement

* Trademark of AT&TCo

Prepared for American Telephone and Telegraph Company by Teletype Corporation

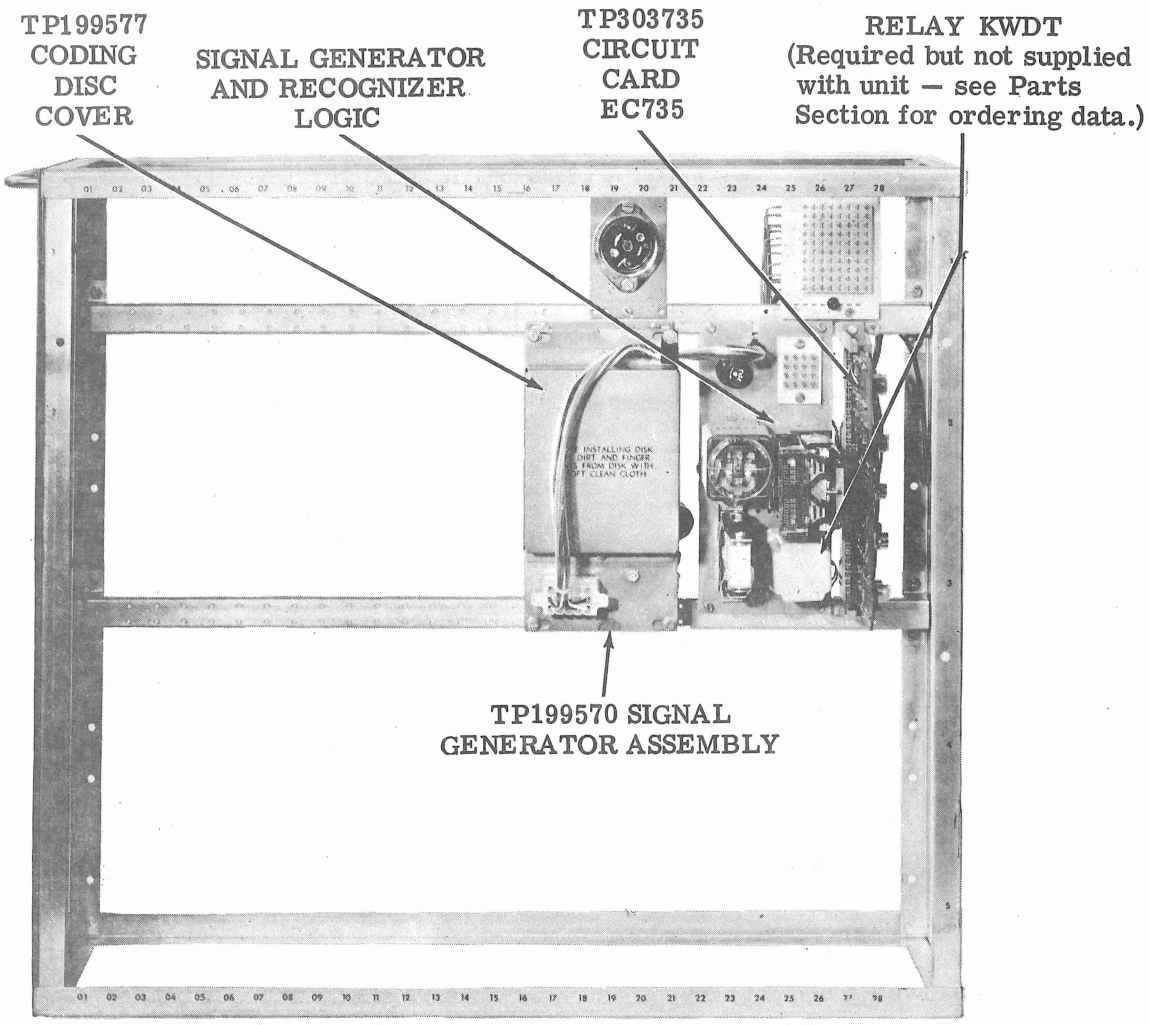



Figure 1 - Discrete Calling Recognizer (TP308513) — Right Side View

with the locally generated signal, the transmitter is permitted to start, thus protecting the sender against incorrect-number calls in the unattended mode of operation.

3.02 The discrete calling logic consists of EC735 circuit board assembly and four relays: MS (Motor Start), CL (Clutch), CP (Transmit Start Character Comparator) and GO (Proceed to Transmit). Relay MS is used to apply power to the signal generator motor. Relay CL is used to control the motor clutch, and the CP relay reset (if a nonvalid character is received). The CP relay is used for its own reset (if a nonvalid character is received), and controlling the GO relay. Self-latching relay GO is used to blind the Request-to-Send lead, isolating the CL relay and controlling the discrete calling delay timer for transmission into a computer or simulated receivers.

3.03 Refer to Figures 4 and 5 for timing diagrams of the control logic.

3.04 Signal generator consists of an ac synchronous motor which drives a codeable etched circuit board commutator (coding disc). Contact is made to the coding disc by stationary contacts brought out and used for timing. The speed of the motor is 20 rpm. The motor clutch is actuated by 48 v dc controlled by the relay CL.

3.05 When power to the terminal is turned on, the signal generator coding disc may not be in its "home" position. When this condition exists, the homing recognizer control contact is closed to ground and both the CL and MS relays are energized to allow the motor to rotate the disc until it reaches "home." At that time the

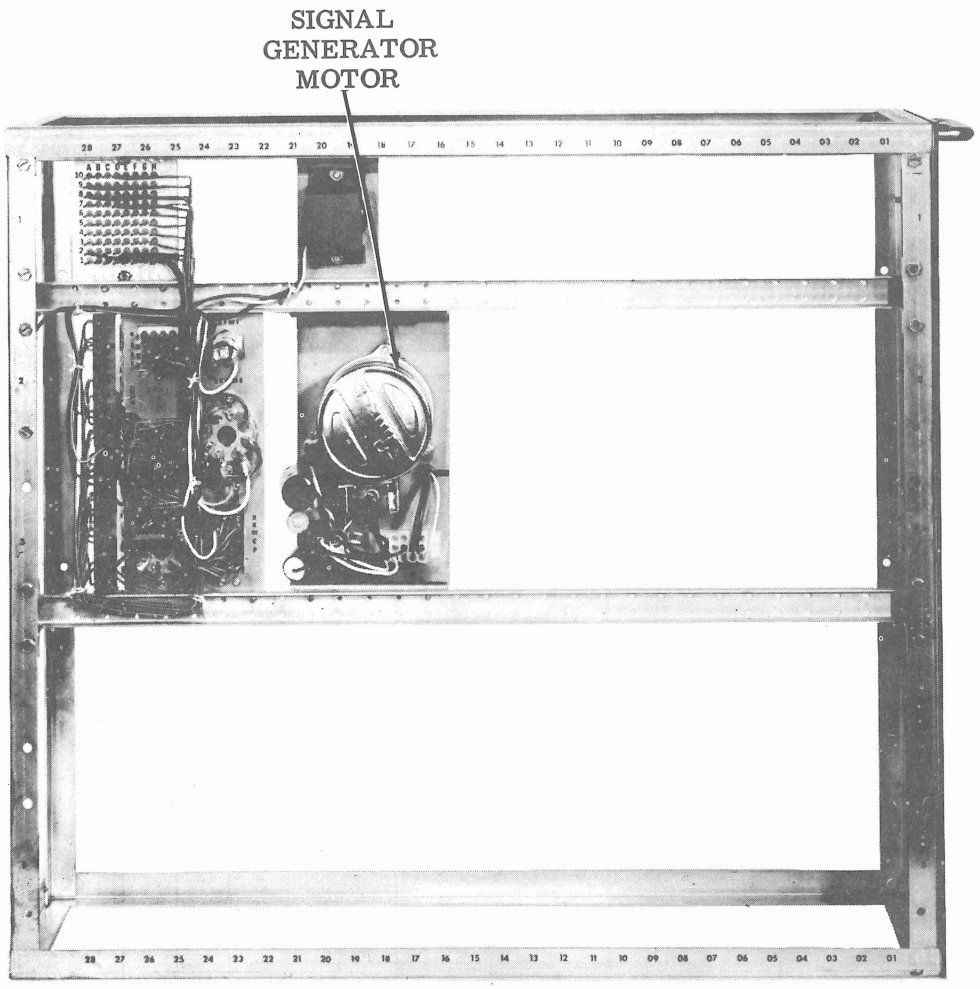



Figure 2 - Discrete Calling Recognizer (TP308513) — Left Side View

homing recognizer contact opens, both relays de-energize and the signal generator is primed for the proper sequence of operation.

3.06 With the sender terminal in the idle condition, relay GO is de-energized. Through GO contact 10B, 0 volt is presented to the sender station control to blind the Request-to-Send lead. This allows the receiver to control its Request-to-Send lead, reverse the echo suppressors, and transmit to the sender.

MANUAL OPERATION

3.07 With the sender terminal in the MANUAL mode of operation, relay GO is energized when the data set goes into the data mode. This relay energization removes the 0-volt signal from the Request-to-Send Blind in the station control assembly and the sender is able to transmit, bypassing the discrete calling sequence.

3.08 The discrete calling logic and associated relays are not used if the sender is locked in the MANUAL mode of operation.

UNATTENDED OPERATION

3.09 With the sender terminal in the UNATTEND mode of operation, the UA (Unattend) relay is energized (providing the station control is strapped for unattended answering).

3.10 When the receiver calls the sender and the sender goes into the data mode, the DSR (Data Set Ready) relay energizes and a 0-

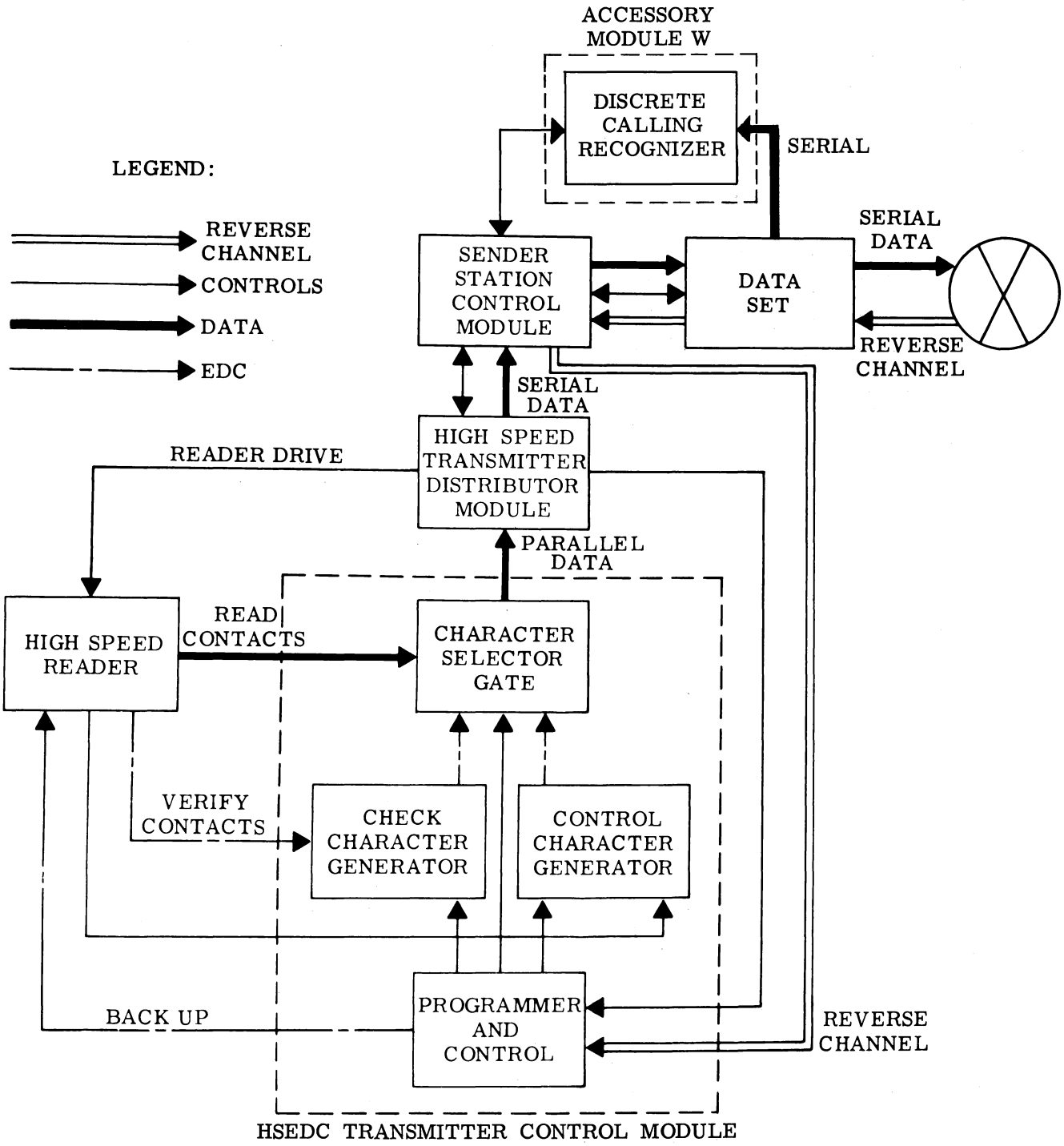



Figure 3 - Block Diagram of Tape Sender 4A

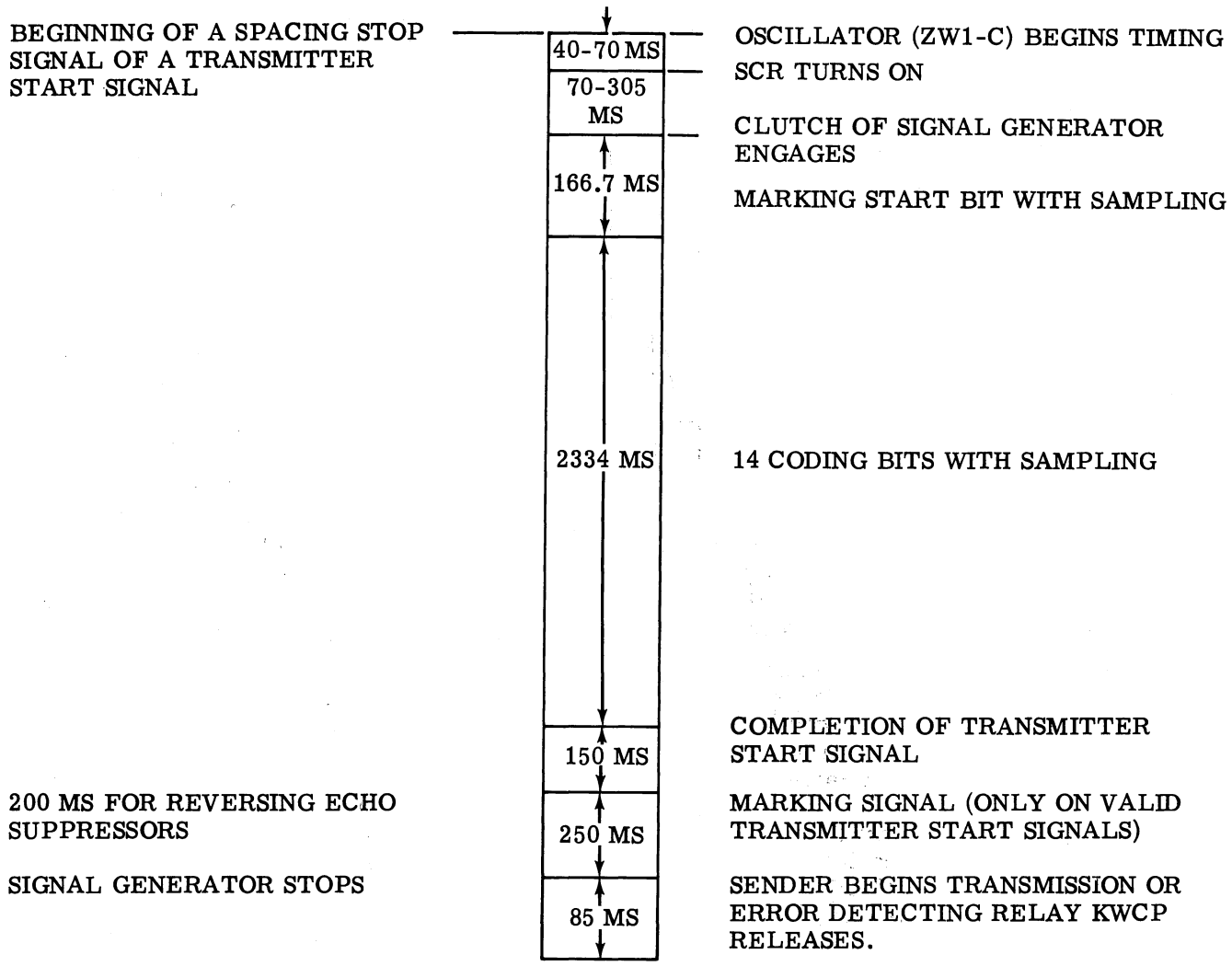



Figure 4 - Timing Diagram of Discrete Calling Recognizer

volt signal is presented to both the MS relay in the discrete calling logic, and the DT relay in the sender station control assembly. The DT relay will begin a 60-second time-out to drop the call unless the GO condition is satisfied. At the same time the MS relay presents ac power to the B1001 synchronous motor. If tape was not inserted into the reader, the discrete calling logic will not be primed to begin the discrete calling sequence. Within the station control assembly, a signal is presented to the DT relay to begin a 60-second time-out and drop the call.

3.11 When the data set goes into the data mode, a 0-volt signal is presented to pin 3 of ZW1-C to prime this relay driver. Contact 8M of relay GO prevents relay GO from energizing until the transmit start signal has been accepted, compared, and recognized as valid.

3.12 The normal signal on the Receive Data lead is -6 volts, or mark hold. Presented to pin 34 of ZW1-A, a polar to neutral converter, this signal clamps the output of ZW1-A at 0 volts. The signal generator, in its "home" position, has its homing identifier control contact closed to ground. This signal is presented to pin 13 of relay driver ZW1-C to prime that driver. The 0-volt input signal to ZW1-C, pin 9, will have no affect on the output signal, pin 11, which remains clamped off.

3.13 When the receiver begins the transmitter start signal sequence, it puts on line a long spacing signal of approximately 350 ms in duration. This polar (+6v) signal converted to a neutral (-6v) signal is presented to the ZW1-C relay driver and begins an oscillator time-out as indicated in Figure 4 (approximately 40-70

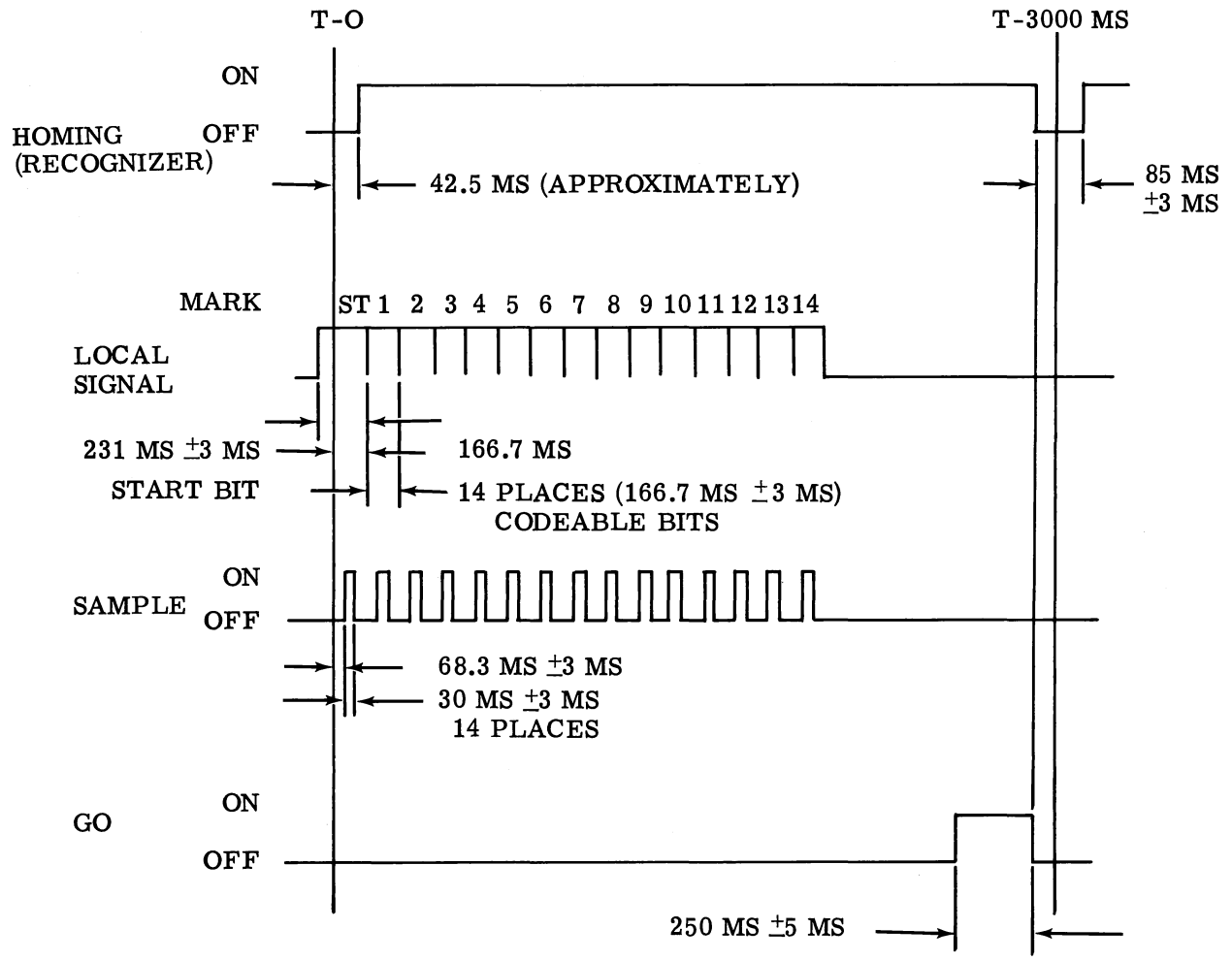



Figure 5 - Timing Diagram of Discrete Calling Recognizer Signal Generator

ms). At the end of this time-out, the control SCR (silicon controlled rectifier) is turned on. When the incoming data signal turns marking, the relay driver output pin 11 of ZW1-C is turned on and the clutch energizes.

3.14 When the synchronous motor clutch energizes, it actuates the clutch mechanism and the disc begins to rotate. When the homing recognizer control contact closes, relay CL energizes and, together with relay MS, latches on. Through CL contact 5, the clutch latches on and the relay driver ZW1-C is isolated.

3.15 At the same time the transmitter start signal is received at the sender, the sender generates its own local transmitter start signal. The two signals, received and local, are applied to inputs 15 and 21 respectively of ZW1-E, sampling relay drivers. These signals are compared and sampled by the sample signal on the signal generator assembly. Because of inherent difference in motor speeds, and consequently disc rotation speeds, and due to the phase difference between received and local transmitter start signals, these signals must be sampled every bit to discount erroneous bit readings and invalid character recognition. A sample signal, contact closure to ground, will present 0 volt to pin 18 of ZW1-E. With inputs 15 and 21 of ZW1-E marking (0 volts), and the signal generator in the sampling state, the outputs 17 and 24 of ZW1-E will turn on and present energizing conditions to relay CP, coils 1 and 2. Since both transmitter start signals are alike, relay CP will remain unenergized. If during the sample state, one signal is marking and the other spacing, relay CP will energize and mechanically latch to indicate an invalid start signal.

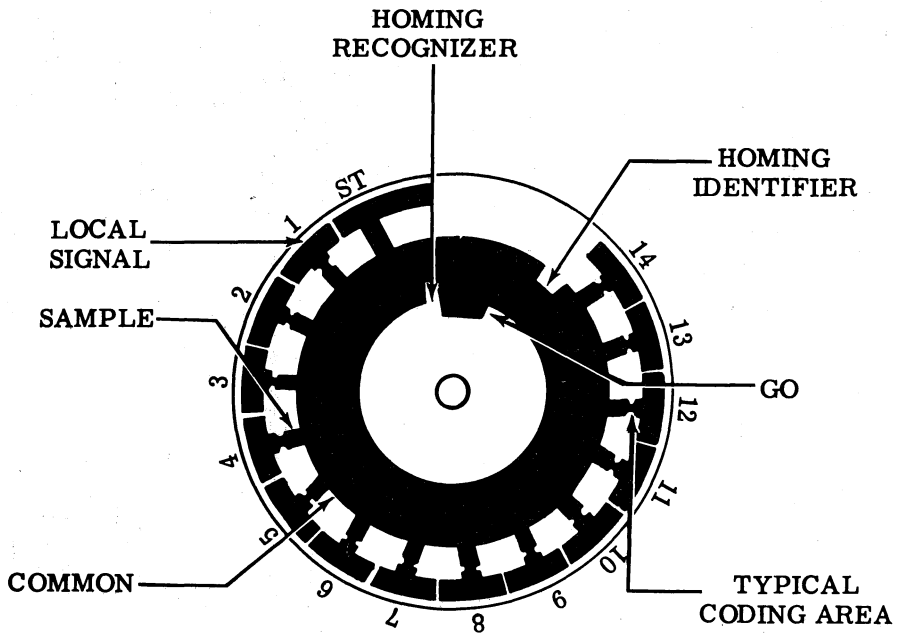



Figure 6 - Discrete Calling Recognizer Coding Disc (TP199580)

3.16 When the received transmitter start signal compares with the locally generated transmitter start signal, relay CP will remain unenergized during the entire discrete calling sequence. Approximately 150 ms after completion of the marking start bit and the 14 coding bits, the GO signal is generated by the signal generator. This contact closure to ground will energize the GO relay, due to contact 1NC of the CP relay being closed. The GO relay will be electrically latched by its own 8M contact. At the same time, contact 10B of the GO relay will open to remove the 0 volt blind signal from the sender Request-to-Send data set lead. Time-out condition will be removed by action of the 9B contact of the GO relay. Circuit ZW1-C will be reset by the homing identifier signal.

3.17 Approximately 250 ms after the GO signal is generated, the homing recognizer control signal opens, the CL and MS relays de-energize and the discrete calling operation is complete. Due to contact 11B of the GO relay, the clutch will be unable to be re-energized by the discrete calling logic until the present call is completed and the GO relay is de-energized.

3.18 When the received transmitter start signal does not compare with the locally generated transmitter start signal, relay CP energizes during the first invalid bit and mechanically latches. After completion of the 14 coding bits, the signal generator generates the GO control signal. Because the CP relay is energized, contacts 1NC open and 2NO and 3NO close. Contact 1NC of the CP relay prevents the GO relay from energizing to indicate an invalid character. When the signal generator completes its cycle, the homing recognizer control signal opens, the CL and MS relays de-energize. As soon as the CL relay de-energizes, the reset coil of the CP relay energizes to reset the CP relay. The 0-volt signal will still be present on the sender Request-to-Send lead to blind that lead and on the DT relay to continue the time-out condition.

3.19 The receiver may continue to recycle the discrete calling sequence at the sender until the DT relay in the station control assembly times-out and drops the call.

3.20 The reverse channel is the only communication link from a receiver to the sender. When the reverse channel is lost and the RC (Reverse Channel) relay pulls in, a provision has been made in this discrete calling logic to drop the GO condition after a preset time if re-

verse channel is not regained. The DT relay is time delay adjustable. If the reverse channel is lost and the DT relay times-out, the normally open contact (pins 5 and 7) on the DT relay closes to drop the GO relay and blind the Request-to-Send lead and begin the sender time-out to drop the call. The DT relay is not used when a receiver is calling an unattended sender. The DT relay is used only when a calling station, such as a computer, has a defined Inner Block Gap (IBG). This relay (KWDT) TP303073 is not supplied with the discrete calling logic. Refer to appropriate parts section for ordering information.

## 4. INSTALLATION

4.01 A screwdriver is the only tool required to install the discrete calling recognizer in the Tape Sender 4A.

4.02 To install the unit, remove the rear panel of the cabinet. Lift out the 80-pin connector labeled PE128 and the ac cord (with male plug) labeled PE121 from the bottom of the cabinet. Guide these two cables through the center open area to the front of the cabinet. Remove the protective shield from the PE128 connector and discard. Plug both connectors into the appropriate receptacles on the accessory module. Screw the PE128 connector tightly into its receptacle. Insert the module into the center area of the cabinet. During this process, make sure that the cables in the rear of the cabinet do not obstruct the module insertion and that the module can slide completely in the cabinet.

4.03 To install the fixed 60 second delay KWDT relay (TP303073) a strap is used at TBJ4-C5 to TBJ2-A9-7421WD (TB1 and TB2 sheet 4C of 7071WD). Relay KWDT is then installed at XKGDT on the station control panel.

## 5. DISC CODING AND TESTING

5.01 To code the coding disc, remove the two 6-40 screws holding the TP199577 cover to the TP199570 signal generator assembly (Figure 1).

5.02 Remove the thumb nut and pull off the TP199580 coding disc.

5.03 Prepare the TP199580 coding disc by coding bits 1 thru 14 in the desired sequence (Figure 6).

5.04 A marking bit identifies a bit which has continuity from the local signal to the common (Figure 6). Conversely, a spacing bit does not have continuity to the common signal. The coding disc is manufactured with all bits marking. Therefore, continuity must be broken for spacing bits.

5.05 The use of combinations of all marks, all spaces, single marks, single spaces, and single transitions must be avoided.

5.06 To make a bit spacing, remove the etched circuit board material in the corresponding code area (Figure 6) by scraping it with the edge of a sharp screwdriver or a pocket knife.

5.07 Install the coding disc on the signal generator using the thumb nut.

5.08 To properly test the discrete calling feature, it is necessary to have a Tape Receiver 4B equipped with a discrete calling generator (TP308512) call a Tape Sender 4A equipped with the discrete calling recognizer. Both coding discs must be coded identically.

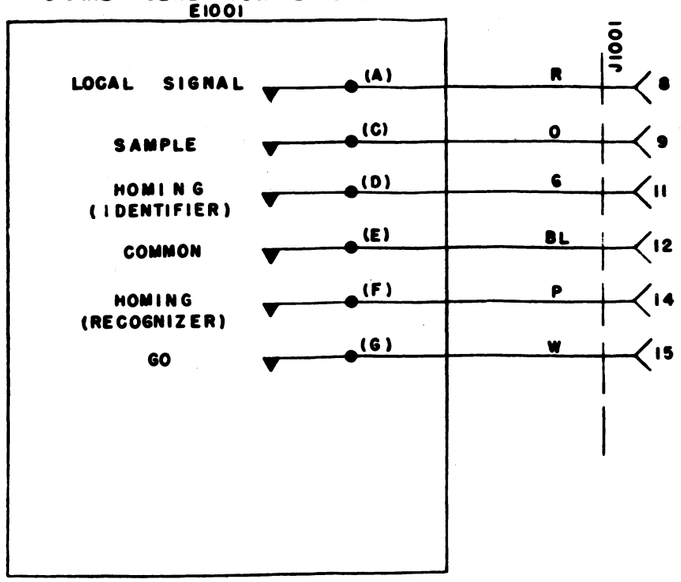
## 6. ATTACHMENT INDEX

| TITLE | DIAGRAM NUMBER |
|---|---|
| Signal Generator Schematic (No. 199570) | 7029WD |
| Signal Generator Actual (No. 199570) | 7030WD |
| Discrete Calling Recognizer Type 4 Sender Circuit Card | 7421WD<br>303735 |

| NO. | NOTES |
|---|---|
| 1. | REFER TO 7030WD FOR ACTUAL WIRING DIAGRAM. |
| 2. | TERMINAL DESIGNATIONS ENCLOSED IN PARENTHESES ARE NOT MARKED ON THE COMPONENT. |
| 3. | ⟩ INDICATES TERMINAL ON RECEPTACLE J1001. |
| 4. | COLOR CODE:<br>W — WHITE  BK — BLACK<br>P — PURPLE  R — RED<br>O — ORANGE  G — GREEN<br>BL — BLUE |
| 5. | J1001 TERMINAL VOLTAGES MAY VARY WITH APPLICATION AS FOLLOWS<br>A - 117 VAC  E — -6VDC  I — NOT USED<br>B — AC COMMON  F — -12VDC<br>C — +6VDC  G — -28VDC<br>D — GRD  H — -48VDC |

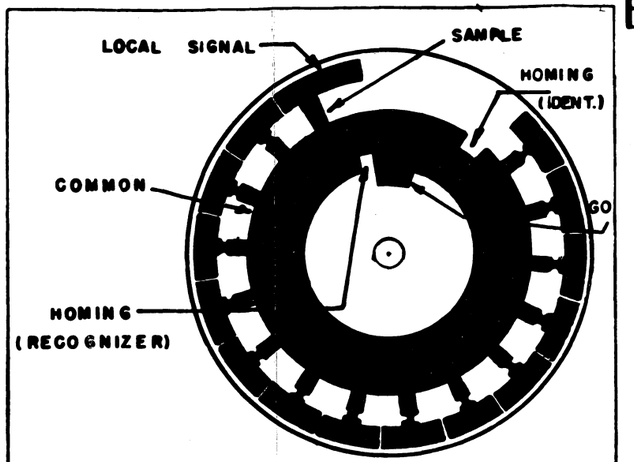
| ASSEMBLY USED ON | TERMINAL 1 | 2 | 6 | 8 | 9 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|
| 199552 | I | A | B | G | I | G | G | A | I | I |
| 199555 | I | A | B | G | G | I | G | A | G | G |

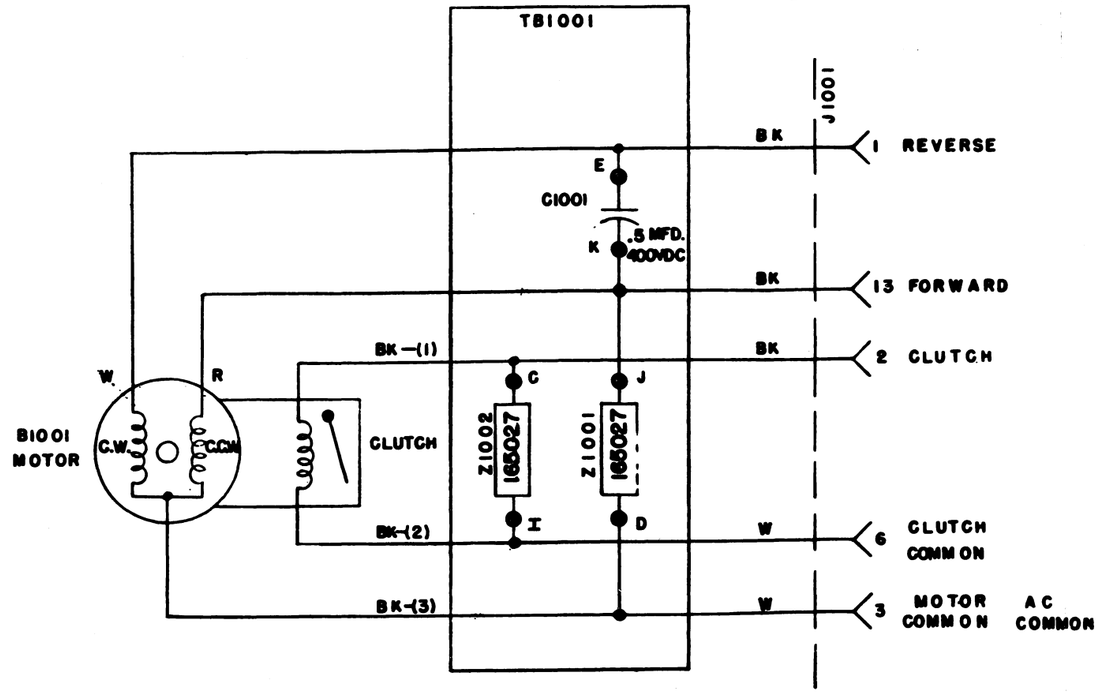
SIGNAL GENERATOR BRUSHES E1001




REFERENCE ONLY

CODING DISC 199580




| 7029 WD | | |
|---|---|---|
| REVISIONS | | |
| ISSUE | DATE | AUTH. NO. |
| 2 | 8-18-65 | 87498 |
| 3 | 9-10-65 | 87498-2 |
| 4 | 4-14-69 | 99119 |
| | | |
| | | |

SPEC. NO. 608245

SCHEMATIC DIAGRAM FOR SIGNAL GENERATOR ASSEM.
ASSEM. NO. 199570

APPROVALS

| D AND R | E OF M |
|---|---|
| | |

E-NUMBER

PROD. NO. 7029 WD

DATE: 11-16-63

P.D. FILE NO. 1-A148/134 A A

DRAWN. G.J.M. CHKD

ENGD. W.R.F. APPD.

TELETYPE CORPORATION

7029 WD

ET-131491

ET-88147
TC25516-941

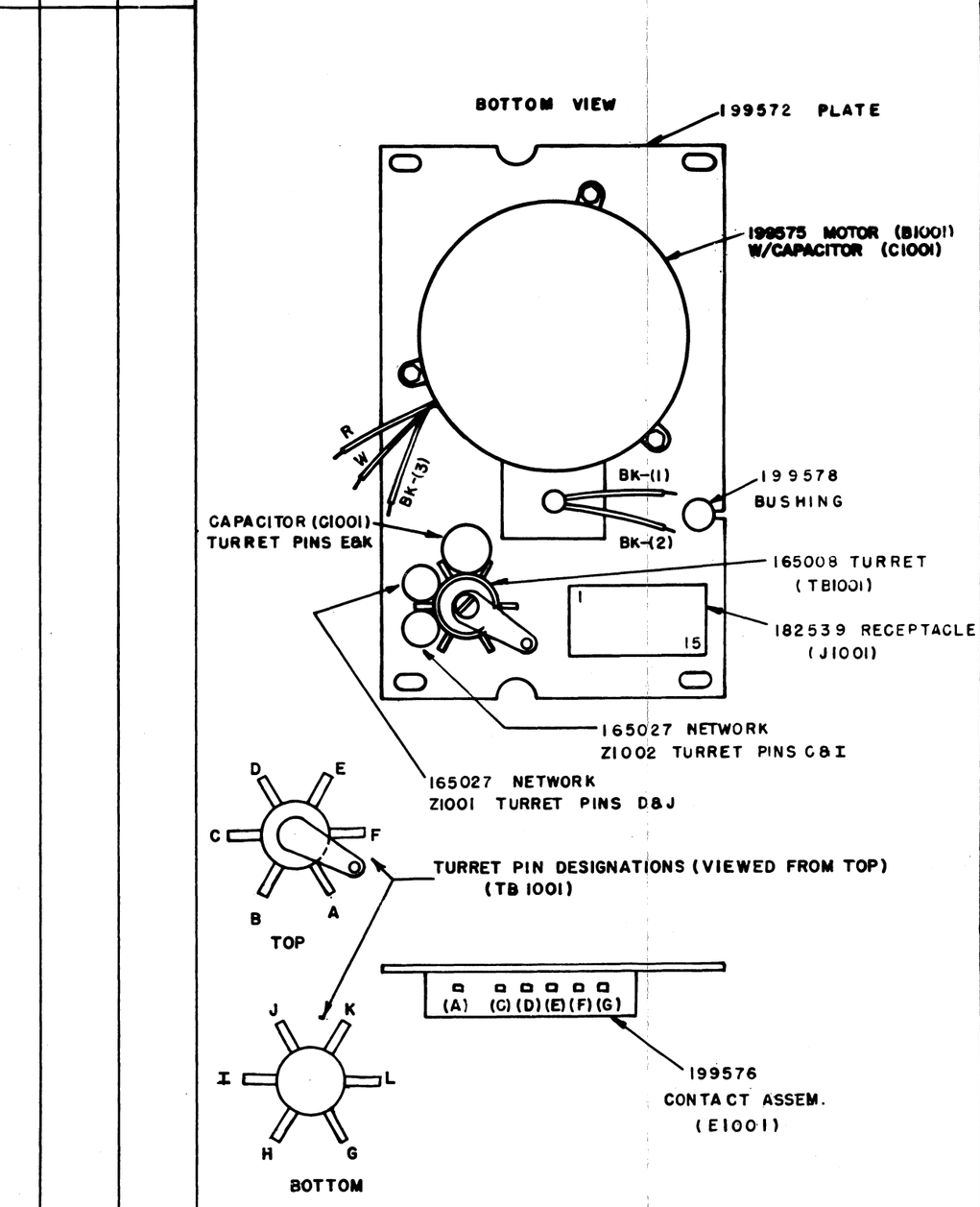
| NO. | NOTES |
|---|---|
| 1. | REFER TO 7029 WD FOR SCHEMATIC. |
| 2. | TERMINAL DESIGNATIONS ENCLOSED IN PARENTHESES ARE NOT MARKED ON THE COMPONENT. |
| 3. | WIRE CONNECTOR J1001 ACCORDING TO TABLE. |

| TERMINAL | WIRE |
|---|---|
| 1 | 31880 RM |
| 2 | 31880 RM |
| 3 | 31881 RM |
| 6 | 31881 RM |
| 8 | 31906 RM |
| 9 | 31901 RM |
| 11 | 31905 RM |
| 12 | 31902 RM |
| 13 | 31880 RM |
| 14 | 31904 RM |
| 15 | 31798 RM |

| | |
|---|---|
| 4. | COLOR CODE:<br>BL — BLUE<br>BK — BLACK<br>O — ORANGE<br>R — RED<br>P — PURPLE<br>W — WHITE<br>G — GREEN |
| 5. | J1001 TERMINAL VOLTAGES MAY VARY WITH APPLICATION AS FOLLOWS:<br>A-117 VAC E--6VDC I-NOT USED<br>B-AC COMM.F--12VDC<br>C--+6VDC G--28VDC<br>D-GRD H---48VDC |

| ASSEM. USEDON | J1001 TERMINALS 1 2 6 8 9 11 12 13 14 15 |
|---|---|
| 199552 | I A B G I G G A I I |
| 199555 | I A B G G I G A G G |

| COMP. | MODULE CONN. | CONTACT ASSEM. | MOTOR ASSEM. | TURRET |
|---|---|---|---|---|
| COMP. DESIG. | J1001 | E1001 | B1001 | TB1001 |
| ASSOC. ASSEM. | | | | |
| COMP. NO. | 182539 | 199576 | 199573 | 165008 |










7030 WD

REVISIONS

| ISSUE | DATE | AUTH NO |
|---|---|---|
| 2 | 8-18-65 | 87498 |
| 3 | 4-14-69 | 99119 |

ACTUAL WIRING DIAGRAM FOR SIGNAL GENERATOR ASSEMBLY

ASSEM. NO. 199570

APPROVALS

| D AND R | E OF M |
|---|---|
| | |

E-NUMBER

PROD. NO. 7030WD

DATE: 11-16-63

P.D. FILE NO. 1-A148/134 AA

DRAWN. G.J.M. | CHKD

ENGD. W.R.F. | APPD RVR

TELETYPE CORPORATION

7030 WD

| NO. | NOTES |
|---|---|

| SUPPORTING INFORMATION | |
|---|---|
| CATEGORY | NO. |

CONTENTS

# ISSUE CONTROL RECORD

| SHEET NO. | ISSUE 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | | | | |

7421 WD

REVISIONS APPLYING TO THIS CONTROL RECORD

| ISSUE | DATE | AUTH. NO. |
|---|---|---|
| 1 | 8-14-68 | 18998-R |
| | | |
| | | |
| | | |

ISSUE CONTROL
SHEET 1 OF 1

SCHEMATIC
WIRING DIAGRAM
FOR
DISCRETE CALLING RECOGNIZER
TYPE 4 DATASPEED
SENDER

ASSEMBLY NO. 308513 (MODULE 4)

| | |
|---|---|
| WD NUMBER 7421WD | |
| DRAWN C.J.R. | CHKD. |
| ENGD. E.F.R. | APPD. |

TELETYPE
CORPORATION

7421 WD

1

TC 482 (1-66) SEE R&D ROUTINE #5 FOR USE OF THIS FORM

## NOTES

1. REFER TO 7423WD FOR ACTUAL WIRING DIAGRAM.
2. 
3. → INDICATES MALE TERMINAL ON CONNECTOR
   ← INDICATES FEMALE TERMINAL ON CONNECTOR
   ○ DESIGNATES TERMINALS ON WIRE-WRAP FIELD ASSEM. AND TERMINAL BOARD.
   (S) DESIGNATES SIGNAL GROUND
   (C) DESIGNATES CIRCUIT GROUND AND -48 VOLTS RETURN.
   ⏚ DESIGNATES FRAME GROUND
4. TERMINAL DESIGNATIONS ARE FOR REFERENCE AND ARE NOT MARKED ON COMPONENTS.
5. ALL VOLTAGES DC UNLESS OTHERWISE SPECIFIED.
6. ALL RESISTORS ARE 1/2 WATT AND IN OHMS UNLESS OTHERWISE SPECIFIED.
7. NETWORK NO. TELETYPE NO.
   1 165027 120 0.35
8. B1001, C1001 AND TB1001 ARE ASSOCIATED WITH PART NUMBER 199570, 7029WD AND 7030WD.
9. RELAY DT IS NOT SUPPLIED WITH THE 308513 ASSEMBLY. RELAY TP303073 MAY BE USED: IT IS A FIXED 60 SECOND DELAY ON ENERGIZATION. A RELAY SIMILAR TO 303073 MAY BE USED IF A VARIABLE DELAY IS DESIRED.
10. REFER TO 303735 (EC735) FOR DESCRIPTION AND THEORY OF OPERATION OF THIS CIRCUIT CARD ASSEMBLY.
11. REFERENCE WIRING DIAGRAMS:

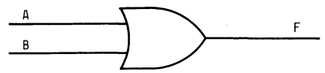
| | |
|---|---|
| SENDER DISTRIBUTOR MODULE | 7410WD |
| SENDER STATION CONTROL MODULE | 7402WD |
| SENDER WIRING FIELD ASSEMBLY | 7C71WD |

12. PART OF THE 308559 CABLE ASSEMBLE.

LOGIC DESIGNATIONS

1-STATE = 0V

0-STATE = -6V




| A | B | F |
|---|---|---|
| 0 | 0 | 0 |
| 1 | 1 | 1 |
| 0 | 1 | 1 |
| 1 | 0 | 1 |

NOTE: THE SAME PRINCIPLE APPLIES TO "4" INPUT "OR" GATES.

INPUT LOGIC DESIGNATIONS

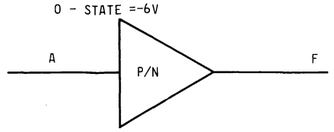
1 - STATE =+6V

0 - STATE =-6V

OUTPUT LOGIC DESIGNATIONS

1 - STATE =0V

0 - STATE =-6V

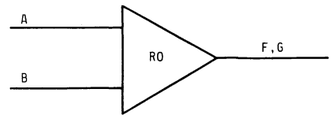



| A | F |
|---|---|
| 1 | 0 |
| 0 | 1 |

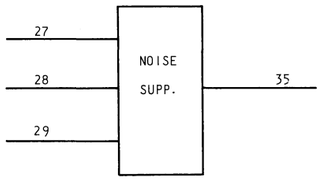
LOGIC DESIGNATIONS

1 - STATE = 0V

0 - STATE = -6V OPEN

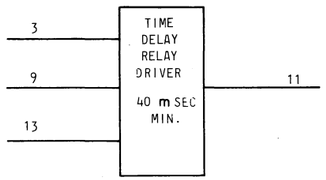


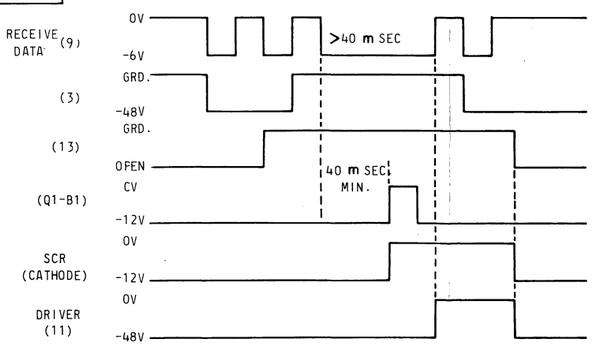

| A | B | F | A | B | G |
|---|---|---|---|---|---|
| 0 | 1 | 0 | 0 | 1 | 0 |
| 1 | 1 | 1 | 1 | 1 | 1 |
| 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 1 | 0 | 0 |




NOTE: THIS CIRCUIT WILL PREVENT NOISE SPIKES GREATER THAN -48V FROM AFFECTING THE RELAYS.

TIMING DIAGRAM FOR:




NOTE:
REVISION INFORMATION MUST ALSO BE REFLECTED ON THE ISSUE CONTROL RECORD, WHICH IS A PART OF THIS DRAWING.

# 7421 WD

**REVISIONS**

| ISSUE | DATE | AUTH. NO. |
|---|---|---|
| 1 | 8-14-68 | 18998-R |
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SEE ISSUE CONTROL RECORD FOR COMPLETE LIST OF SHEETS COMPRISING THIS W.D.

SHEET 1

SCHEMATIC
WIRING DIAGRAM
FOR
DISCRETE CALLING RECOGNIZER
TYPE 4 DATASPEED
SENDER

ASSEMBLY NO. 308513
(MODULE W)

**APPROVALS**

| D AND R | E OF M |
|---|---|
| MK | L T |

E-NUMBER

PROD. NO. 7421WD

DATE 6/24/68

P.D. FILE NO. 2-96.134.184AA

| DRAWN CJR/RS | CHKD. |
|---|---|
| ENGD. EFR | APPD. |

TELETYPE CORPORATION

7421WD

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B TC 434 (2-69)

# 7421 WD

## REVISIONS

| ISSUE | DATE | AUTH. NO. |
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| 1 | 8-14-68 | 18998-R |
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NOTE:
REVISION INFORMATION MUST ALSO BE REFLECTED ON THE ISSUE CONTROL RECORD, WHICH IS A PART OF THIS DRAWING.

SEE ISSUE CONTROL RECORD FOR COMPLETE LIST OF SHEETS COMPRISING THIS W.D.
SHEET 2

SCHEMATIC DIAGRAM

DISCRETE CALLING RECOGNIZER
TYPE 4 DATASPEED
SENDER

ASSEMBLY NO. 308513
(MODULE W)

**APPROVALS**

| D AND R | E OF M |
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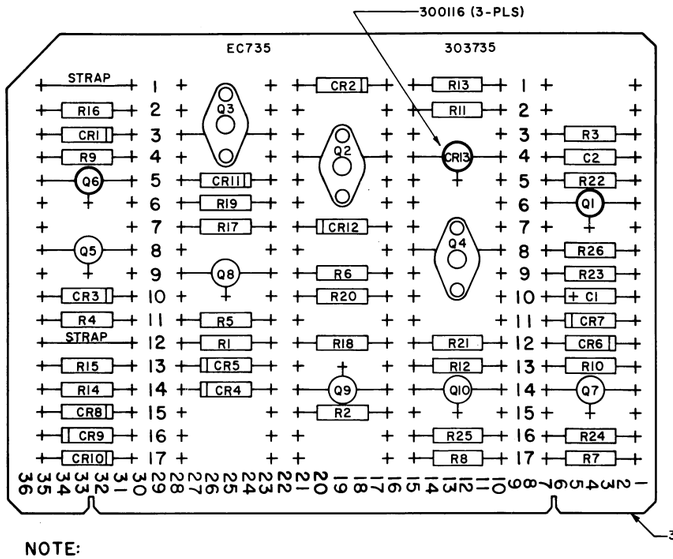
| E-NUMBER | |
| PROD. NO. | 7421 WD |
| DATE | 8-7-67 |
| P.D. FILE NO. | 2-96.134.184 A |
| DRAWN CJR | CHKD. |
| ENGD. EFR | APPD. |

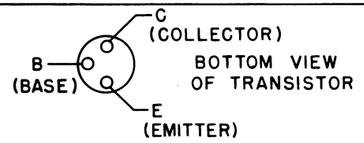
**TELETYPE CORPORATION**

7421 WD

TC 434-2-63

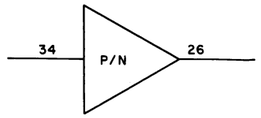



NOTE:
REFER TO MR 2001 TYPE II FOR BASIC MARKING INFORMATION



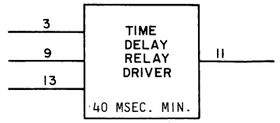

TRANSMITTER START RECOGNIZER LOGIC FOR DATASPEED

CIRCUIT A



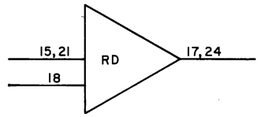

CIRCUIT B


CIRCUIT C




CIRCUIT D


CIRCUIT E




THIS CARD CONSISTS OF FIVE CIRCUITS:

CIRCUIT A: POLAR TO NEUTRAL SIGNAL CONVERTER
THE INPUT, PIN 34, WILL CONVERT POSITIVE AND NEGATIVE EIA-RS-232-B INTERFACE SIGNALS TO -6V AND OV RESPECTIVELY AT OUTPUT PIN 26. TRANSISTOR Q5 IS USED TO AMPLIFY POSITIVE SIGNALS WHICH CUT OFF SIGNAL INVERTER AMPLIFIER TRANSISTOR Q6. RESISTOR R4 BIASED TO -12V WILL SUPPLY BASE CURRENT IN ORDER TO SATURATE TRANSISTOR Q6 WHEN A NEGATIVE SIGNAL IS APPLIED TO THE INPUT, PIN 34. AN OPEN CIRCUITED INPUT WILL CAUSE TRANSISTOR Q6 TO CONDUCT, THEREBY GENERATING A OV SIGNAL AT THE OUTPUT.

CIRCUIT B: TWO INPUT OR GATE
THE OUTPUT OF THE GATE, PIN 25 WILL BE OV WHEN ANY OF THE INPUTS ARE OV, THE INPUTS ARE ISOLATED BY DIODES. THE CATHODES OF THE DIODES ARE BIASED BY THEIR NEGATIVE EXTERNAL LOAD.

CIRCUIT C: TIME-DELAY CONTROLLED RELAY DRIVER
WITH INPUT PINS 3 AND 9 AT O VOLTS, TRANSISTOR Q7 IS CUT OFF AND ANY CHARGE ON THE TIMING CAPACITOR C1 DISCHARGES THROUGH CR6 AND R10 TO -12V. THE RELAXATION OSCILLATOR IS INHIBITED FROM OSCILLATING. TRANSISTOR Q10 IS SATURATED AND PRESENTS FORWARD BIAS TO THE DRIVER TRANSISTOR Q4. SINCE CR13 IS IN THE OFF CONDITION, THE RELAY LOAD ON Q4 IS DE-ENERGIZED. WHEN THE INPUT SIGNAL, PIN 9, GOES TO -6V, TRANSISTOR Q10 IS CUT-OFF. TRANSISTOR Q7 IS SATURATED AND GROUNDS THE CATHODE OF CR6, THE TIMING CAPACITOR BEGINS CHARGING THROUGH R23 TO +6V, AT A CHARGE OF -1V, THE UNIJUNCTION TRANSISTOR Q1 FIRES. THE OUTPUT AT BASE 1 IS 10 MS WIDE AND 12V HIGH, AND THE PERIOD OF OSCILLATION IS APPROXIMATELY 40 MS. THIS PULSE IS AC-COUPLED TO THE GATE OF SCR CR13. AT THE GATE THE PULSE IS 6V HIGH AND APPROXIMATELY 5 µS WIDE. IF INPUT, PIN 13, IS AT O VOLTS, THE SCR TURNS ON.
WHEN THE INPUT, PIN 9, GOES BACK TO O VOLTS, TRANSISTOR Q7 IS CUT-OFF, THE TIMING CAPCITOR C1 DISCHARGES AND THE UNIJUNCTION Q1 IS INHIBITED FROM OSCILLATING. THE SCR ELEMENT IS LEFT IN THE ON CONDITION. TRANSISTOR Q10 IS FORWARD BIASED TO SATURATE RELAY DRIVER Q4 AND ENERGIZE THE RELAY LOAD.
TO RESET THE RELAY-DRIVER AND TURN OFF THE SCR, OPEN-CIRCUIT INPUT PIN 13.
TO INHIBIT THIS RELAY-DRIVER OPERATION, OPEN-CIRCUIT (-48V) INPUT PIN 3.

CIRCUIT D: RELAY COIL NOISE SUPPRESSION
THESE THREE DIODES ARE USED FOR SUPPRESSION OF INDUCTIVE NOISE OF RELAY LOADS. DIODES CR8, CR9, AND CR10 PREVENT NOISE PULSES MORE NEGATIVE THAN -48 VOLTS FROM AFFECTING THE RELAY COILS.

CIRCUIT E: RELAY DRIVERS
THIS CIRCUIT CONSISTS OF TWO IDENTICAL TWO-STAGE COMMON EMITTER AMPLIFIERS. THE OUTPUT TRANSISTORS ARE A MEDIUM POWER TYPE CAPABLE OF DELIVERING A LOAD CURRENT OF UP TO 0.25 AMPERES AT -48 VOLTS.
WITH THE EMITTERS GROUNDED, AND -6V APPLIED AT THE INPUTS (PINS 21 AND 15), THE INPUT TRANSISTORS (Q8 AND Q9) ARE CUT OFF APPLYING +6V TO CUT OFF THE OUTPUT TRANSISTORS (Q3 AND Q2). WHEN OV IS APPLIED TO THE INPUTS, THE INPUT TRANSISTORS ARE FORWARD BIASED DRIVING THE INPUT OF THE OUTPUT TRANSISTORS NEGATIVE TO SATURATE IT.
WITH THE EMITTERS OPEN-CIRCUITED, THE OUTPUT TRANSISTORS WILL REMAIN CUT-OFF REGARDLESS OF INPUT SIGNALS.
THESE RELAY DRIVERS MAY BE USED INDEPENDENTLY OR IN COMBINATION.

CIRCUIT CARD EC 735

| REF. DESIG. | TELETYPE PART NO. | TOTAL QTY. | NAME AND DESCRIPTION | LOCATING FUNCTION |
|---|---|---|---|---|
| R1-R3 | 137442 | 3 | RESISTOR, 1500 OHMS | CURRENT LIMIT |
| R4-R6 | 118146 | 3 | RESISTOR, 4700 OHMS | BIAS |
| R7-R8 | 118146 | 2 | RESISTOR, 4700 OHMS | CURRENT LIMIT |
| R9-R12 | 137441 | 4 | RESISTOR, 1200 OHMS | COLLECTOR LOAD |
| R13 | 137440 | 1 | RESISTOR, 1000 OHMS | BIAS |
| R14 | 118180 | 1 | RESISTOR, 10000 OHMS | CURRENT LIMIT |
| R15 | 118159 | 1 | RESISTOR, 150000 OHMS | BIAS |
| R16 | 118724 | 1 | RESISTOR, 220 OHMS | COLLECTOR LOAD |
| R17-18 | 129852 | 2 | RESISTOR, 2200 OHMS | COLLECTOR LOAD |
| R19-21 | 118725 | 3 | RESISTOR, 270 OHMS | CURRENT LIMIT |
| R22 | 137438 | 1 | RESISTOR, 100 OHMS | BIAS |
| R23 | 120121 | 1 | RESISTOR, 62000 OHMS | BIAS |
| R24 | 143664 | 1 | RESISTOR, 7500 OHMS | BIAS |
| R25 | 118177 | 1 | RESISTOR, 22000 OHMS | BIAS |
| R26 | 137602 | 1 | RESISTOR, 470 OHMS | BIAS |
| | | | | |
| C1 | 179529 | 1 | CAPACITOR, 1 MFD | TIMING |
| C2 | 177332 | 1 | CAPACITOR, .002 MFD | COUPLING |
| | | | | |
| | | | | |
| CR1-2 | 177108 | 2 | DIODE, D2 | CLAMP |
| CR3 | 177611 | 8 | RECTIFIER IN682 | CLAMP |
| CR4-7 | 177611 | | SAME AS CR3 | STEERING |
| CR8-10 | 177611 | | SAME AS CR3 | NOISE SUPPRESSION |
| CR11-12 | 181619 | 2 | DIODE, IN482 | CLAMP |
| CR13 | 303096 | 1 | SILICON CONT. RECTIFIER | CONTROL |
| | | | | |
| | | | | |
| Q1 | 177610 | 1 | TRANSISTOR, 2N1671 | OSCILLATOR |
| Q2-4 | 193250 | 3 | TRANSISTOR, 2N3213 | RELAY DRIVER |
| Q5 | 177422 | 1 | TRANSISTOR, N-39 | EMITTER FOLLOWER |
| Q6-7 | 177105 | 2 | TRANSISTOR, P-22 | CONVERTER |
| Q8-10 | 177106 | 3 | TRANSISTOR, N-33 | AMPLIFIER |
| | | | | |
| | 303095 | 1 | CIRCUIT CARD, ETCHED | |
| | | 2 | STRAP, 24 AWG | |
| | 144495 | 8 | PAD, TRANSISTOR | |
| | 300116 | 3 | TRANSISTOR, CAPS | |

303735

REVISIONS

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| 1 | 9-4-68 | 18998-R |

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APPROVALS

| R AND D | E OF M |
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E-NUMBER

PROD NO. 303735

DATE 6/20/68

R&D FILE 2-96.134.184A

| DRAWN C.J.R. | CHKD. |
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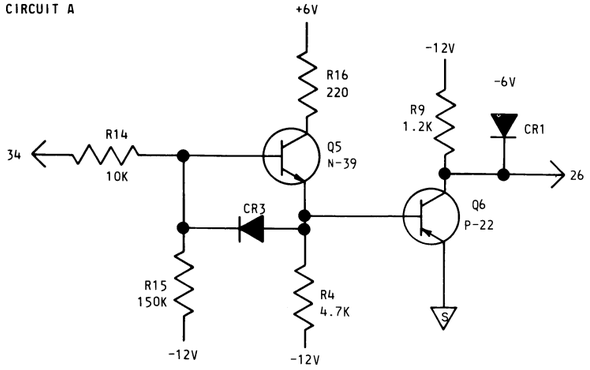
| ENGD. E.F.R. | APPD. |

TELETYPE
CORPORATION

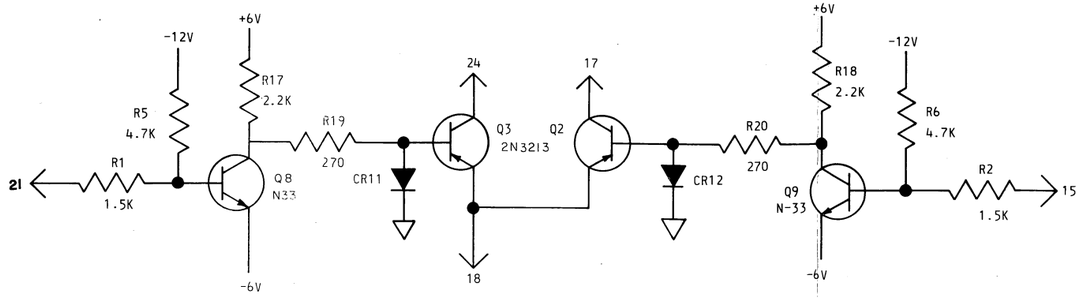
303735

TC 474 (1-66)

CIRCUIT A




CIRCUIT E

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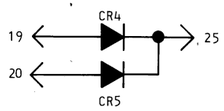
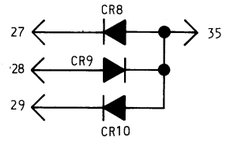
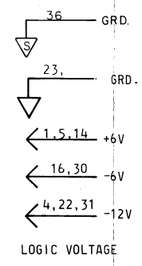


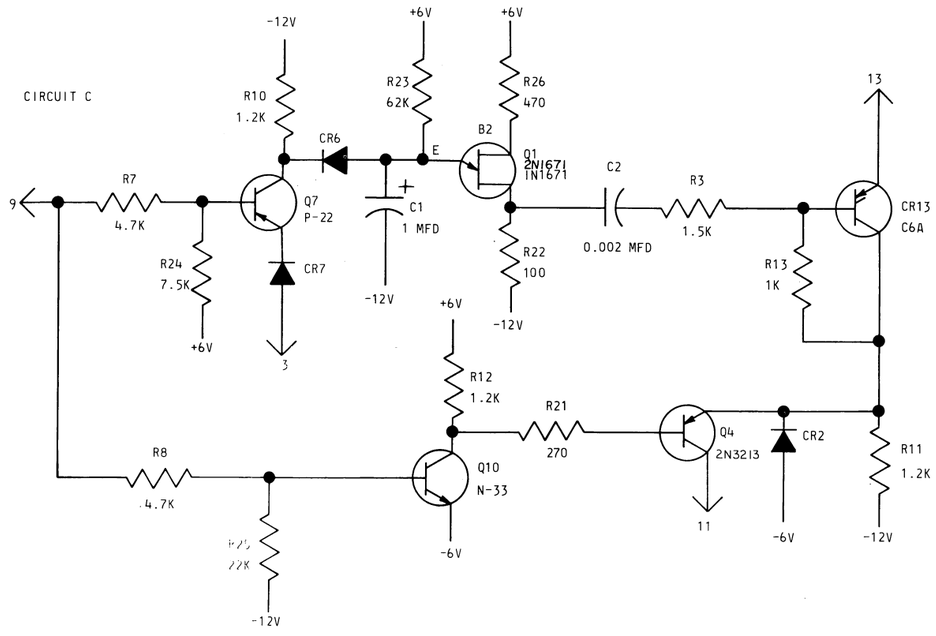

CIRCUIT D




LOGIC VOLTAGE

CIRCUIT C

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| REVISIONS | | |
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| APPROVALS | |
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| E-NUMBER | |
| PROD. NO. 303735 | |
| DATE 6-20-68 | |
| P.D. FILE NO. 2-96.134.184A | |
| DRAWN CJR | CHKD. |
| ENGD. EFR | APPD. |

TELETYPE CORPORATION

303735

TC 434 (2-63)