

"DATASPEED " TAPE-TO-TAPE SYSTEM
TYPE 1 AND TYPE 2 TAPE SENDERS AND RECEIVERS

ELECTRONIC CIRCUITRY
SCHEMATIC DIAGRAMS AND
CIRCUIT BOARD DRAWINGS

1. INTRODUCTION

1.01 This section provides the schematic diagrams and circuit board drawings for the 1A and 2A Tape Senders and 1B and 2B Tape Receivers used in the DATASPEED Tape-to-Tape System. The actual wiring diagrams for the sender and receiver are provided in a separate section.

1.02 This section is reissued to incorporate the latest wiring information. Arrows in the margins indicate changes and additions.

2. GENERAL

2.01 The schematic diagrams make use of circuit logic symbols to represent a group of electrical components arranged on a printed circuit board so as to perform a specific function or functions. Each logic symbol is designated by two numbers: a "Z" number, and an "EC" number. The "Z" number denotes the physical location of the circuit board in the

electronic module assembly represented by the schematic diagram. The "EC" number refers to the specific type of circuit board used in that location; one type of circuit board may be used in more than one location.

2.02 Each circuit board drawing carries two numbers: a six digit number, and an "EC" number. The six digit number is considered as the part number of the circuit board, and should be used (prefixed with TP) when ordering replacement circuit boards. The last three digits of the part number are the same as the three digits of the "EC" number; for example, part number TP172322 is circuit board EC322. The circuit board drawing consists of a parts list, a parts layout of the circuit board, a schematic diagram of the circuit, a circuit description and a drawing of the circuit logic symbol.

2.03 The index (Part 3) lists the subject matter of each diagram and drawing included in the section. In addition, it also lists the numbers of the WD and EC drawings.

3. DIAGRAM INDEX

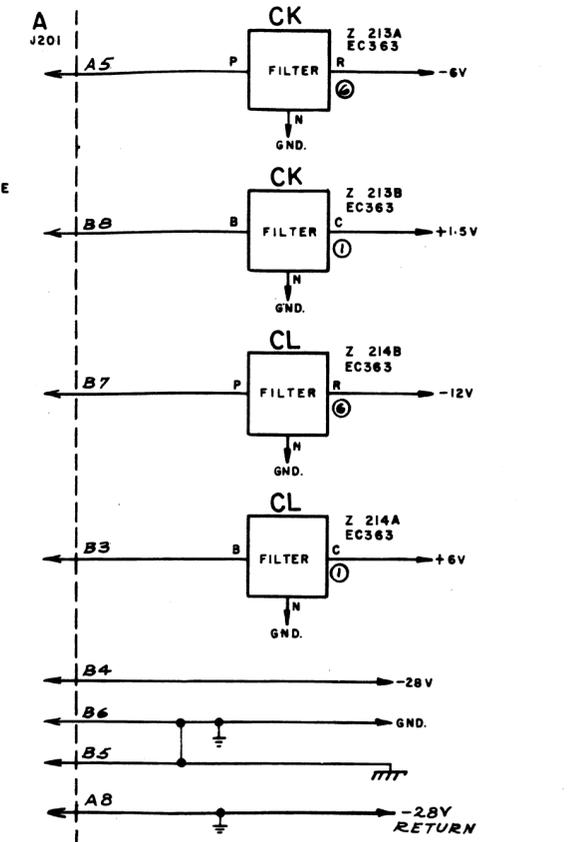
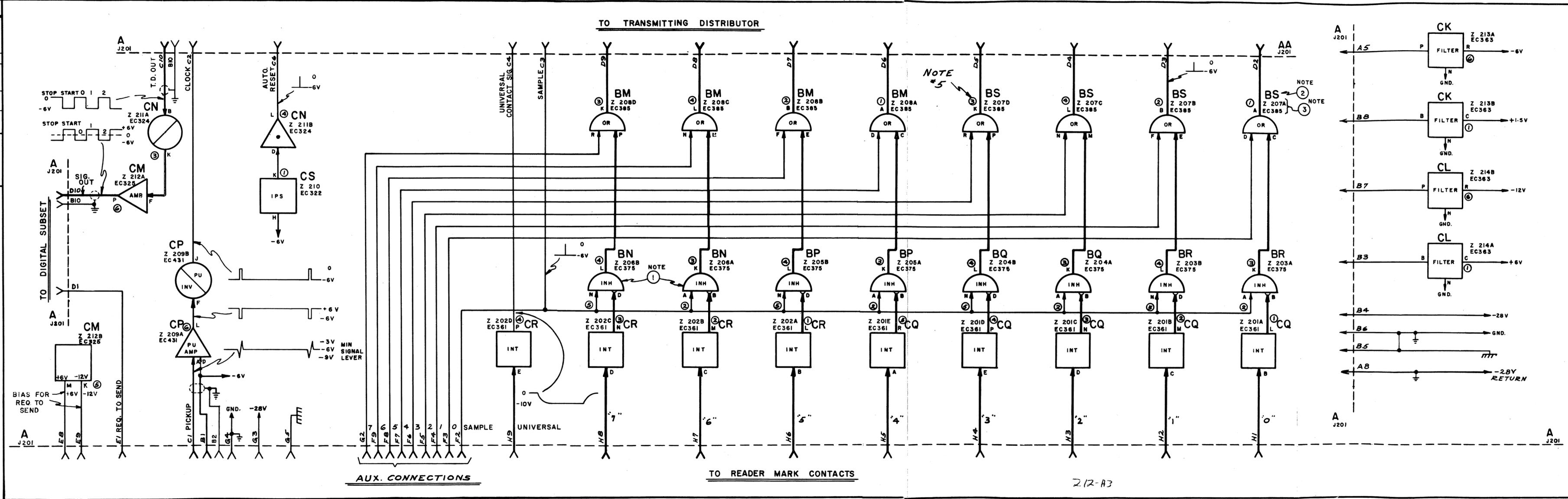
SUBJECT	DIAGRAM NUMBER	DIAGRAM ISSUE
Sending Signal Converter	3831WD	D
Receiving Signal Converter	3833WD	7
Line Break and Automatic Answer (Sending)	3843WD	4
Automatic Answer (Receiving)	3845WD	O
Sending Distributor	4439WD	C
Receiving Distributor	4441WD	F
Y-Connector	4799WD	C
Sending Signal Converter W/Rubout Delete	5917WD	A
"Y" Connector	7024WD	5
Protected Unattended Transmitter (Identifier)	7025WD	5
Protected Unattended Transmitter (Recognizer)	7027WD	7

SECTION 592-800-400

DIAGRAM INDEX (continued)

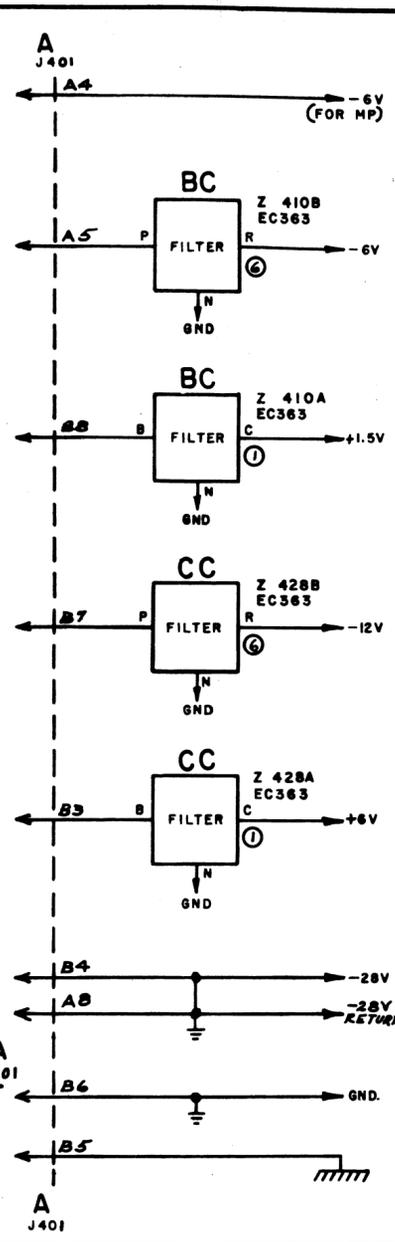
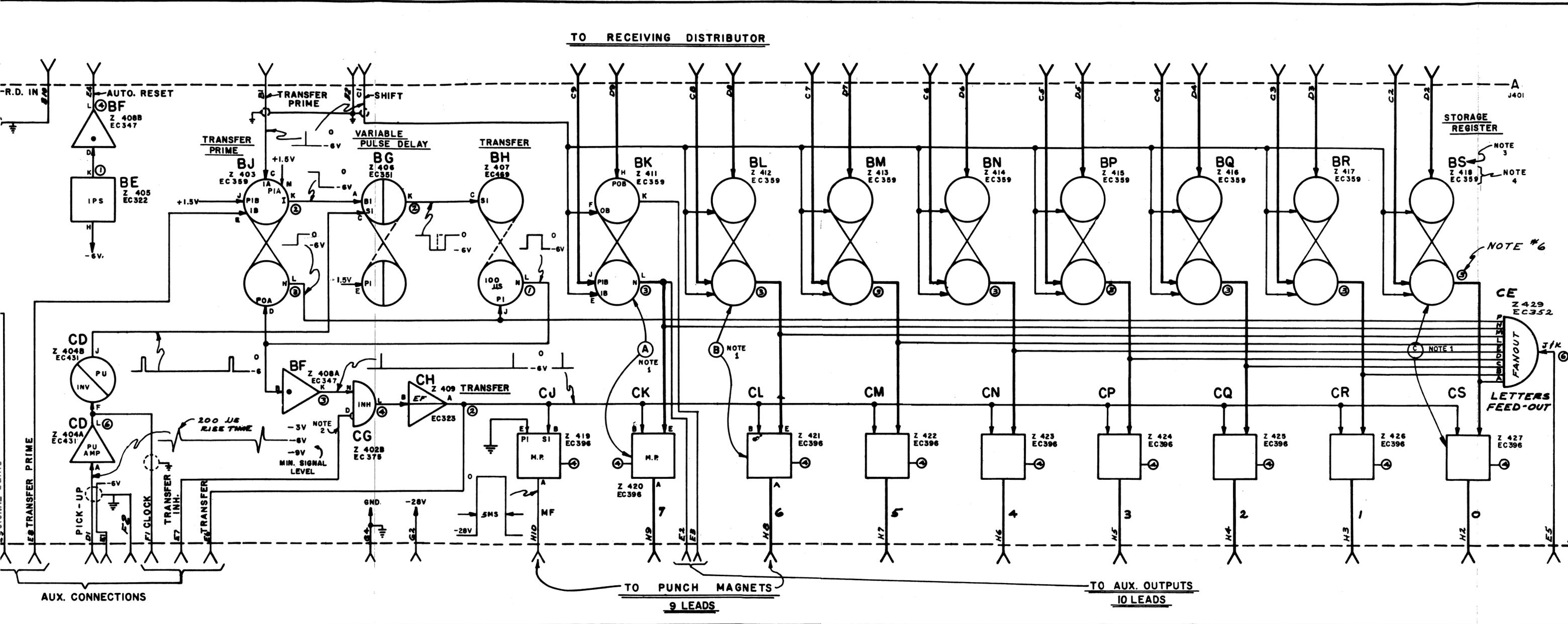
SUBJECT	DIAGRAM NUMBER	DIAGRAM ISSUE
→ Signal Generator (Sender & Receiver)	7029WD	4
→ Automatic Answer (DATASPEED Receiver)	7279WD	3
Relay Driver (2)	146520	3
Relay Driver and Receiving Input Amplifier	146521	2
(NPN) Emitter Follower and Inhibit Gate	172321	3
Integrator Pulse Shaper	172322	2
Symmetrical Emitter Follower	172323	2
Inverter and Pulse Amplifier	172324	4
Output Amplifier and Voltage Bias	172325	2
Pulse Amplifier and Emitter Follower (PNP)	172326	4
(NPN) Emitter Follower (2)	172333	5
Pulse Amplifier (2)	172347	8
→ Variable Pulse Delay (0.41 to 1.3 Milliseconds)	172351	8
Diode Fan-Out Gate	172352	3
Receiver Input Amplifier	172355	2
Flip-Flop	172359	5
Integrator	172361	0
Filter (2)	172363	0
Variable One-Shot (0.65 to 2.2 Milliseconds)	172365	3
Diode Gates (3)	172374	8
Inhibit Gate (2)	172375	5
Diode Gates (4)	172385	6
Start-Stop Oscillator (1050 Baud)	172394	5
Fixed One-Shot (200 Microseconds)	172395	4
→ Magnet Pulser	172396	7
(PNP) Inverter (2)	172401	4
Squaring Amplifier	172420	4
Pick-Up Amplifier	172431	13
Fixed One-Shot (100 Microseconds)	172469	8
→ Variable One-Shot (0.9 to 1.5 Milliseconds)	172473	13
Single Delay (50 Microseconds)	172490	7
Inhibit Gate and Relay Driven (Special)	172497	6
Time Delay Relay Driver	177543	4
→ Transmitter Start Recognizer Logic	303650	5

- NOTES**
- 1 TTSC 500 (5 & 6 LEVEL CODE) - CIRCUIT ELEMENTS Z 206A & Z 206B ARE OMITTED - TTSC 800 (7 & 8 LEVEL CODE) Z 206A AND Z 206B ARE INCLUDED.
 - 2 DENOTES POSITION IN MODULE
 - 3 Z NUMBER DENOTES CIRCUIT ELEMENT AND EC NUMBER REFERS TO CIRCUIT BOARD.
 - 4 FOR ACTUAL WIRING DIAGRAM REFER TO 3835WD
 - 5 NUMBER IN CIRCLE DENOTES TEST POINT ON CIRCUIT CARD.
 - 6 WITH REGARD TO OUTPUT WAVEFORMS ALL RISE TIMES SHOULD BE 6 μSECS OR LESS WITH VOLTAGE LEVELS OF -6V ±.4V TO 0V WITH THE EXCEPTION OF INTEGRATOR EC361, SIGNAL OUT EC325, AND PICKUP AMPLIFIER



3831WD		
REVISIONS		
ISSUE	DATE	AUTH. NO.
A	1-10-61	72625
B	11-1-61	71487
C	2-9-62	72630
D	4-6-62	73039
SCHEMATIC DIAGRAM FOR HIGH SPEED TRANSMITTING SIGNAL CONVERTER		
TTSC 500 AND TTSC 800		
DATE: 12-7-59		
P.D. FILE NO. 1-1134AA		
DRAWN BY: WCHKD. ENGR. E.H.P. APPD. [Signature]		
TELETYPE CORPORATION		
3831WD		

212-A3



VARIATIONS IN APPARATUS CODES CHART

COMPONENTS OMITTED OR INCLUDED - OMIT X INCLUDE

CODE - TRSC	600	700	800
A			
B			
C			

LEVEL	6	7	8
A			X
B		X	X
C	X	X	X

3833WD

REVISIONS

ISSUE	DATE	AUTH. NO.
A	6-19-61	70239
B	8-24-61	71476
C	8-9-62	72630
D	4-6-62	75039
E	6-28-64	82090
F	7-18-69	96799

APPROVALS

DATE 11-27-59
 P.D. FILE NO. 1-47,134AA
 DRAWN BY CHKD. JWP
 ENGD. EWP APPD. JWP

TELETYPE CORPORATION

3833WD

NO	NOTES
1	REFER TO VARIATIONS IN APPARATUS CODE CODES CHART
2	AT -6V WHEN AUXILIARY CONNECTIONS ARE NOT USED.
3	DENOTES POSITION IN MODULE
4	Z NUMBER DENOTES CIRCUIT ELEMENT AND EC NUMBER REFERS TO CIRCUIT BOARD
5	FOR ACTUAL WIRING DIAGRAM REFER TO 3837WD
6	NUMBER IN CIRCLE DENOTES TEST POINT ON CIRCUIT CARD.
7	WITH REGARD TO OUTPUT WAVE FORMS OF EC355, EC351, EC469 AND EC359 ALL RISE TIMES AND FALL TIMES SHOULD BE 6 MICROSECONDS OR LESS, ALL OTHER OUTPUTS RISE TIMES SHOULD BE 6 MICROSECONDS OR LESS UNLESS OTHERWISE SPECIFIED.

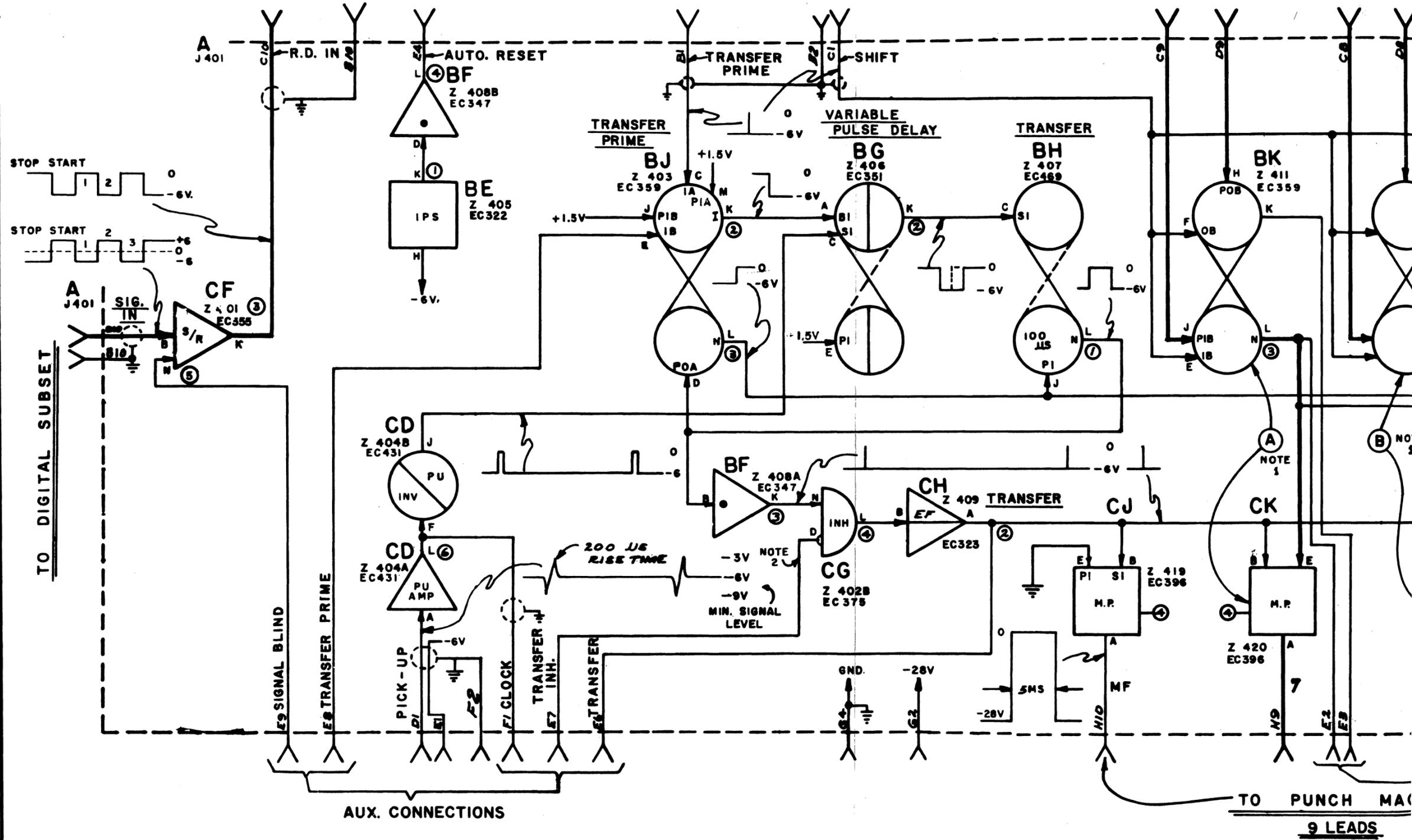


CHART-TRANSMITTING TERMINAL OPERATING CONDITIONS

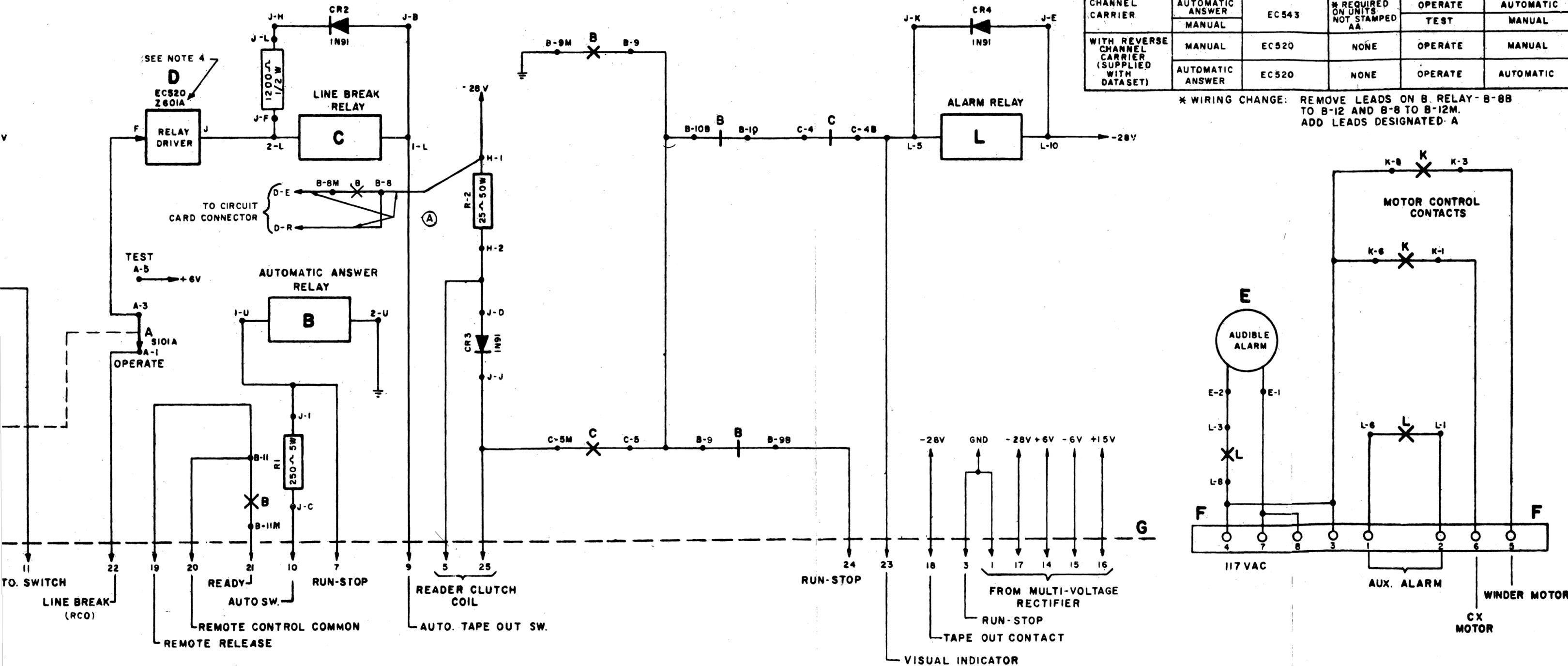
CONDITIONS		CIRCUIT CARD USED	WIRING CHANGE	TEST-OPERATE SWITCH	AUTOMATIC MANUAL SWITCH
WITHOUT REVERSE CHANNEL CARRIER	MANUAL	EC 520	NONE REQUIRED	TEST	MANUAL
	AUTOMATIC ANSWER	EC 543	* REQUIRED ON UNITS NOT STAMPED AA	OPERATE	AUTOMATIC
	MANUAL			TEST	MANUAL
WITH REVERSE CHANNEL CARRIER (SUPPLIED WITH DATASET)	MANUAL	EC 520	NONE	OPERATE	MANUAL
	AUTOMATIC ANSWER	EC 520	NONE	OPERATE	AUTOMATIC

* WIRING CHANGE: REMOVE LEADS ON B RELAY - B-8B TO B-12 AND B-8 TO B-12M. ADD LEADS DESIGNATED: A

3843 WD

REVISIONS

ISSUE	DATE	AUTH NO.
1	5-4-62	73356
2	10-4-62	74728
3	11-11-62	92421-RC



APPROVALS

D AND E OF M

E-NUMBER

PROD. NO. 3843WD

SCHEMATIC WIRING DIAGRAM FOR DATASPEED LINE BREAK AND AUTOMATIC ANSWER. (TRANSMITTER)

DATE 19-OCT-61

P.D. FILE NO. 1-11344

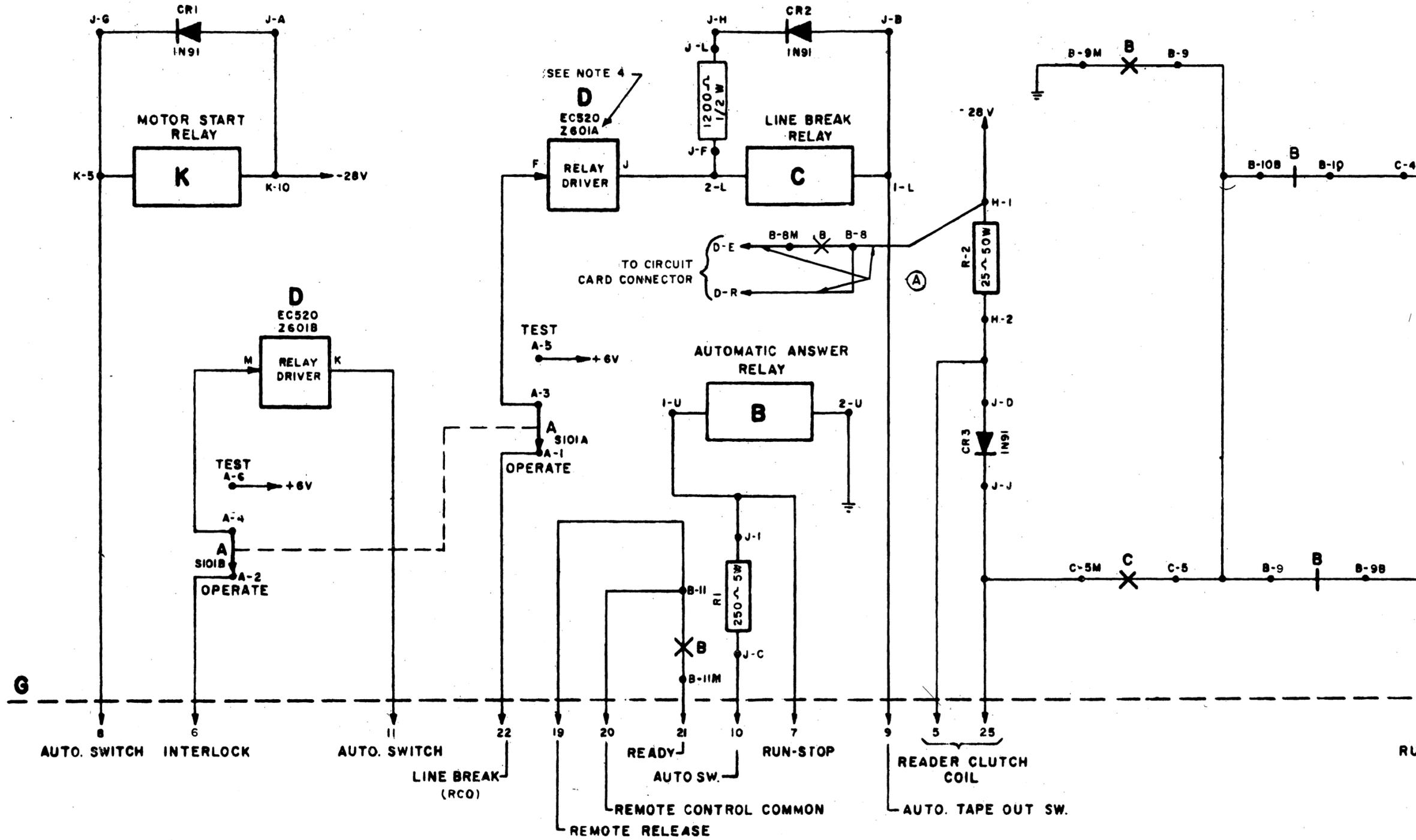
DRAWN BY CHKD

ENGD. CJR APPR

TELETYPE CORPORATION

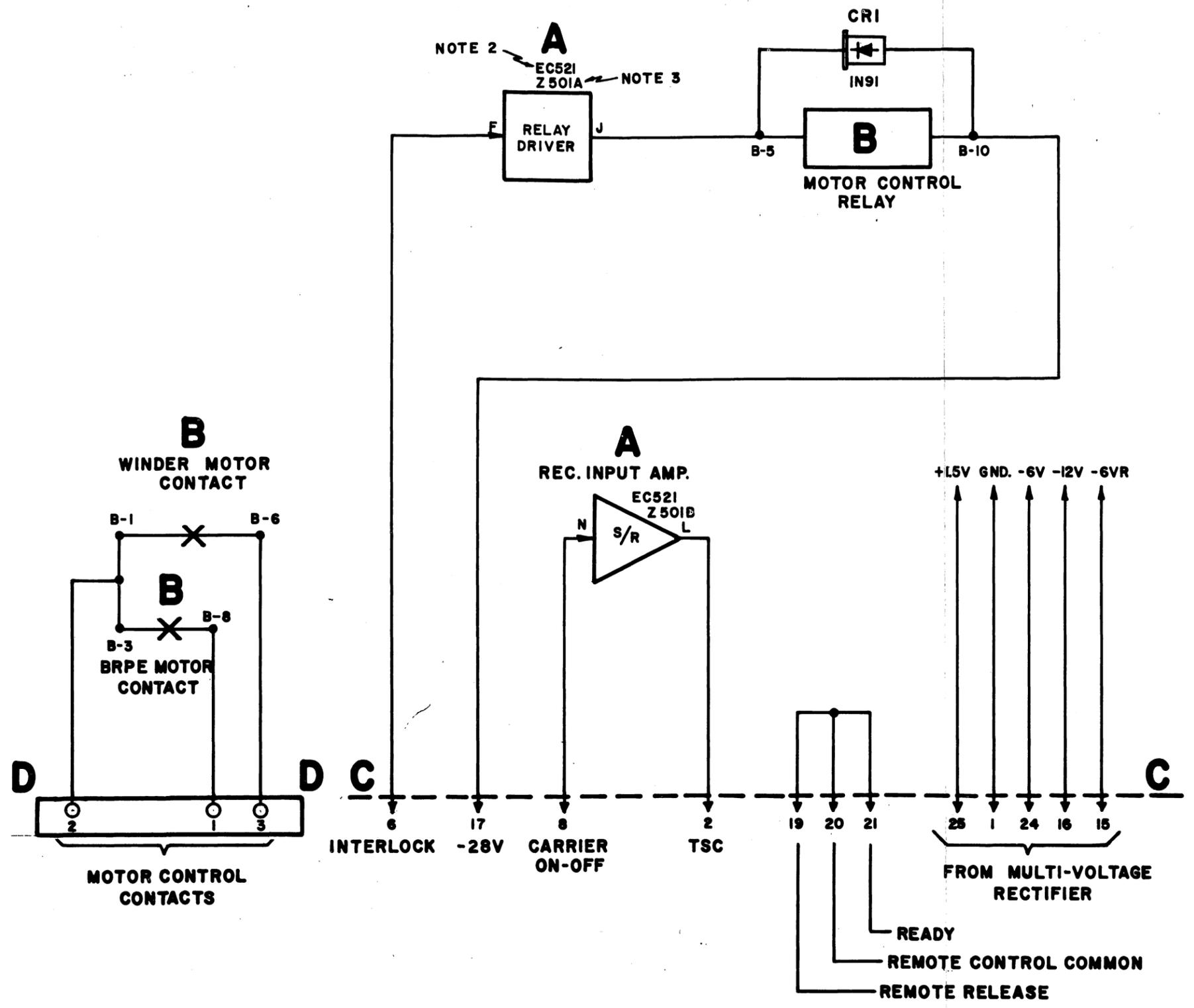
3843 WD

NO	NOTES
1	FOR ACTUAL WIRING DIAGRAM REFER TO 3842WD
2	EC NUMBER DENOTES CIRCUIT CARD NUMBER
3	Z NUMBER DENOTES CIRCUIT ELEMENT.
4	SEE CHART REGARDING TRANSMITTING TERMINAL OPERATING CONDITIONS.



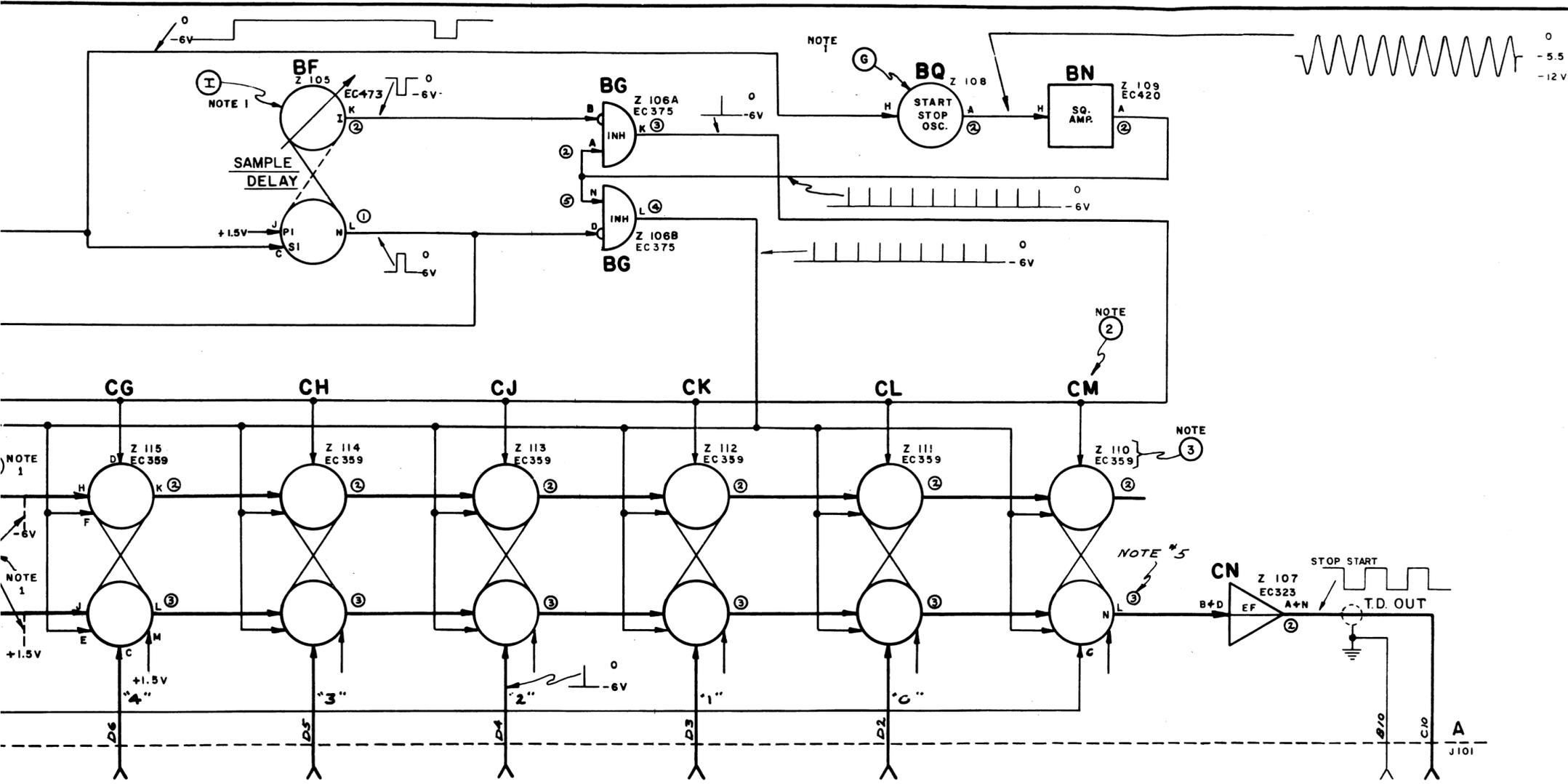
NO.	NOTES
1	FOR ACTUAL WIRING DIAGRAM REFER TO 3844 WD
2	DENOTES CIRCUIT CARD NUMBER
3	DENOTES CIRCUIT ELEMENT

3845 WD		
ISSUE	DATE	AUTH. NO.

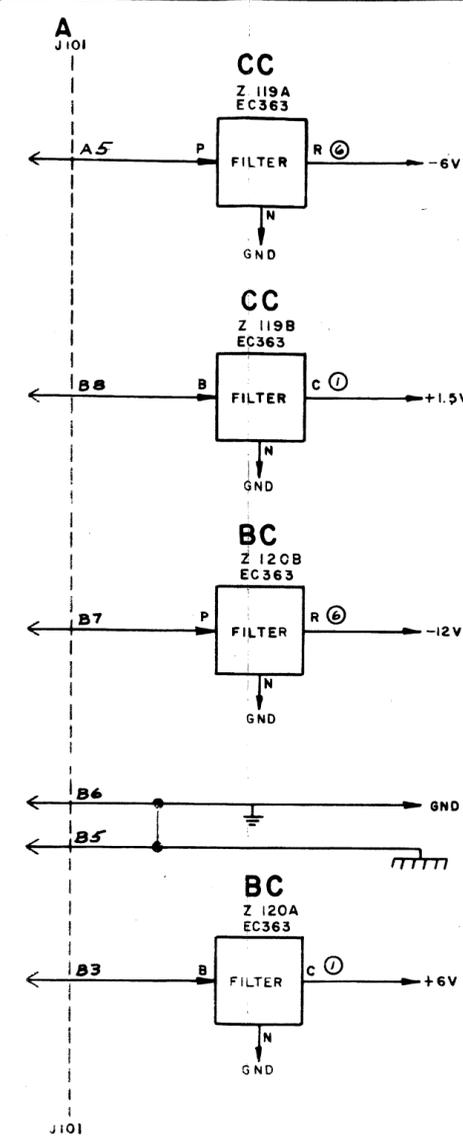


SCHEMATIC WIRING
DIAGRAM FOR
DATASPEED AUTO-
MATIC ANSWER.
(RECEIVER)

APPROVALS	
D AND R	E OF M
<i>[Signature]</i>	<i>[Signature]</i>
E-NUMBER	
PROD. NO. 3845WD	
DATE: 16-OCT.-61	
P.D. FILE NO. 1-11.134AA	
DRAWN SW	CHKD
ENGD. CJR	APPD
TELETYPE CORPORATION	
3845 WD	



SET "I" FROM SIGNAL CONVERTER



VARIATIONS IN APPARATUS CODES CHART

CODE - TTD	COMPONENTS OMITTED OR INCLUDED																
	501				601				701				801				
BAUD	600																
LEVEL	5				6				7				8				
A	EC 359	-	-	-	X	-	-	-	X	-	-	-	X	-	-	-	X
B	EC 359	-	-	X	X	-	-	X	X	X	X	X	X	X	X	X	X
C	EC 359	-	X	X	X	-	X	X	X	X	X	X	X	X	X	X	X
D	STRAPS	-	-	X	-	-	-	X	-	-	X	-	-	X	-	-	-
E	STRAPS	-	X	-	-	-	X	-	-	-	-	-	-	-	-	-	-
F	STRAPS	X	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-
G	START-STOP OSCILLATOR	EC391 (1.66ms)				EC392 (1.33ms)				EC393 (1.11ms)				EC394 (0.952ms)			
H	ADJUST TO	1600us				1250us				1040us				900us			
I	ADJUST TO	825us				650us				500us				475us			

CODE-TTD	603
BAUD	1050
LEVEL	6
A	EC359
B	EC359
C	EC359
D	STRAPS
E	STRAPS
F	STRAPS
G	START-STOP OSCILLATOR 0.952MS
H	ADJUST TO 900us
I	ADJUST TO 475us

4439WD

REVISIONS

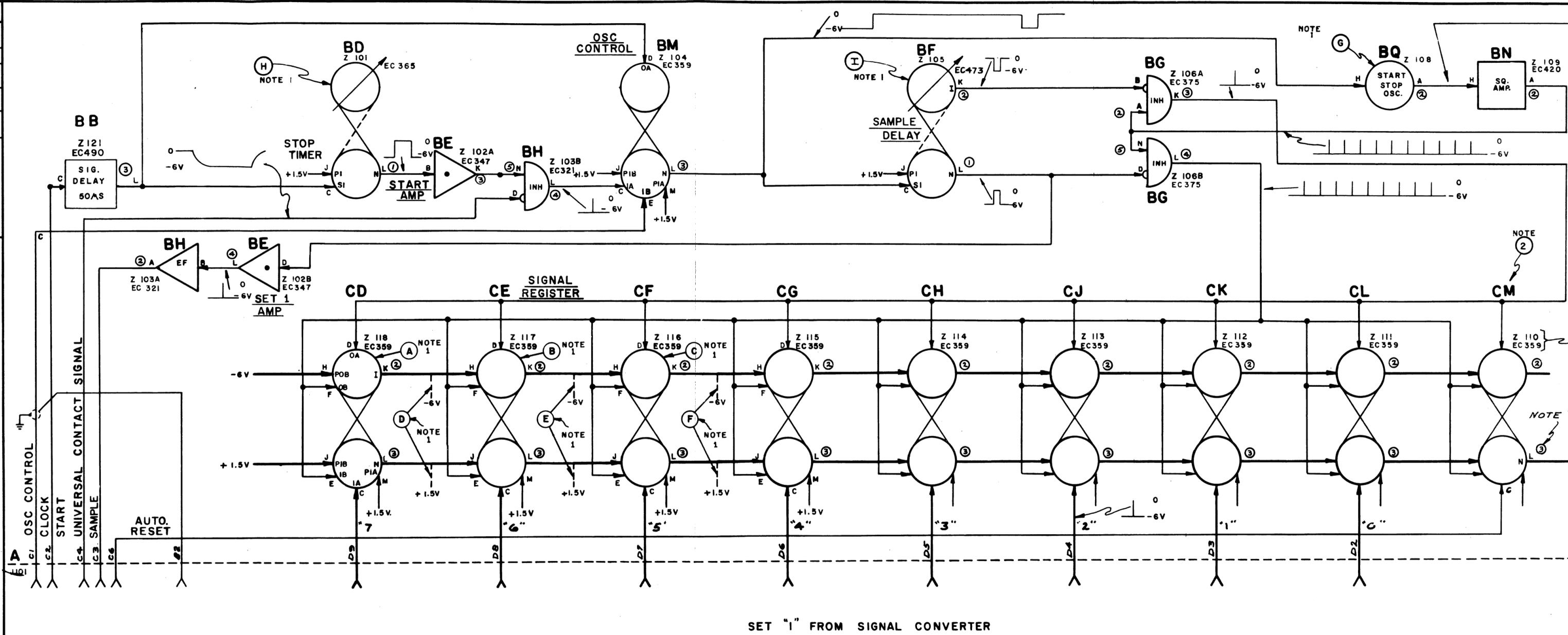
ISSUE	DATE	AUTH. NO.
A	1-1-61	7487
B	7-9-61	72428
C	4-6-62	73039

SCHEMATIC DIAGRAM FOR HIGH SPEED TRANSMITTING DISTRIBUTOR

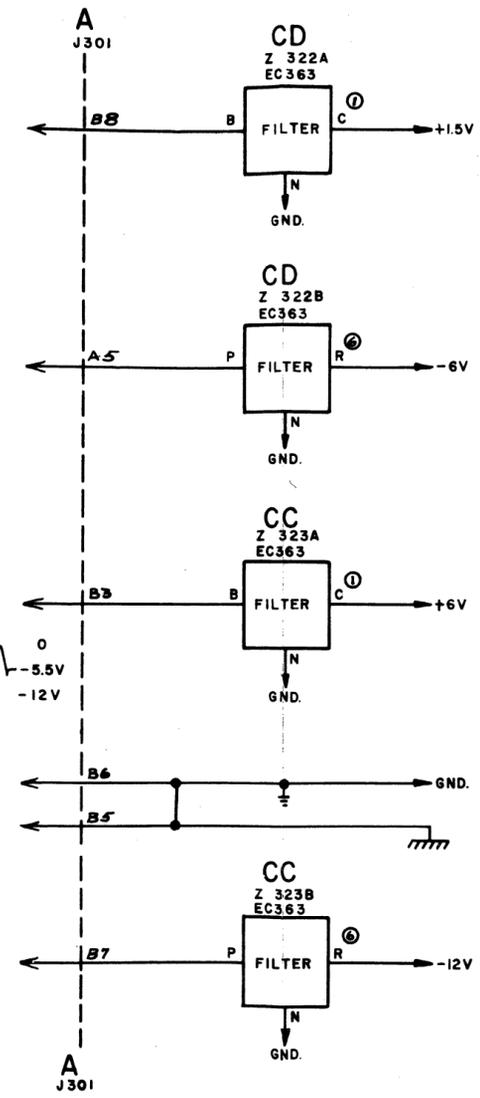
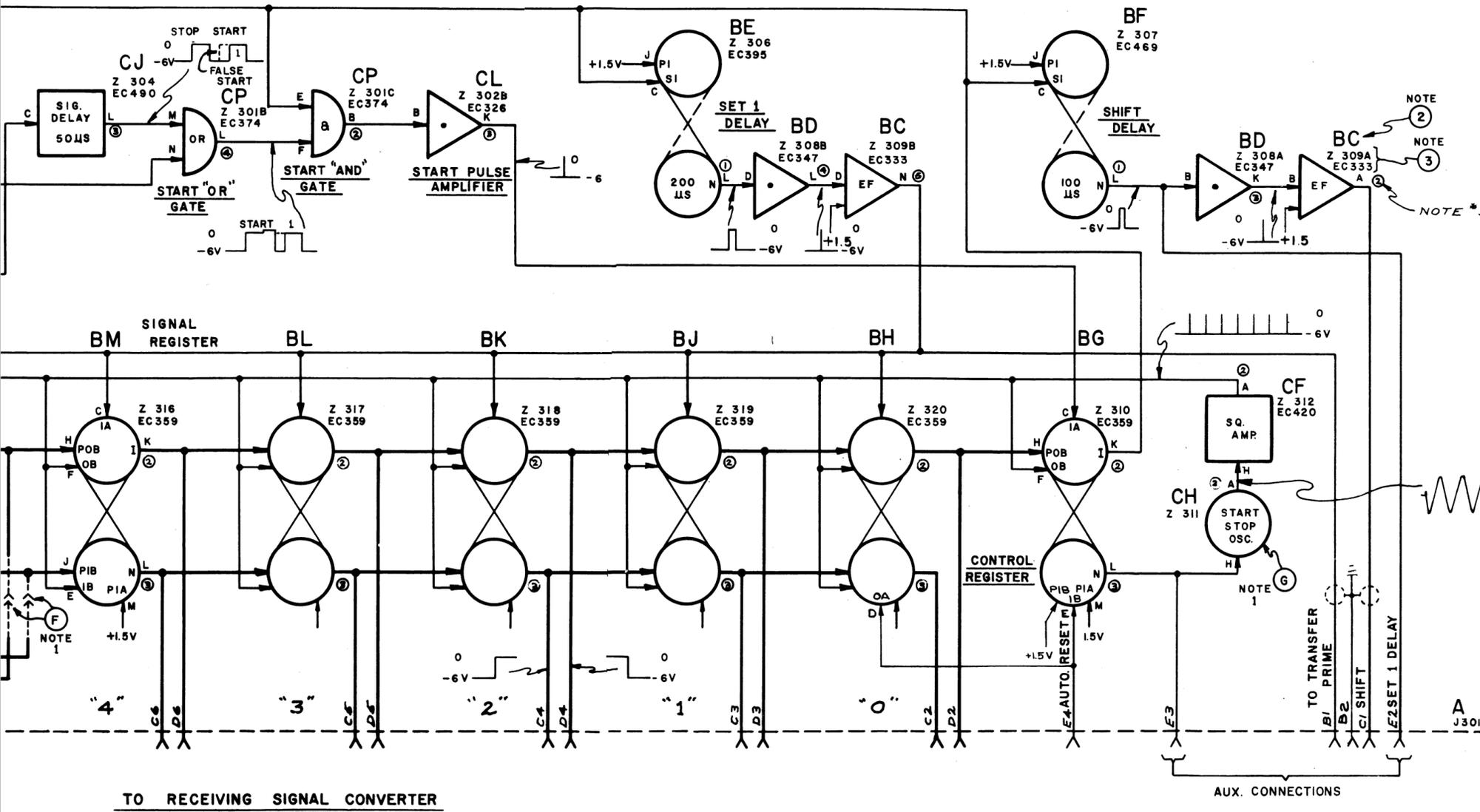
TTD 501 TO 502
601 TO 603
701 TO 703
801 TO 804

DATE 14-APRIL-61
P.D. FILE NO. 1-11-3422
DRAWN J.W. CHKD J.H.
ENGD. EXP. APPR. J.H.
TELETYPE CORPORATION
4439WD

- NO NOTES
- 1 REFER TO VARIATIONS IN APPARATUS CODES CHART
 - 2 DENOTES POSITION IN MODULE
 - 3 Z NUMBER DENOTES CIRCUIT ELEMENT AND EC NUMBER REFERS TO CIRCUIT BOARD.
 - 4 FOR ACTUAL WIRING DIAGRAM REFER TO 4438WD.
 - 5 ② NUMBER IN CIRCLE DENOTES TEST POINT ON CIRCUIT CARD.
 - 6 WITH REGARD TO OUTPUT WAVEFORMS OF EC365, EC473 AND EC359 RISE AND FALL TIMES SHOULD BE 6 μSECS OR LESS WITH VOLTAGE LEVELS OF -6V ± 4V TO 0V OR SLIGHTLY POSITIVE. ALL OTHER OUTPUTS SHOULD HAVE RISE TIMES OF 6 μSECS OR LESS WITH THE EXCEPTION OF START-STOP OSCILLATOR.



SET "1" FROM SIGNAL CONVERTER



VARIATIONS IN APPARATUS CODES CHART

COMPONENTS OMITTED OR INCLUDED - OMIT X INCLUDE

CODE - TRD	501	601	701	801	502	602	702	802	703	803	804	
BAUD	600				750				900	1050		
LEVEL	5	6	7	8	5	6	7	8	7	8	8	
A EC 359	-	-	-	X	-	-	-	X	-	X	X	
B EC 359	-	-	X	X	-	-	X	X	X	X	X	
C EC 359	-	X	X	X	-	X	X	X	X	X	X	
D STRAPS	-	-	X	-	-	-	X	-	X	-	-	
E STRAPS	-	X	-	-	-	X	-	-	-	-	-	
F STRAPS	X	-	-	-	X	-	-	-	-	-	-	
G START-STOP OSCILLATOR	EC391 (1.66ms)				EC392 (1.33ms)				EC393 (1.11ms)	EC394 (0.95ms)		
H ADJUST TO	1600us ± 100 us				1330us ± 100 us				1100us ± 100us	950us		
I ADJUST TO	82.5us				65.0us				50.0us	47.5us		
J EQUIP. WITH	EC365				EC365				EC365	EC365		

CODE - TRD	603
BAUD	1050
LEVEL	6
A EC 359	-
B EC 359	-
C EC 359	X
D STRAPS	-
E STRAPS	X
F STRAPS	-
G START-STOP OSCILLATOR	EC394 (0.95ms)
H ADJUST TO	2.9ms ± .1us
I ADJUST TO	475 us
J EQUIP. WITH	EC475

4441WD

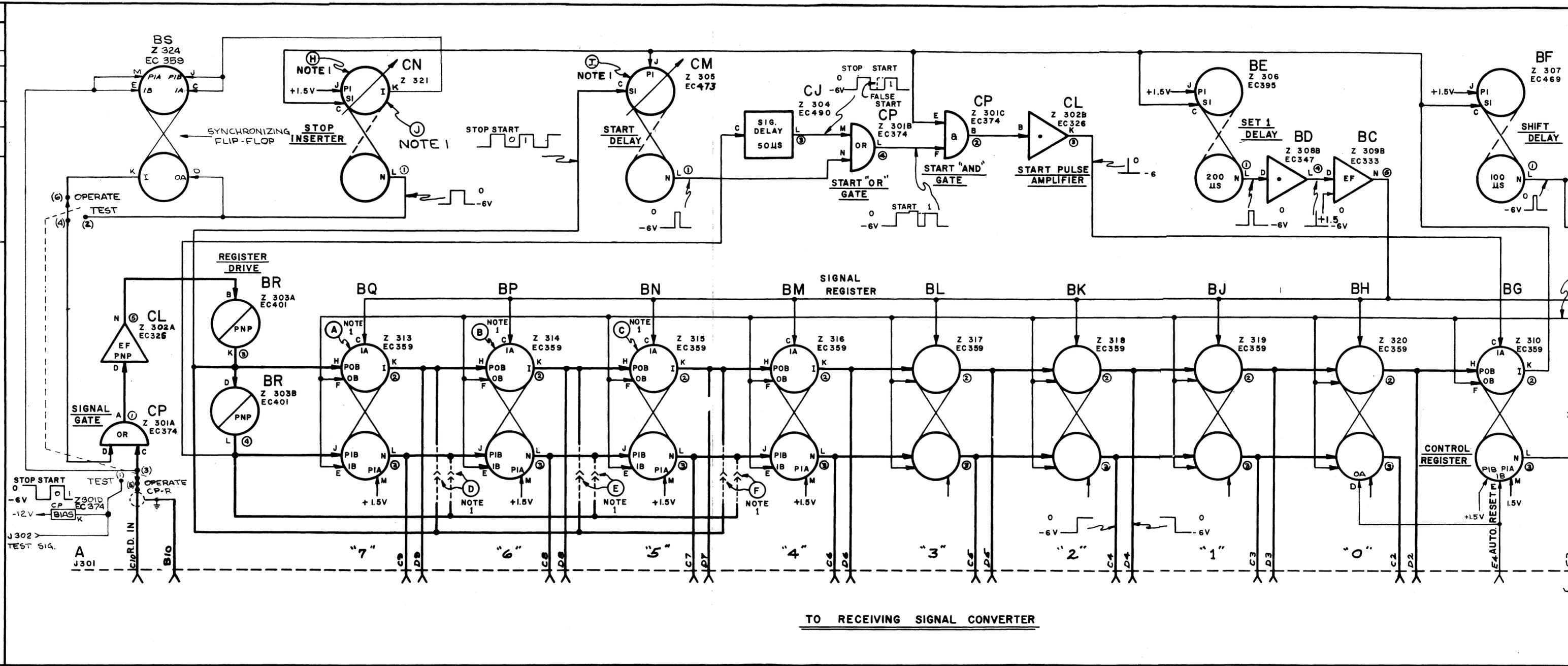
REVISIONS

ISSUE	DATE	AUTH. NO.
A	10-11-61	71401
B	10-24-61	71476
C	2-9-62	72430
D	4-6-62	73039
E	8-14-62	73193
F	10-8-62	74731

SCHEMATIC DIAGRAM FOR HIGH SPEED RECEIVING DISTRIBUTOR
TRD 501 TO 502
601 TO 603
701 TO 703
801 TO 804

DATE: 13-APRIL-61
P.D. FILE NO. 1-22.134AA
DRAWN BY: CHKD: ENGD. EXP. APPD.: TELETYPE CORPORATION
4441WD

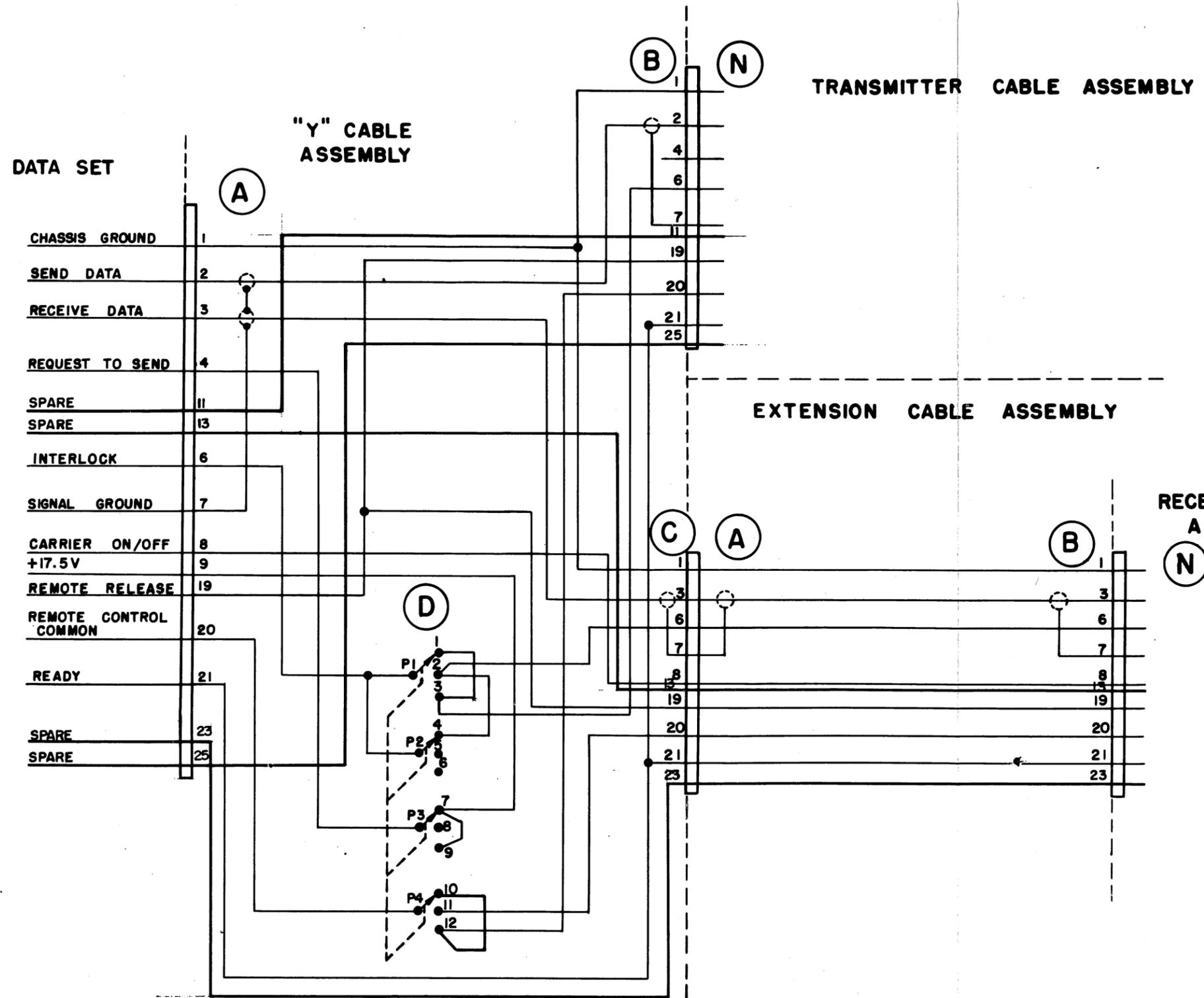
NO.	NOTES
1	REFER TO VARIATIONS IN APPARATUS CODES CHART.
2	DENOTES POSITION IN MODULE
3	Z NUMBER DENOTES CIRCUIT ELEMENT AND EC NUMBER REFERS TO CIRCUIT BOARD.
4	FOR ACTUAL WIRING DIAGRAM REFER TO 4440WD
5	② NUMBER IN CIRCLE DENOTES TEST POINT ON CIRCUIT CARD.
6	WITH REGARD TO OUTPUT WAVEFORMS OF EC365, EC473, EC469, EC490, EC374, AND EC359 RISE TIMES AND FALL TIMES SHOULD BE 6 μSECS OR LESS WITH VOLTAGE LEVELS FROM -6V ± .4V TO 0 VOLTS OR SLIGHTLY POSITIVE. ALL OTHER OUTPUTS SHOULD HAVE RISE TIMES OF 6 μSECS. OR LESS WITH THE EXCEPTION OF START-STOP OSCILLATOR.



TO RECEIVING SIGNAL CONVERTER

4799 WD

ISSUE	DATE	AUTH. NO.
A	2-16-62	72539
B	2-19-62	72488
C	5-31-62	73817



RECEIVER CABLE ASSEMBLY

TRANSMITTER CABLE ASSEMBLY

EXTENSION CABLE ASSEMBLY

"Y" CABLE ASSEMBLY

DATA SET

SCHEMATIC DIAGRAM
FOR
TRANSMIT-RECEIVE
TERMINAL
MODIFICATION KIT

APPROVALS

D AND R E OF M

E-NUMBER:

PROD. NO. 4799 WD

DATE:

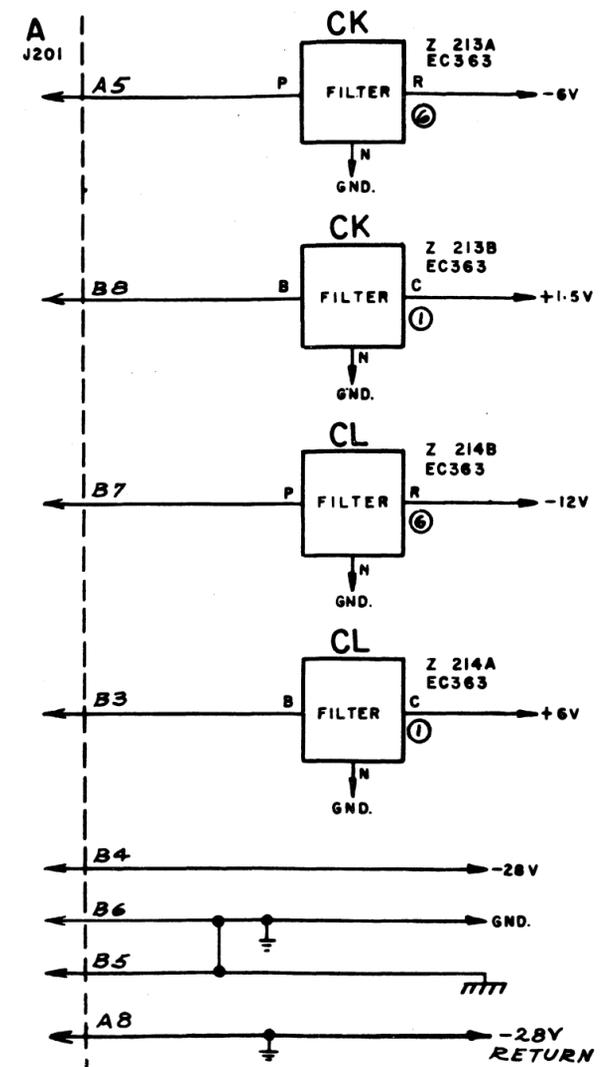
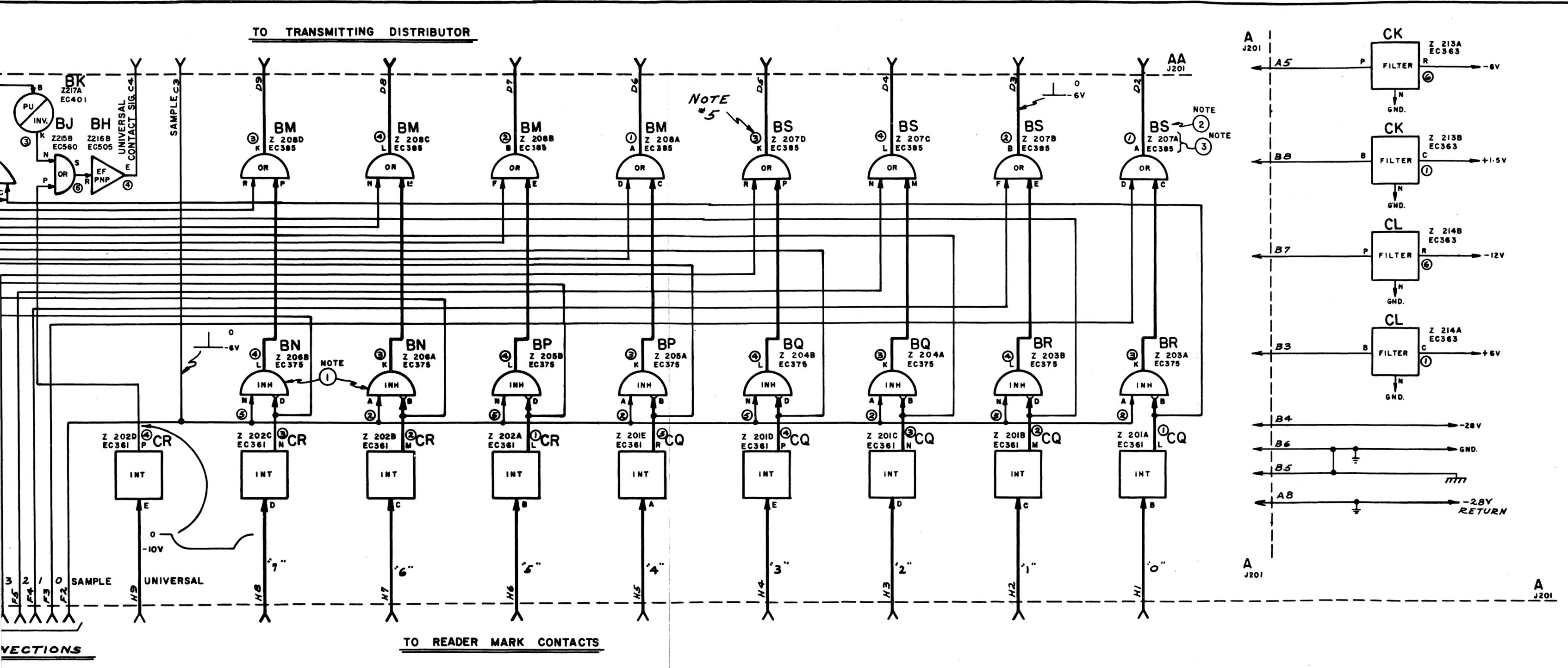
P.D. FILE NO. 1-22.134 RR

DRAWN E. E. CHKD. O. H.

ENG. O. L. H. APPD. M. A. S.

TELETYPE
CORPORATION

4799 WD



5917 WD

REVISIONS		
ISSUE	DATE	AUTH. NO.
A	3-13-62	76320

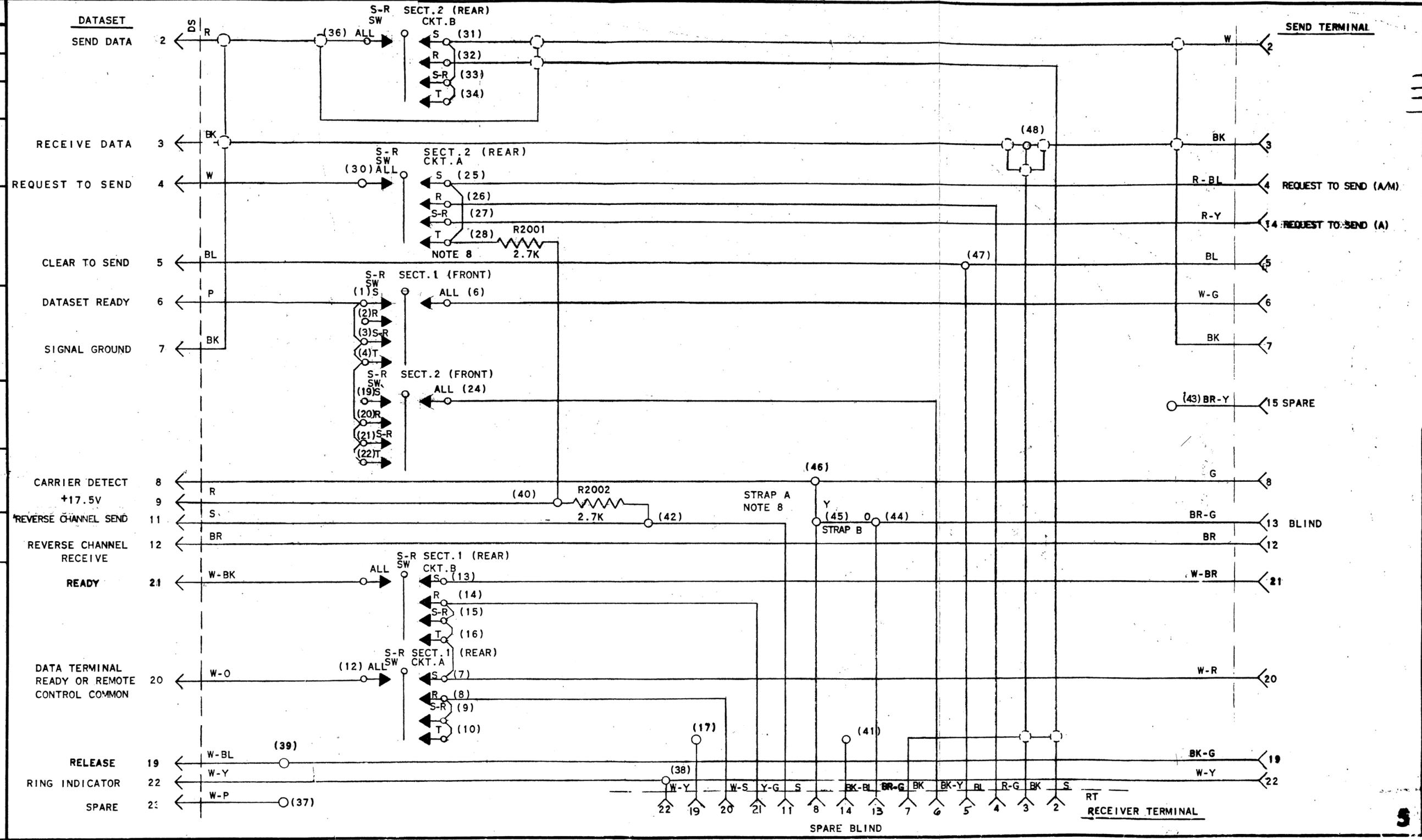
PROD. NO. 5917 WD
 DATE: 10-26-62
 P.D. FILE NO. 1-11134AA
 DRAWN BY: WJ/CHKD: JN
 ENGR: EHP/APPD: RJK

TELETYPE CORPORATION

5917 WD

SCHMATIC DIAGRAM FOR HIGH SPEED TRANSMITTING SIGNAL CONVERTER W/RUBOUT DELETE TTSC 501 AND TTSC 801

- NO NOTES
- REFER TO 199620 FOR ACTUAL WIRING.
 - ALL VOLTAGES DC.
 - ALL RESISTORS 1/2 WATT AND RESISTANCE VALUES IN OHMS.
 - ← INDICATES TERMINALS ON PLUG DS
↘ INDICATES TERMINALS ON RECEPTACLES ST AND RT.
 - COLOR CODE:
W - WHITE BK - BLACK
P - PURPLE S - SLATE
O - ORANGE R - RED
BL - BLUE G - GREEN
BR - BROWN Y - YELLOW
 - POSITION DESIGNATIONS ON THE SEND-RECEIVE SWITCH (S-R) ARE AS FOLLOWS:
S - SEND
R - RECEIVE
S-R - SEND-RECEIVE
T - TEST
 - TERMINAL DESIGNATIONS ENCLOSED IN PARENTHESES REFER TO TERMINALS ON THE S-R SWITCH. THE TERMINAL DESIGNATIONS ARE FOR REFERENCE AND ARE NOT MARKED ON THE S-R SWITCH.
 - REMOVE RESISTOR R2001 AND STRAP A WHEN CONNECTED TO 1A OR 2A DATASPEED SENDERS EQUIPPED WITH A 199551 PROTECTED UNATTENDED TRANSMITTER MODIFICATION KIT.



7024 WD

REVISIONS		
ISSUE	DATE	AUTH. NO.
2	1-6-65	82828
3	1-13-67	91426
4	3-30-67	91426-2
5	2-21-69	96951-RC

SCHEMATIC WIRING DIAGRAM FOR DATASPEED "W" CABLE ASSEMBLY ASSEM. NO. 199620

APPROVALS

D AND R E OF M

E-NUMBER

PROD. NO. 7024WD

RD FILE NO. 1-A148/134AA

DATE 3/17/84

DRAWN GJM CHKD [Signature]

ENGD. WRF APPD. [Signature]

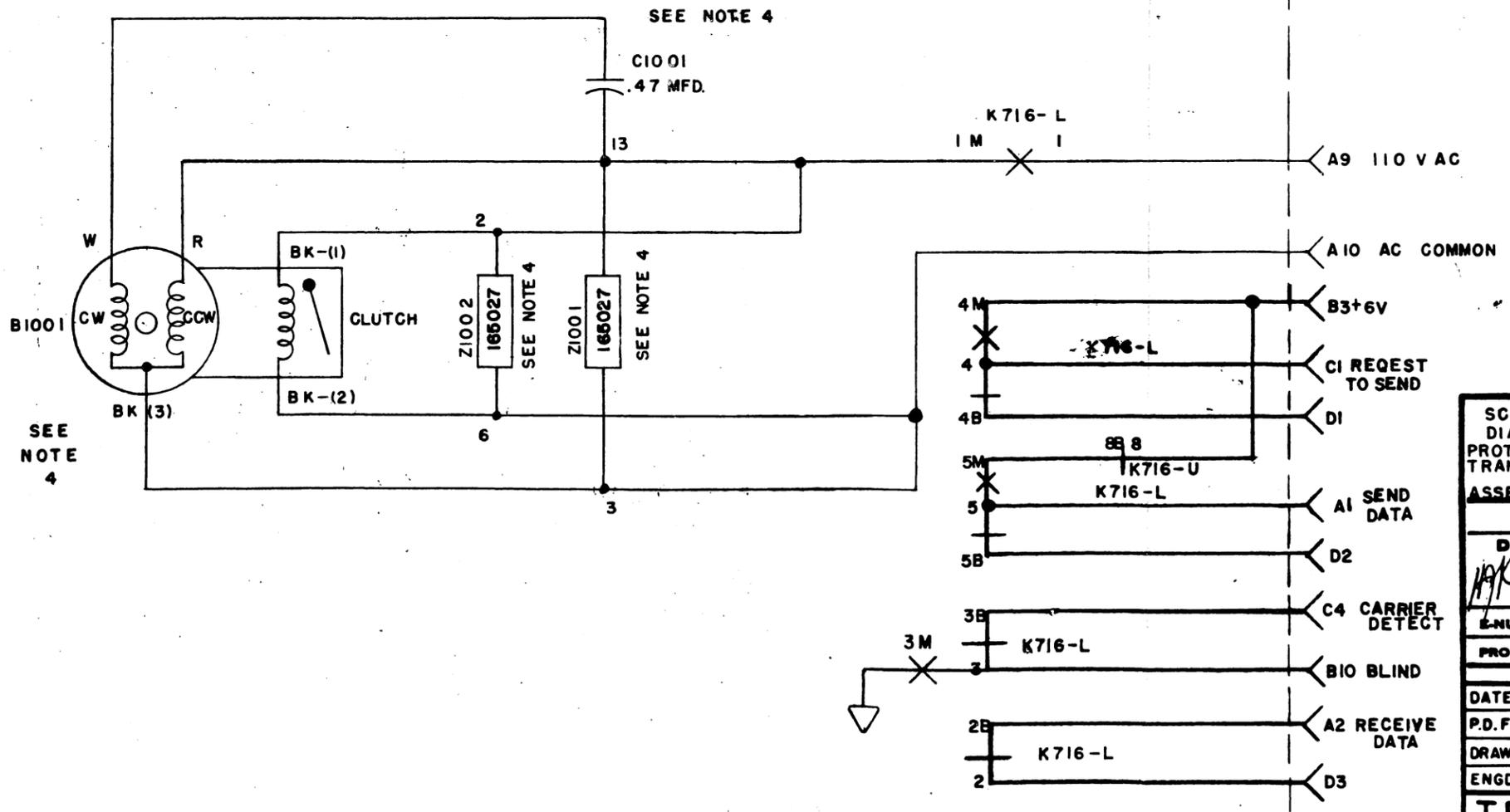
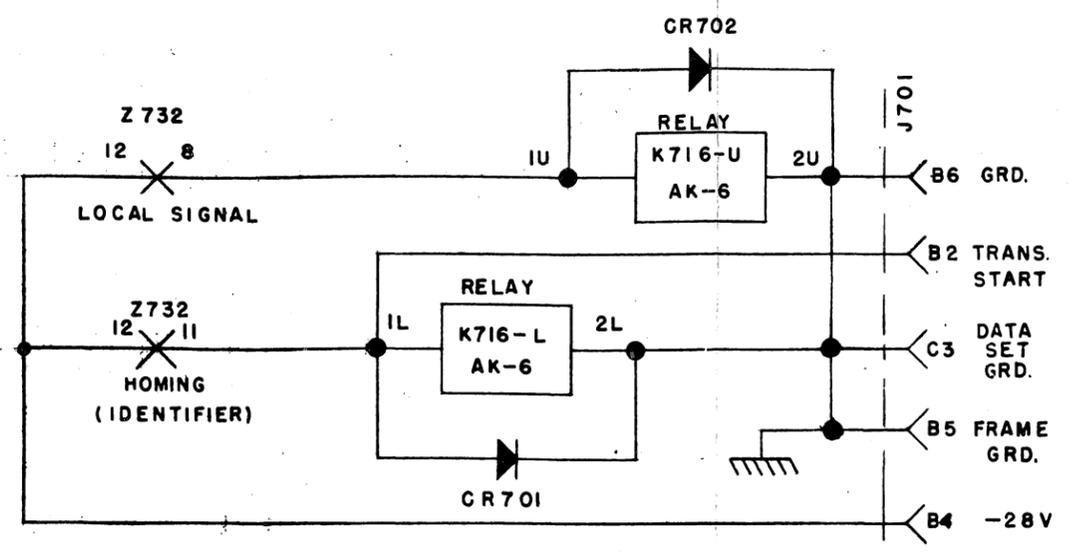
TELETYPE CORPORATION

7024 WD

- NO. NOTES
- REFER TO 7026WD FOR ACTUAL WIRING DIAGRAM.
 - ALL VOLTAGES DC EXCEPT TERMINAL A9 & A10 ON CONNECTOR J701.
 - INDICATES TERMINAL ON RECEPTACLE J701.
 - B1001, C1001, Z1001 & Z1002 ARE ASSOCIATED WITH Z732 PART NUMBER 199570, 7029 WD & 7030WD.
 - TERMINAL DESIGNATIONS ENCLOSED IN PARENTHESES ARE NOT MARKED ON THE COMPONENT.
 - Z732 TERMINAL CONNECTIONS REFER TO TERMINAL CONNECTIONS ON P702 WHICH CONNECTS TO Z732.

7025 WD

REVISIONS		
ISSUE	DATE	AUTH. NO.
2	3-13-64	81044
3	12-9-64	82824
4	8-18-65	87498
5	9-10-65	87498-2



SCHEMATIC WIRING DIAGRAM FOR PROTECTED UNATTENDED TRANSMITTER IDENTIFIER MODULE ASSEMBLY NO. 199552

APPROVALS

D AND R	EOPM
<i>[Signature]</i>	<i>[Signature]</i>

E-NUMBER
PROD. NO. 7025WD

DATE: 11-16-63
P.D. FILE NO. 1-A148/134AA
DRAWN G.J.M. CHKD. *[Signature]*
ENGD. W.R.F. APPD. *[Signature]*

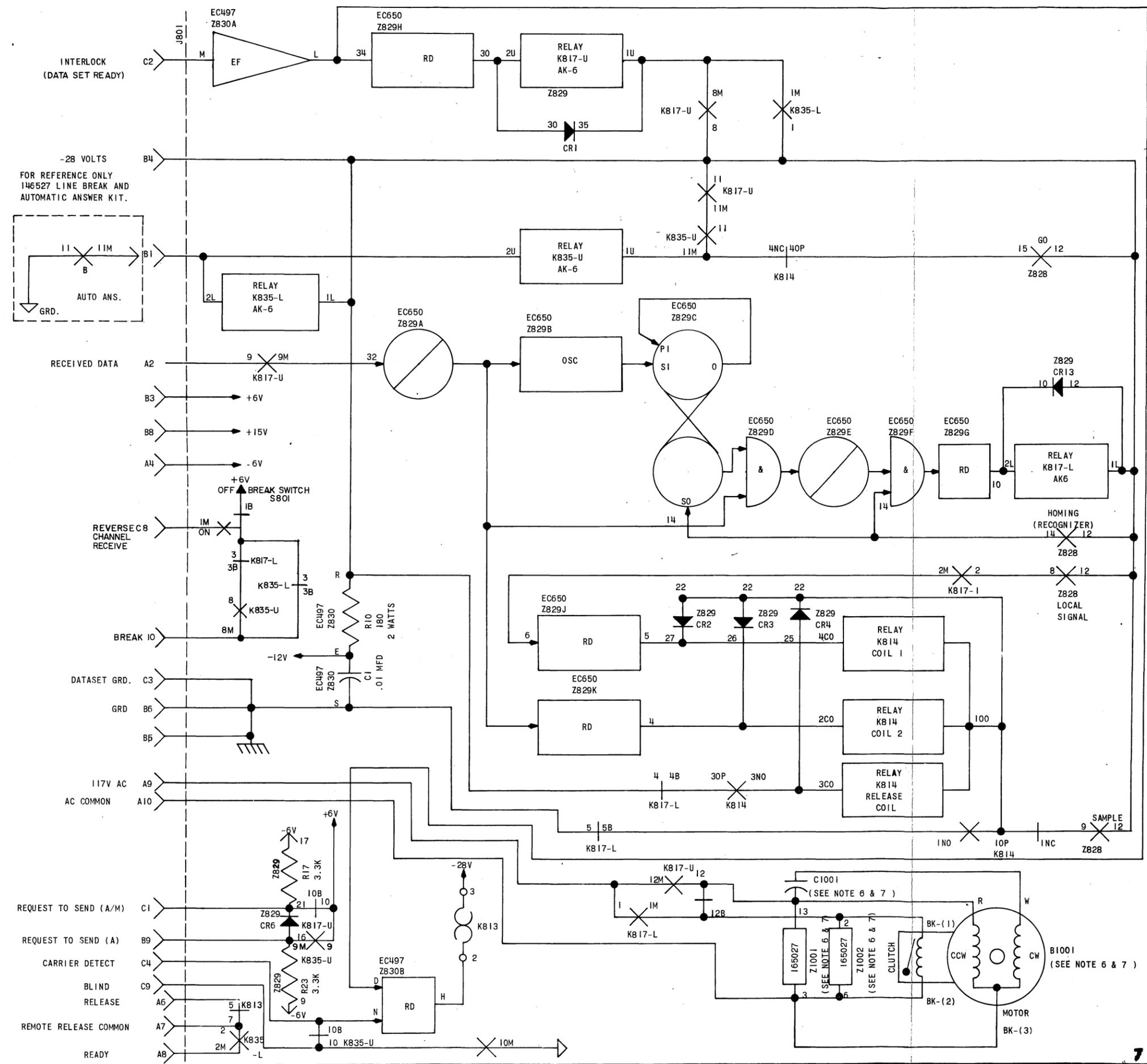
TELETYPE CORPORATION
7025 WD

7027 WD

REVISIONS

ISSUE	DATE	AUTH. NO.
2	6-8-64	82363
3	8-31-64	83261
4	12-9-64	82824
5	8-18-65	87498
6	9-10-65	87498-2
7	2-21-69	96951-RC

- NOTES
- REFER TO 7028WD FOR ACTUAL WIRING DIAGRAM.
 - ALL VOLTAGES DC EXCEPT TERMINALS A9 & A10 ON J801.
 - TERMINAL DESIGNATIONS ENCLOSED IN PARENTHESES ARE NOT MARKED ON COMPONENTS.
 - ALL RESISTORS 1/2 WATT UNLESS OTHERWISE SPECIFIED.
 - INDICATES TERMINATION ON RECEPTACLE J801.
 - B1001, C1001, Z1001 & Z1002 ARE ASSOCIATED WITH Z828, PART NUMBER 199570, 7029WD & 7030WD.
 - Z828 TERMINAL CONNECTIONS REFER TO TERMINAL CONNECTIONS ON P802 WHICH CONNECT TO Z828.



SCHEMATIC
WIRING DIAGRAM
FOR
PROTECTOR UNATTENDED
TRANSMITTER
RECOGNIZER
MODULE
ASSEMBLY NO. 199555

APPROVALS

D AND R	E OF M
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E-NUMBER	
PROD. NO.	7027WD
DATE	1-9-63
P.D. FILE NO.	1A148/134.A
DRAWN	R.P. CHKD.
ENGD.	J.K. APPD.

TELETYPE
CORPORATION

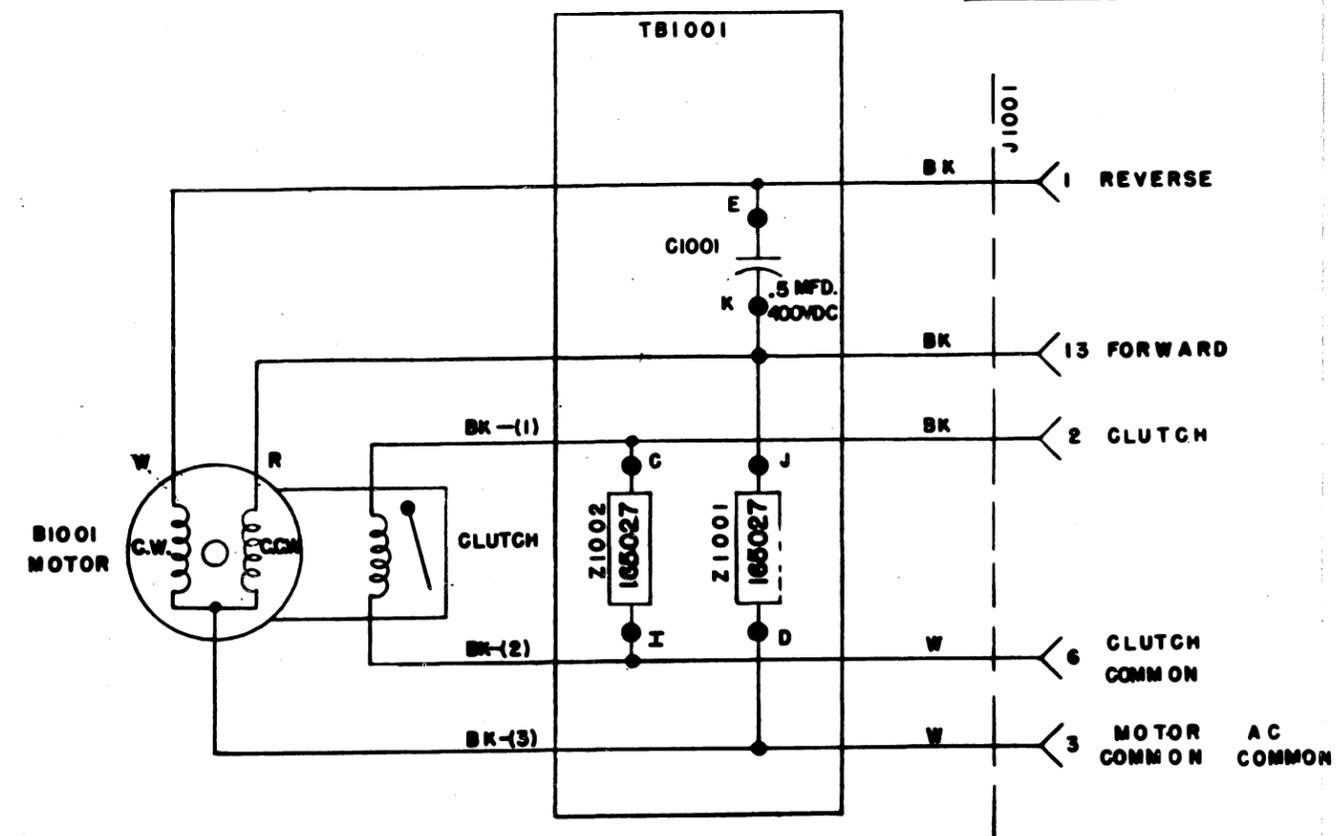
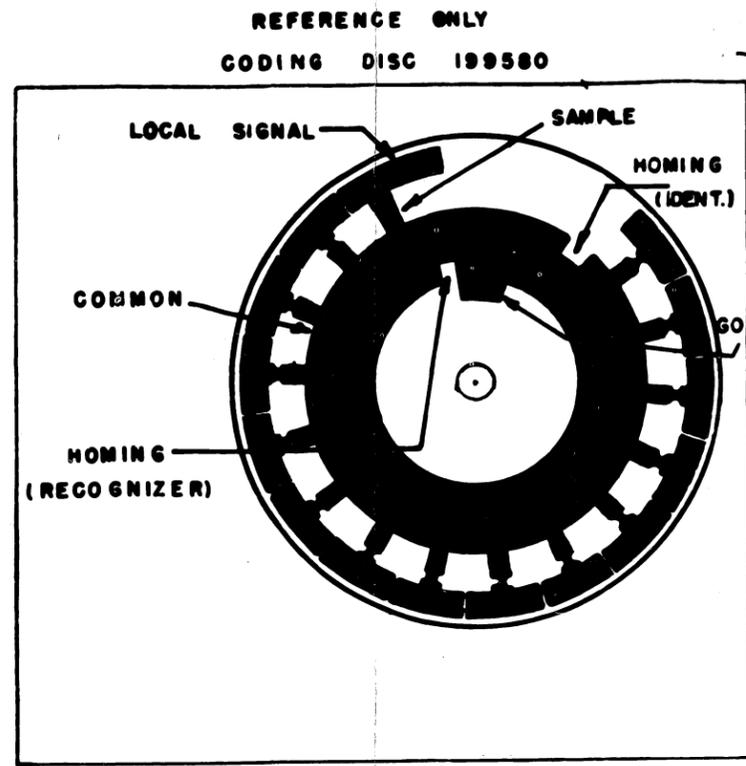
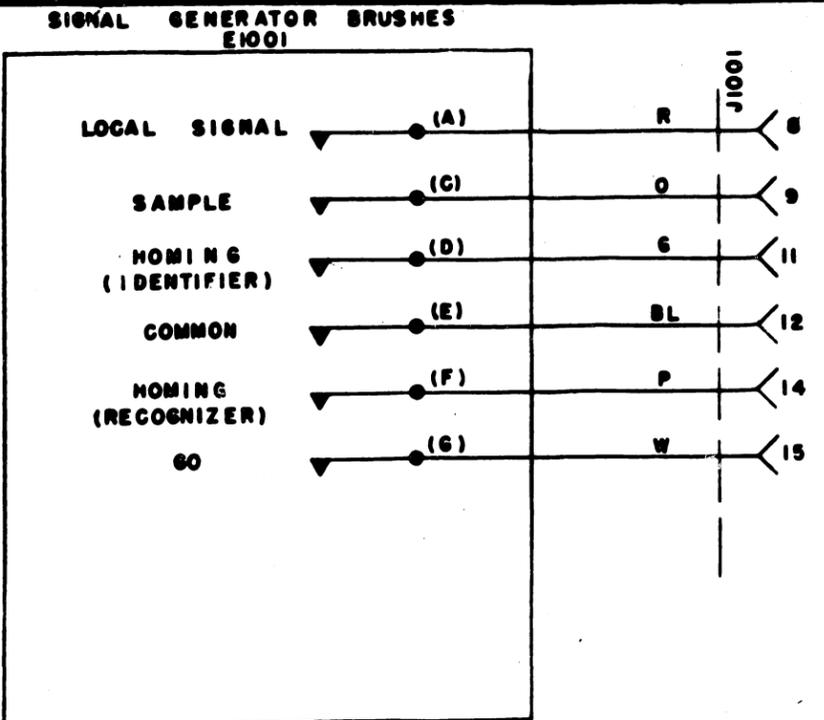
7027 WD

7029 WD

REVISIONS

ISSUE	DATE	AUTH. NO.
2	8-8-65	87498
3	9-10-65	87498-2
4	4-14-69	9918

- NOTES**
- REFER TO 7030WD FOR ACTUAL WIRING DIAGRAM.
 - TERMINAL DESIGNATIONS ENCLOSED IN PARENTHESES ARE NOT MARKED ON THE COMPONENT.
 - INDICATES TERMINAL ON RECEPTACLE J1001.
 - COLOR CODE:
 W - WHITE BK - BLACK
 P - PURPLE R - RED
 O - ORANGE G - GREEN
 BL - BLUE
 - J1001 TERMINAL VOLTAGES MAY VARY WITH APPLICATION AS FOLLOWS:
 A - 117 VAC E - -6VDC I - NOT USED
 B - AC COMMON F - -12VDC
 C - +6VDC G - -28VDC
 D - GRD H - -48VDC
- | ASSEMBLY USED ON | TERMINAL | | | | | | | | | | | | | | |
|------------------|----------|---|---|---|---|----|----|----|----|----|--|--|--|--|--|
| | 1 | 2 | 6 | 8 | 9 | 11 | 12 | 13 | 14 | 15 | | | | | |
| 199552 | I | A | 8 | 6 | I | 6 | 6 | A | I | I | | | | | |
| 199555 | I | A | B | 6 | 6 | I | 6 | A | 6 | 6 | | | | | |



SCHMATIC DIAGRAM FOR SIGNAL GENERATOR ASSEMBLY ASSEMBLY NO. 199570

APPROVALS

DESIGNED BY: *[Signature]*
 CHECKED BY: *[Signature]*

PROD. NO. 7029 WD

DATE: 11-16-63
 P.D. FILE NO. 1-AM8/134AA
 DRAWN: G.J.M. CHKD: *[Signature]*
 ENGR. W.R.F. APPD. *[Signature]*

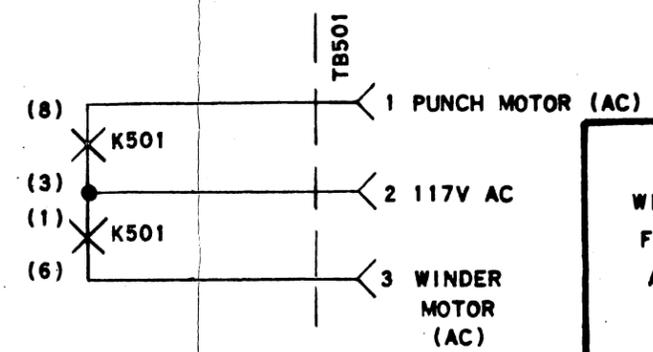
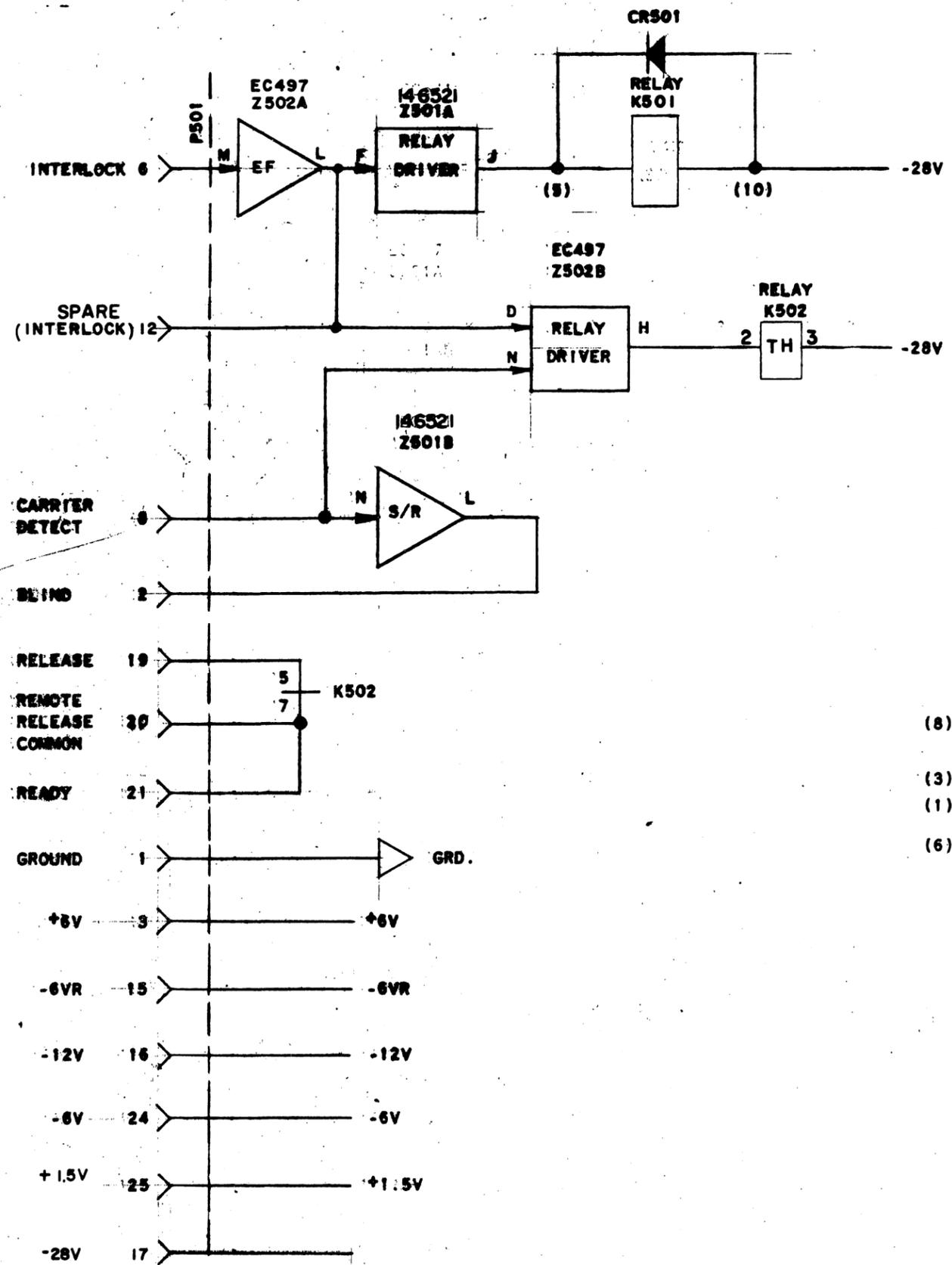
TELETYPE CORPORATION
 7029 WD

7279 WD

REVISIONS

ISSUE	DATE	AUTH. NO.
1	6-10-64	15685-R
2	4-26-66	R1893/T
3	2-13-67	95012-RC

- NO NOTES
- REFER TO 7278WD FOR ACTUAL WIRING DIAGRAM.
 - ALL VOLTAGES DC UNLESS OTHERWISE SPECIFIED.
 - TERMINAL DESIGNATIONS ENCLOSED IN PARENTHESES ARE FOR REFERENCE AND NOT MARKED ON THE RELAY K501.
 - INDICATES TERMINALS ON RECEPTACLE P501 AND TERMINAL BOARD TB501.



SCHEMATIC WIRING DIAGRAM FOR AUTOMATIC ANSWER ASSEM. (DATASPEED RECEIVER)

ASSEMBLY NO. 199593

APPROVALS

DESIGNED	BY
CHKD	BY
E-NUMBER	
PROD. NO. 7279WD	
DATE: 4/20/64	
P.D. FILE NO. 1-A148/134A	
DRAWN GJM	CHKD
ENGD. WRF	APPD.

TELETYPE CORPORATION

7279 WD

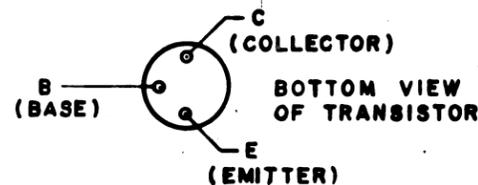
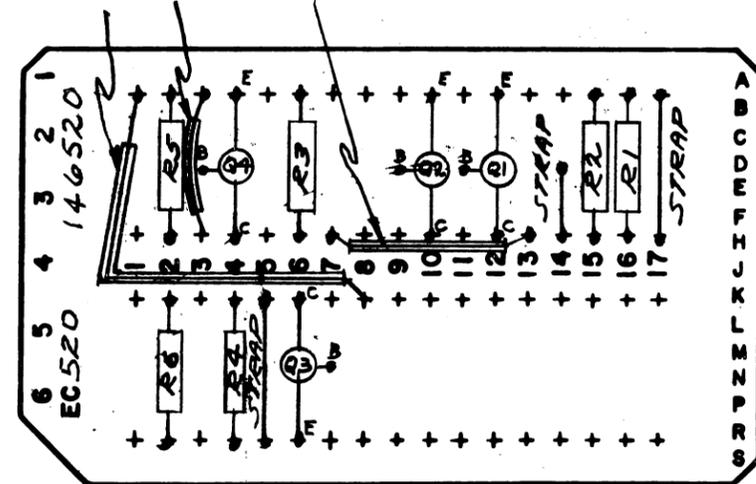
EC 520

RELAY DRIVER (2)

CIRCUIT BOARD EC 520

146520

INSULATED STRAPS



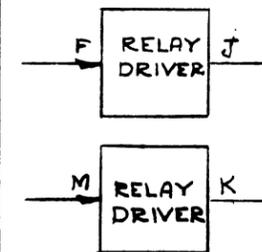
NOTE:
REFER TO 5016WD FOR MARKING
INFORMATION

REF. DESIGN	TELETYPE PART NO.	TOTAL QTY.	NAME AND DESCRIPTION	LOCATING	FUNCTION
R1	129851	2	resistor, Fixed 3300 .5W	Base	
R2	118180	2	resistor, Fixed 10K .5W	Bias	
R3	137442	2	resistor, Fixed 1500 .5W	Collector	
R4			Same as R1		
R5			Same as R3		
R6			Same as R2		
Q1	177105	2	Transistor P-22	Amplifier	
Q2	177224	2	Transistor 2N398A	Power	
Q3			Same as Q1		
Q4			Same as Q2		
EC	172067	1	Circuit Card Etched		
		3	Strap 24 AWG		
		3	Strap 24 AWG Insulated		
	144495	4	PAD, TRANSISTOR		

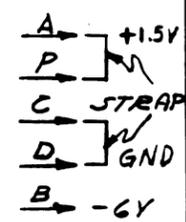
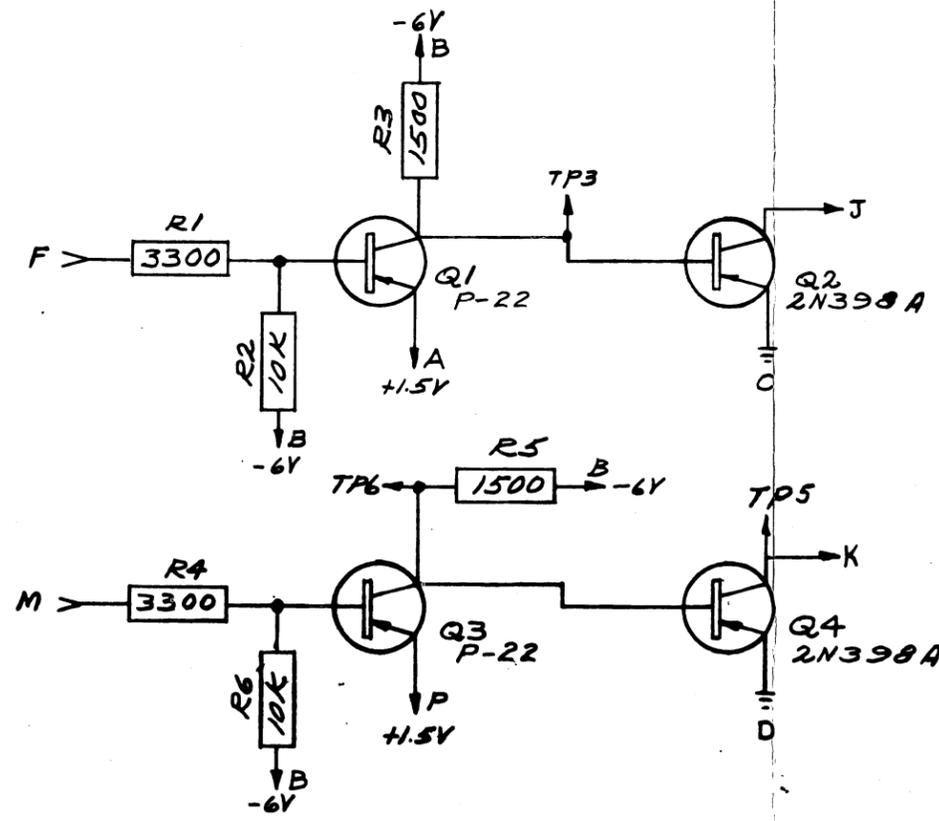
This card consists of two power amplifiers which can be used as Relay Drivers. The circuits will operate with inputs of +8 and Gnd. With +8 volts at input (F), Q1 is biased "OFF" and -6 volts appears on the base of Q2, which turns "ON" and energizes the relay. With Gnd. applied at input (F), Q1 is biased "ON" driving Q2 to cutoff by applying +1.5 volt to the base of Q2. With Q2 "OFF" the relay is not operated.

Relays which require operating voltages and currents greater than -30 volts and 100 ma. should not be used with these circuits.

SYMBOLS



ISSUE	DATE	AUTH NO
2	11-29-61	71786
3	1-2-62	72037



NOTE:
CARD CONNECTIONS ARE REPRESENTED BY LETTERS
TEST POINTS ARE REPRESENTED BY NUMBERS

APPROVALS

D AND R E OF M

E-NUMBER

PROD NO. 146520

DATE 10-OCT-61

PD FILE NO 1-11.134AA

DRAWN SK CHKD: H

ENGD CJR APPD: [Signature]

TELETYPE CORPORATION

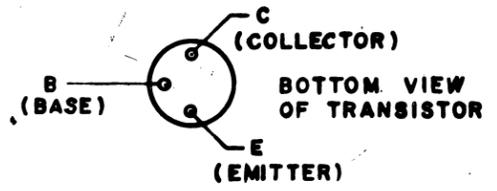
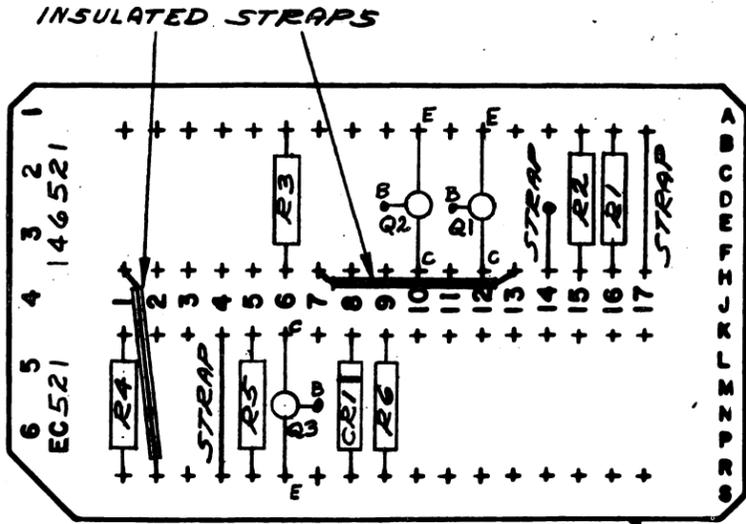
146520

EC.521

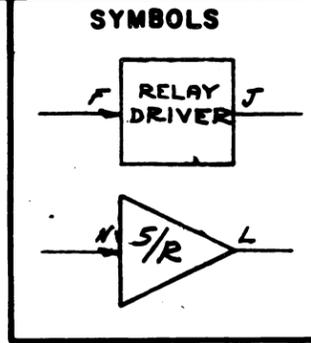
RELAY DRIVER &
REC. INPUT AMPLIFIER

CIRCUIT BOARD EC521

146521



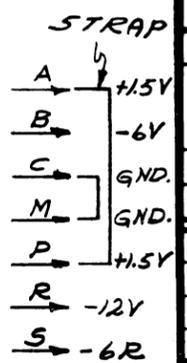
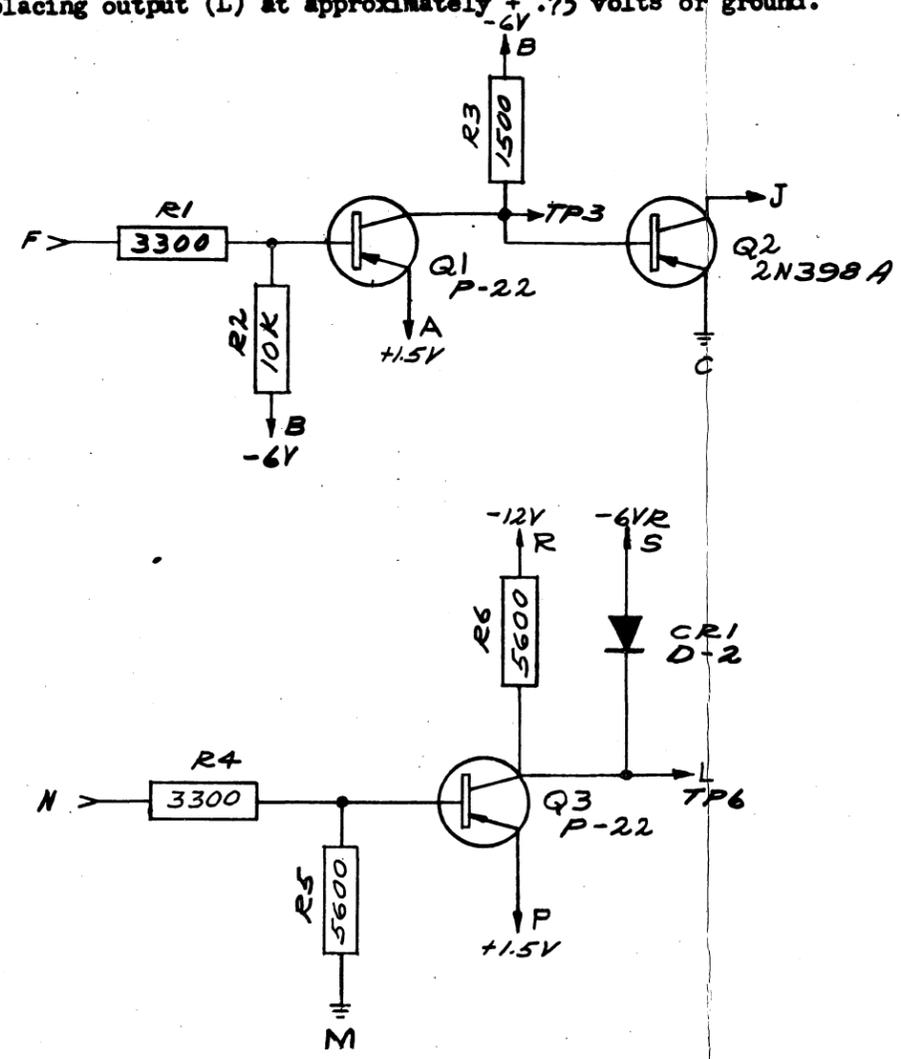
NOTE:
REFER TO 5016WD FOR MARKING
INFORMATION



ISSUE	DATE	AUTH. NO.
2	1-2-68	78031

This card consists of one Relay Driver Circuit and one Receiving Input Amplifier. The Relay Driver consists of Q1 and Q2 with Q2 not to be loaded greater than 30 volts or 100 ma. The circuit will operate with inputs of +8 and Gnd. With +8 volts applied at input (F) Q1 is biased "OFF" and -6 volts appears on the base of Q2 turning it "ON", thereby energizing the relay. With Gnd applied at input (F), Q1 is biased "ON" driving Q2 to cutoff by applying +1.5 volts to the base of Q2. With Q2 off, the relay is not operated.

The Receiving Input Amplifier is used to convert a + 8 volts signal into a zero, -6 volt output. With +8 at input (N), Q3 is biased "OFF" making output (L) a -6 volt. With -8 volts at input (N) Q3 is biased "ON" placing output (L) at approximately +.75 volts or ground.



REF. DESIGN	TELETYPE PART NO.	TOTAL QTY.	NAME AND DESCRIPTION	LOCATING FUNCTION
CR1	177108	1	Diode, D-2	Clamp
R1	129851	2	Resistor, Fixed 3300 .5W	Input Base
R2	118180	1	Resistor, Fixed 10K .5"	Bias
R3	137442	1	Resistor, Fixed 1500 .5W	Load
R4			Same as R1	
R5	118186	2	Resistor, Fixed 5600 .5W	Bias
R6			Same as R5	Load
Q1	177105	2	Transistor P-22	Amplifier
Q2	177224	1	Transistor 2N398A	Power
Q3			Same as Q1	
EC	172067	1	Circuit Card, Etched	
		3	Strap 24 AWG Bare	
		2	Strap 24 AWG Insulated	
	144495	3	PAD TRANSISTOR	

APPROVALS	
D AND R	E OF M
<i>[Signature]</i>	<i>[Signature]</i>
E-NUMBER	
PROD NO. 146521	
DATE 10-OCT-61	
P.D. FILE NO 1-11.134AA	
DRAWN <i>[Signature]</i>	CHKD <i>[Signature]</i>
ENGD <i>[Signature]</i>	APPD <i>[Signature]</i>
TELETYPE CORPORATION	
146521	

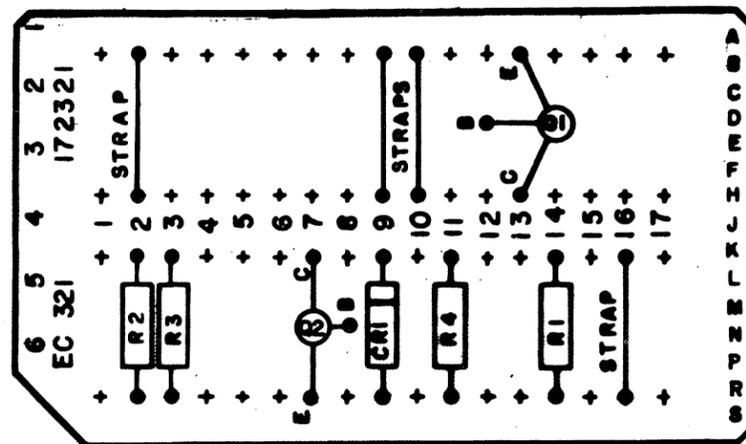
NOTE:
CARD CONNECTIONS ARE REPRESENTED BY LETTERS
TEST POINTS ARE REPRESENTED BY NUMBERS

EC 321

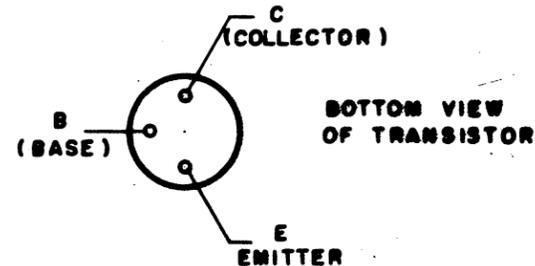
172321

CIRCUIT BOARD EC 321

172321



172065



NOTE:
REFER TO 5016WD FOR
MARKING INFORMATION

REF. DESIGN	TELETYPE PART NO.	TOTAL QTY.	NAME AND DESCRIPTION	LOCATING FUNCTION
R1	118186	3	RESISTOR FIXED 5600 OHMS	EMITTER LOAD
R2			SAME AS R1	BASE BIAS
R3	118146	1	RESISTOR FIXED 4700 OHMS	BASE BIAS
R4			SAME AS R1	COLLECTOR LOAD
CR1	177108	1	DIODE D-2	CLAMPING DIODE
Q1	177106	1	TRANSISTOR N-33	AMPLIFIER
Q2	177105	1	TRANSISTOR P-22	GATE
EC	172065	1	CIRCUIT CARD ETCHED	
		4	STRAPS - BARE 24 AWG	
	144495	2	PAD, TRANSISTOR	

(NPN) EMITTER FOLLOWER AND INHIBIT GATE

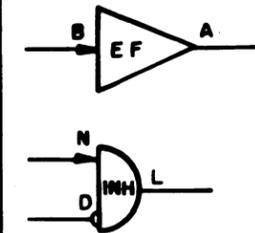
NPN EMITTER FOLLOWER

THIS CIRCUIT IS AN EMITTER FOLLOWER USED TO PROVIDE CURRENT GAIN WITH NO INVERSION OR CHANGE IN THE SIGNAL LEVEL. WITH ZERO VOLTS APPLIED AT THE BASE, ZERO VOLTS APPEARS AT THE EMITTER. THE NPN EMITTER FOLLOWER IS USED TO PROVIDE LOW OUTPUT IMPEDANCE (HIGH CURRENT GAIN) ON THE POSITIVE GOING VOLTAGE TRANSITION (-6 TO 0).

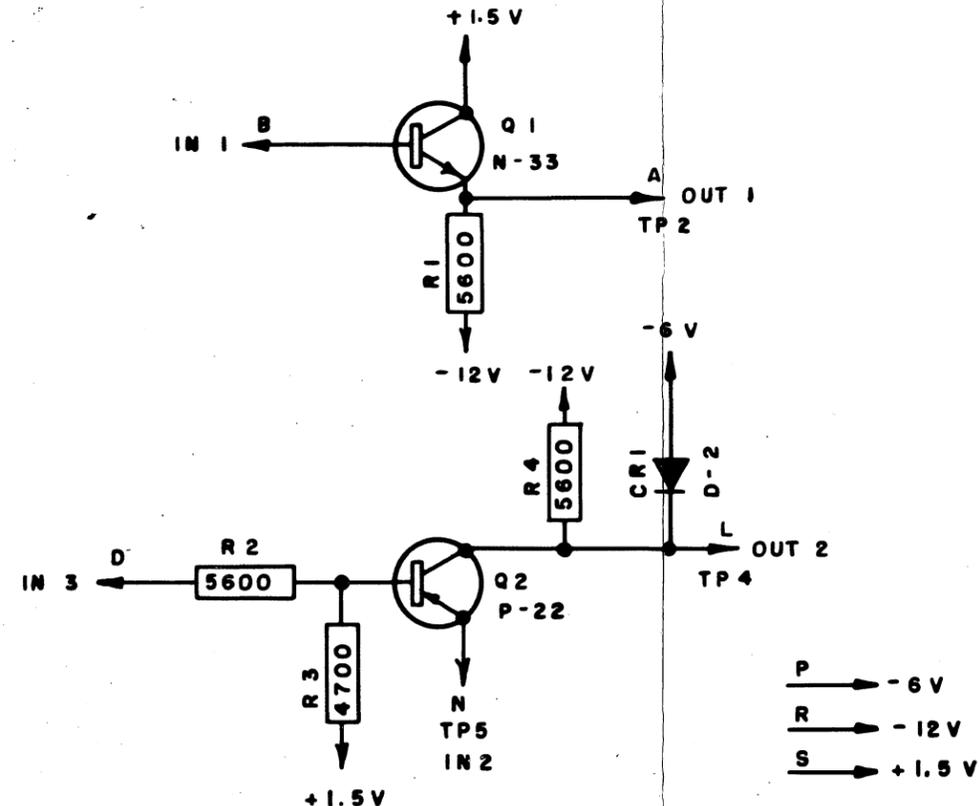
INHIBIT GATE

THE BASE AND EMITTER POTENTIALS VARY FROM -6 TO 0 VOLTS INDEPENDENTLY. IN ORDER FOR Q2 TO CONDUCT, THERE MUST BE A COINCIDENCE OF -6 VOLTS APPLIED TO EMITTER. WHEN THIS CONDITION IS MET Q2 WILL CONDUCT AND THE COLLECTOR OUTPUT IS 0 VOLTS. CR1 CLAMPS THE COLLECTOR AT -6 VOLTS WHEN TRANSISTOR IS NOT CONDUCTING.

SYMBOLS



ISSUE	DATE	AUTH. NO.
2	5-26-61	69892
3	2-10-64	80304



NOTE:
CARD CONNECTIONS ARE REPRESENTED BY LETTERS
TEST POINTS ARE REPRESENTED BY NUMBERS

APPROVALS

D AND R E OF M

E-NUMBER

PROD. NO. 172321

DATE: 12-30-59

P.D. FILE NO. 1-11.134 AA

DRAWN. SW GG CHKD. J.E.

ENG. EPH APPD. J.E.

TELETYPE CORPORATION

172321

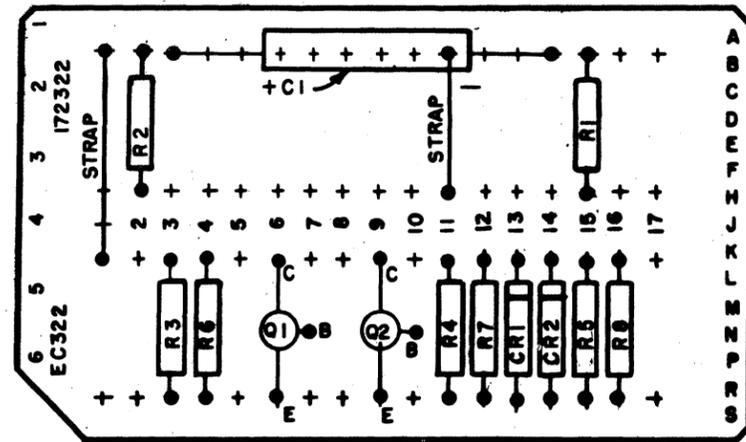
EC 322

172322

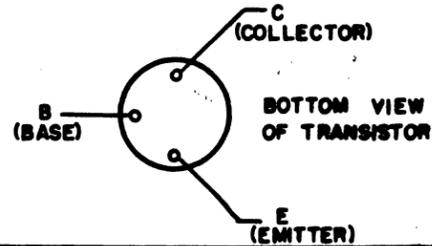
**INTEGRATOR
PULSE SHAPER**

CIRCUIT BOARD EC 322

172322



172062

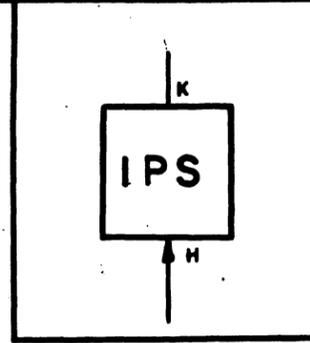


NOTE
REFER TO 5016 WD FOR MARKING INFORMATION

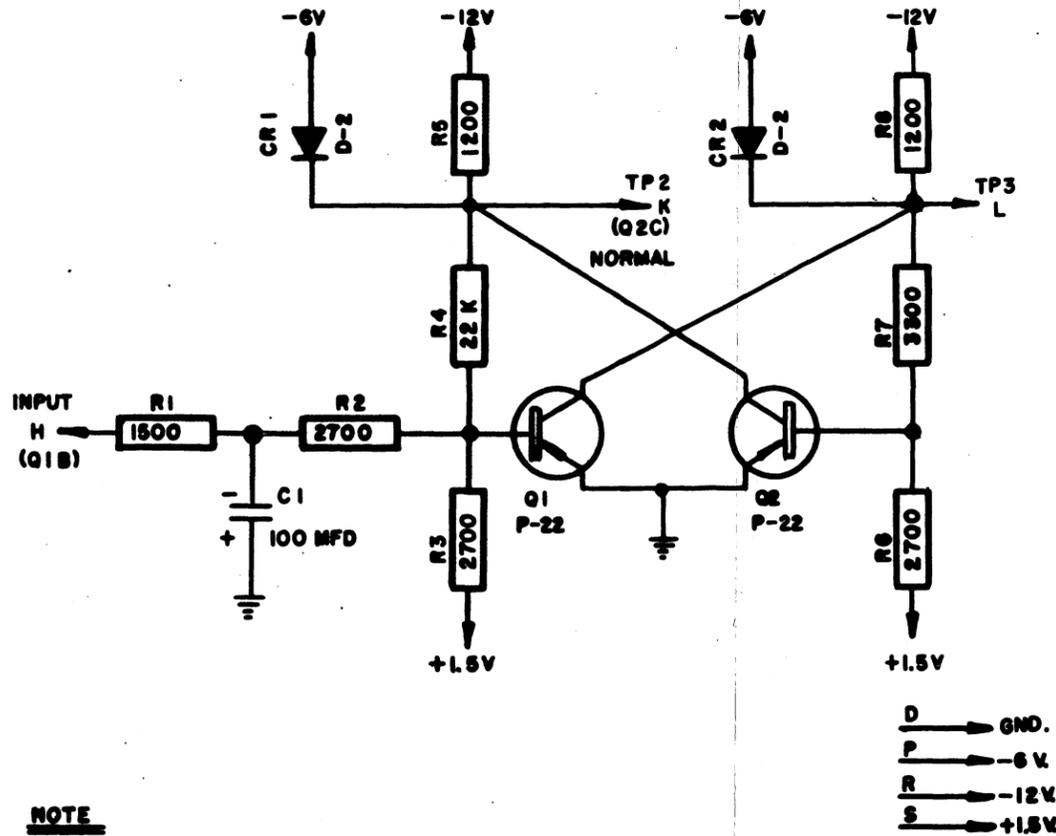
REF DESIGN.	TELETYPE PART NO.	TOTAL QTY.	NAME AND DESCRIPTION	LOCATING FUNCTION
C1	171586	1	CAPACITOR, TANTALUM - 100 MF	INTEGRATION CAP
CR1	177108	2	DIODE, D-2	CLAMP
CR2			SAME AS CR1	CLAMP
R1	137442	1	RESISTOR, FIXED 1500 OHMS	BASE BIAS
R2	118144	3	RESISTOR, FIXED 2700 OHMS	BASE BIAS
R3			SAME AS R2	BASE BIAS
R4	118177	1	RESISTOR, FIXED 22K OHM	BASE BIAS
R5	137441	2	RESISTOR, FIXED 1200 OHMS	COLLECTOR LOAD
R6			SAME AS R2	BASE BIAS
R7	129851	1	RESISTOR, FIXED 3300 OHMS	BASE BIAS
R8			SAME AS R5	COLLECTOR LOAD
Q1	177105	2	TRANSISTOR, P-22	AMPLIFIER
Q2			SAME AS Q1	AMPLIFIER
	144495	2	PAD, TRANSISTOR	
EC.	172062	1	CIRCUIT CARD, ETCHED	
		2	STRAP, BARE 24 AWG.	

THE PURPOSE OF THIS CIRCUIT IS TO RESHAPE THE INPUT SIGNAL SO THAT THE NORMAL OUTPUT SIGNAL HAS A RISE TIME OF 8 USEC OR LESS.

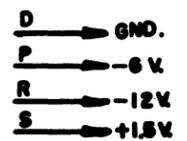
R1, R2, AND C1 ARE CONNECTED TO FUNCTION AS AN INTEGRATION CIRCUIT, WHILE Q1, Q2, AND ASSOCIATED CIRCUITRY RESHAPE SIGNALS WHICH ARE PASSED BY THE INTEGRATION CIRCUIT. NORMALLY THE INPUT AT H IS EITHER 0 OR -6 VOLTS. IF AT ZERO Q1 IS CUT-OFF AND IF -6 VOLTS Q1 IS CONDUCTING Q1 AND Q2 FORM A REGENERATIVE AMPLIFIER WHICH SHARPENS UP THE INTEGRATED INPUT SIGNAL. ABOUT .300 MILLISECONDS AFTER INPUT SIGNAL, OUTPUT SIGNAL IS PRODUCED.



ISSUE	DATE	AUTH. NO.
2	5-26-61	69892



NOTE
CARD CONNECTIONS ARE REPRESENTED BY LETTERS
TEST POINTS ARE REPRESENTED BY NUMBERS



APPROVALS

D AND R: [Signature]
E OF M: [Signature]

E-NUMBER
PROD. NO. 172322
DATE: 1-27-61
P.D. FILE NO. 1-11. 134 A
DRAWN: [Signature] CHKD: [Signature]
ENGD. EHP APPD. [Signature]

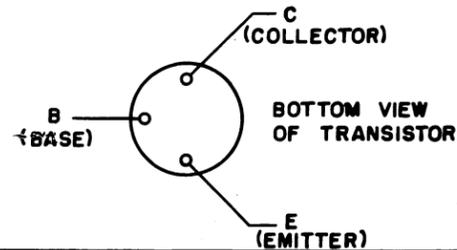
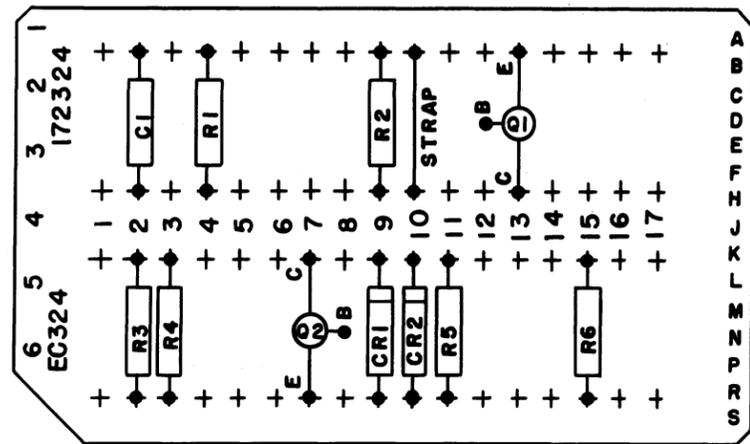
TELETYPE CORPORATION

172322

EC324
172324

CIRCUIT BOARD EC324

172324



NOTE
REFER TO 5016WD FOR MARKING INFORMATION

REF DESIGN	TELETYPE PART NO.	TOTAL QTY.	NAME AND DESCRIPTION	LOCATING FUNCTION
C1	177332	1	CAPACITOR, CERAMIC .002MFD	COUPLING
CR1	177108	2	DIODE D-2	CLAMP
CR2			SAME AS CR1	CLAMP
R1	118146	1	RESISTOR, FIXED 4700 OHMS	BIAS
R2	118186	1	RESISTOR, FIXED 5600 OHMS	BIAS
R3	137440	1	RESISTOR, FIXED 1000 OHMS	BIAS
R4	129851	1	RESISTOR, FIXED 3300 OHMS	BIAS
R5	137441	2	RESISTOR, FIXED 1200 OHMS	COLLECTOR LOAD
R6			SAME AS R5	COLLECTOR LOAD
Q1	177105	2	TRANSISTOR P-22	AMPLIFIER
Q2			SAME AS Q1	AMPLIFIER
EC	172065	1	CIRCUIT CARD, ETCHED	
		1	STRAP BARE 24 AWG	
	144498	2	PAD, TRANSISTOR	

INVERTER AND PULSE AMPLIFIER

THIS CARD CONSISTS OF A PNP COMMON EMITTER INVERTER AMPLIFIER AND A PULSE AMPLIFIER

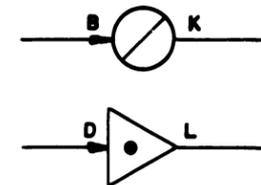
INVERTER

Q1 IS REVERSE BIAS AT APPROXIMATELY 1.5 VOLTS AND THE COLLECTOR IS CLAMPED TO -6V. WITH -6 VOLTS APPLIED AT TERMINAL B, Q1 IS DRIVEN INTO SATURATION CAUSING THE COLLECTOR POTENTIAL TO RISE (-6V TO 0V) FOR DURATION OF THE INPUT SIGNAL.

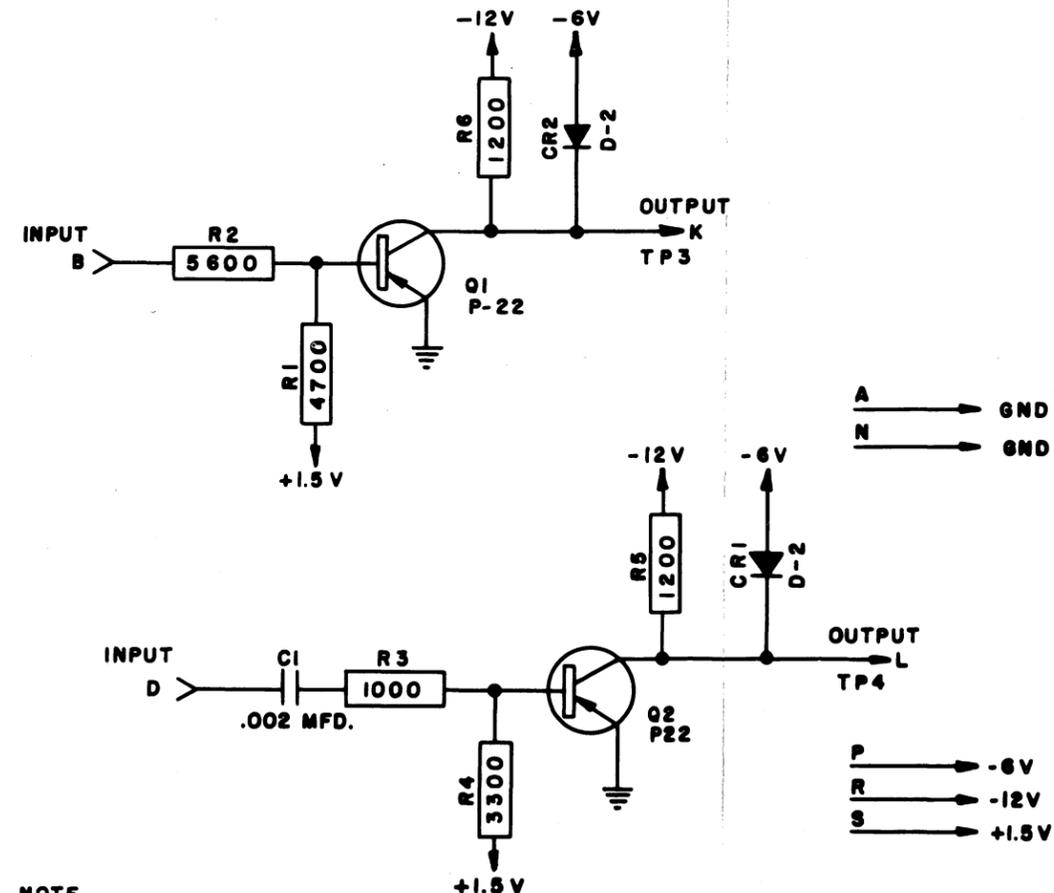
PULSE AMPLIFIER

Q2 IS REVERSED BIAS AT APPROXIMATELY +1.5V WHICH HOLDS Q2 OFF. WITH A NEGATIVE GOING 6V (0V TO -6V) TRANSITION APPLIED TO DIFFERENTIATING CAPACITOR CAUSING BASE POTENTIAL TO GO NEGATIVE FOR A SHORT DURATION OF TIME. THIS CAUSES Q2 TO CONDUCT AND THE COLLECTOR POTENTIAL IS AT 0 VOLTS DURING THIS TIME.

SYMBOLS



ISSUE	DATE	AUTH. NO.
2	5-26-61	69892
3	8-2-61	70507
4	10-16-61	71626



NOTE
CARD CONNECTIONS ARE REPRESENTED BY LETTERS
TEST POINTS ARE REPRESENTED BY NUMBERS

APPROVALS

D AND R	E OF M
<i>[Signature]</i>	<i>[Signature]</i>
E-NUMBER	
PROD. NO. 172324	

DATE: 2-1-60	
P.D. FILE NO. I-II.134AA	
DRAWN. AB	CHKD. <i>[Signature]</i>
ENG. EHP	APPD. <i>[Signature]</i>

TELETYPE CORPORATION

172324

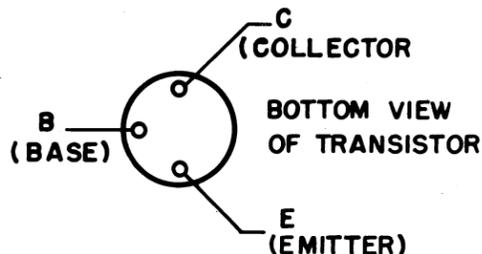
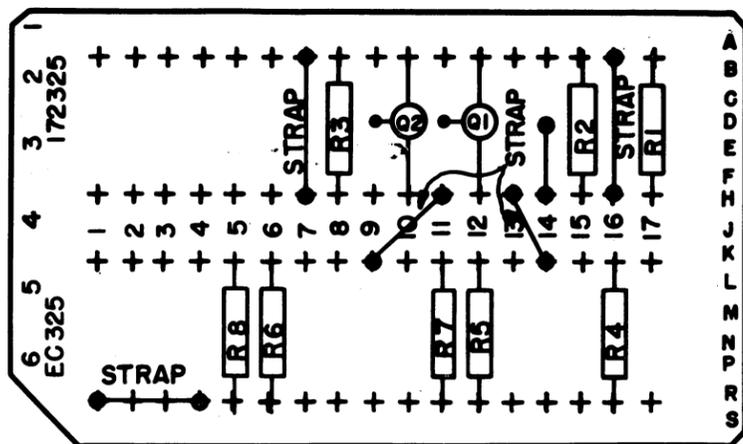
EC 325

172325

**OUTPUT AMPLIFIER
AND VOLTAGE BIAS**

CIRCUIT BOARD EC 325

172325

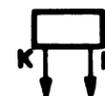


NOTE

REFER TO 5016 WD FOR MARKING INFORMATION

REF. DESIGN	TELETYPE PART NO.	TOTAL QTY.	NAME AND DESCRIPTION	LOCATING FUNCTION
R1	118186	1	RESISTOR, FIXED 5600 OHMS	BIAS RESISTOR
R2	118146	1	RESISTOR, FIXED 4700 OHMS	BIAS RESISTOR
R3	137440	2	RESISTOR, FIXED 1000 OHMS	BIAS RESISTOR
R4	137441	1	RESISTOR, FIXED 1200 OHMS	COLLECTOR LOAD
R5	118725	1	RESISTOR, FIXED 270 OHMS	COLLECTOR LOAD
R6	137601	2	RESISTOR, FIXED 68 OHMS	CURRENT LIMITING
R7			SAME AS R3	BIAS RESISTOR
R8			SAME AS R6	CURRENT LIMITING
Q1	177105	1	TRANSISTOR P-22	AMPLIFIER
Q2	177106	1	TRANSISTOR N-33	AMPLIFIER
EC	172067	1	CIRCUIT CARD, ETCHED	
		6	STRAP - 24 AWG. BARE	
	144495	2	PAD, TRANSISTOR	

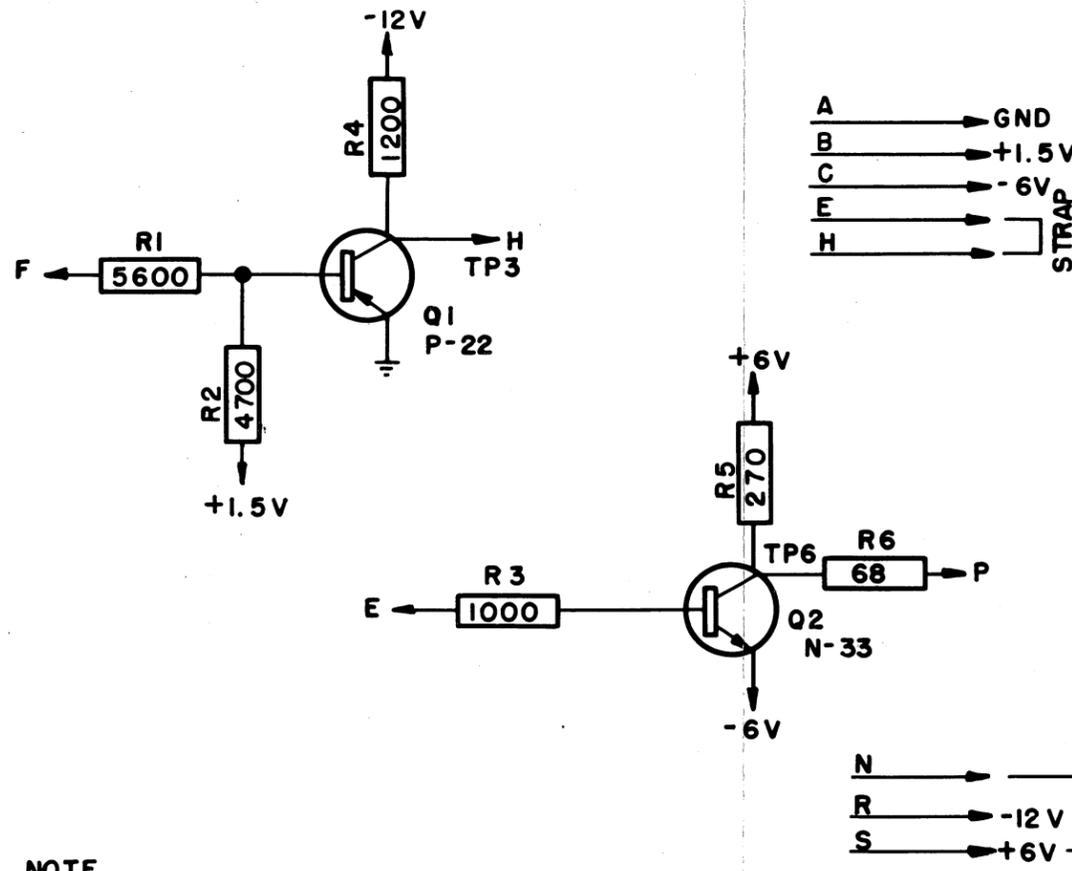
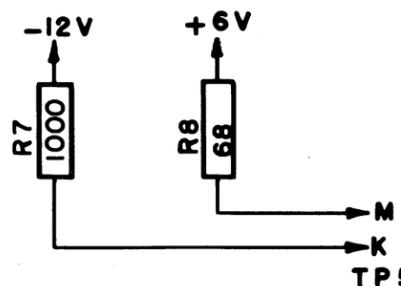
SYMBOLS



THIS CARD BASICALLY CONSISTS OF TWO COMMON EMITTER AMPLIFIERS AND A VOLTAGE BIASING NETWORK. ONE AMPLIFIER IS A PNP TYPE THE OTHER IS A NPN.

THE OUTPUT OF Q1 IS CONNECTED TO THE INPUT OF Q2 BY MEANS OF A STRAP IN THE CONNECTOR BETWEEN POINTS E AND H.

Q1 AND Q2 ARE BOTH OUT-OFF WITH 0 VOLTS APPLIED AT POINT F. R1 AND R2 RETURNED TO +1.5V REVERSE BIAS Q1 APPROXIMATELY +.75V. Q2 IS HELD CUT-OFF BY -12V COLLECTOR POTENTIAL OF Q1. THE OUTPUT AT POINT P IS THEREFORE +6V. WITH -6 VOLTS APPLIED AT POINT F, Q1 CONDUCTS, WHICH IN TURN DRIVES Q2 INTO CONDUCTION. THE OUTPUT AT P THEREFORE BECOMES -6 VOLTS.



NOTE

CARD CONNECTIONS ARE REPRESENTED BY LETTERS TEST POINTS ARE REPRESENTED BY NUMBERS.

ISSUE	DATE	AUTH. NO.
2	5-26-61	69892

APPROVALS

D AND R E OF M

E-NUMBER

PROD. NO. 172325

DATE: 1-26-60

P.D. FILE NO. 1-11.134A

DRAWN. E.R. CHKD. J.H.

ENG. E.H.P. APPD. J.H.

TELETYPE CORPORATION

172325

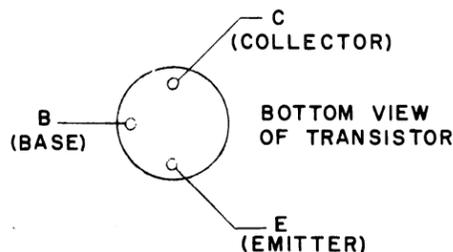
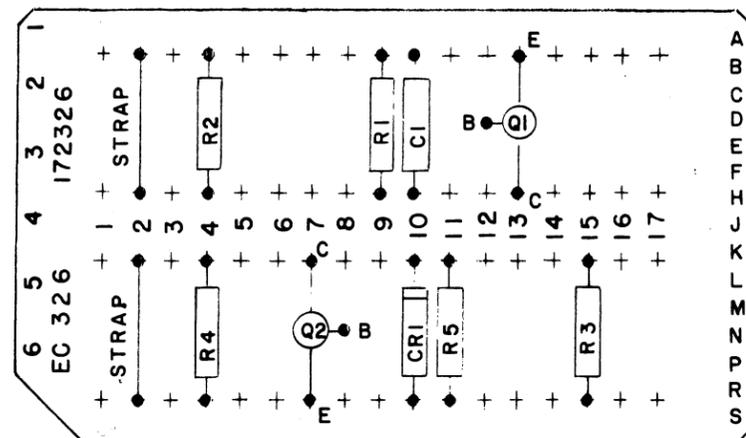
EC 326

172326

PULSE AMP, AND
EMITTER FOLLOWER (PNP)

CIRCUIT BOARD EC326

172326



NOTE
REFER TO 5016 WD FOR MARKING INFORMATION

REF DESIGN.	TELETYPE PART NO.	TOTAL QTY.	NAME AND DESCRIPTION	LOCATING FUNCTION
C1	177332	1	CAPACITOR, CERAMIC .002 MFD	COUPLING CAP
CR1	177108	1	DIODE, D-2	CLAMPING DIODE
R1	137440	1	RESISTOR, FIXED 1000 OHMS	BASE BIAS
R2	129851	1	RESISTOR, FIXED 3300 OHMS	BASE BIAS
R3	137441	1	RESISTOR, FIXED 1200 OHMS	COLLECTOR LOAD
R4	118186	1	RESISTOR, FIXED 5600 OHMS	EMITTER LOAD
R5	137438	1	RESISTOR, FIXED 100 OHMS	CURRENT LIMITING
Q1	177105	2	TRANSISTOR, P-22	AMPLIFIER
Q2			SAME AS Q1	AMPLIFIER
EC	172065	1	CIRCUIT CARD, ETCHED	
		2	STRAPS BARE 24AWG	
	144495	2	PAD, TRANSISTORS	

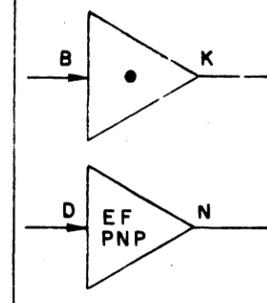
PULSE AMP

Q1 IS REVERSED BIAS AT APPROXIMATELY +1.5V WHICH HOLDS Q1 OFF. WITH A NEGATIVE GOING 6V (0V TO -6V) TRANSISTOR APPLIED TO DIFFERENTIATING CAPACITOR CAUSING BASE POTENTIAL TO GO NEGATIVE FOR A SHORT DURATION OF TIME. THIS CAUSES Q2 TO CONDUCT AND THE COLLECTOR POTENTIAL IS AT 0 VOLTS DURING THIS TIME.

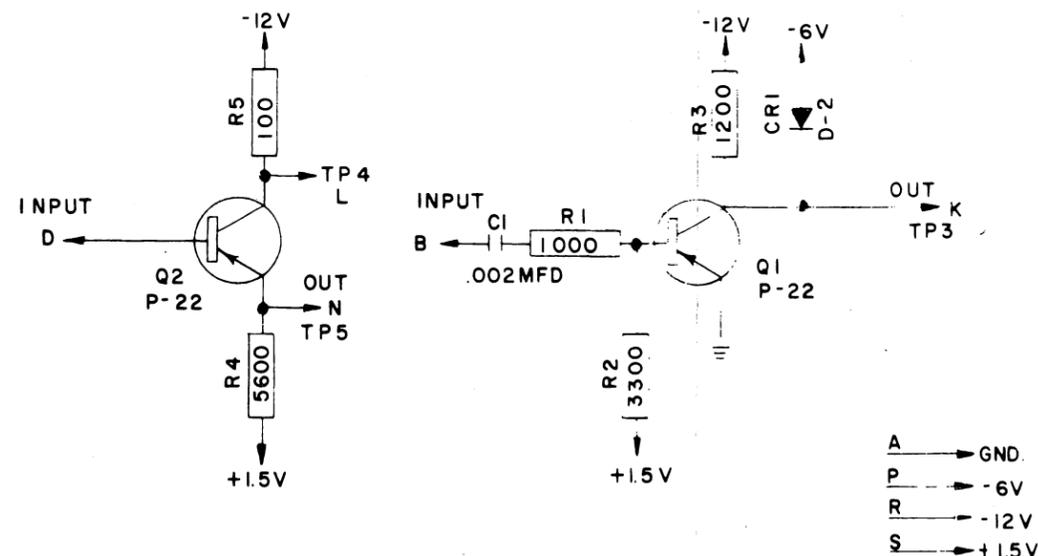
PNP EMITTER FOLLOWER

THIS CIRCUIT IS A EMITTER FOLLOWER USED TO PROVIDE CURRENT GAINS WITH NO INVERSION OR CHANGE IN THE SIGNAL LEVEL. WITH ZERO VOLTS APPLIED AT THE BASE, ZERO VOLTS APPEARS AT EMITTER. THE PNP EMITTER FOLLOWER IS USED TO PROVIDE LOW OUTPUT IMPEDANCE (HIGH CURRENT GAIN) ON THE NEGATIVE GOING VOLTAGE TRANSITION (-6 TO 0 VOLTS).

SYMBOLS



ISSUE	DATE	AUTH. NO.
2	5-26-61	68892
3	11-16-61	71626
4	4-5-62	83031



NOTE
CARD CONNECTIONS ARE REPRESENTED BY LETTERS
TEST POINTS ARE REPRESENTED BY NUMBERS

APPROVALS

D AND R E OF M

E-NUMBER
PROD. NO. 172326
DATE: 2-19-60
P.D. FILE NO 1-11.134 AA
DRAWN SW. F.S. CHKD <i>[Signature]</i>
ENGD E.H.P. APPD

TELETYPE CORPORATION
172326

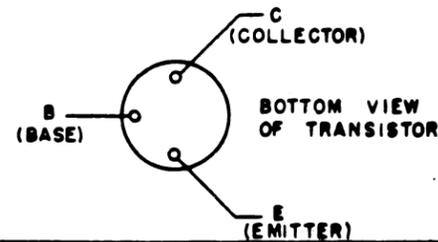
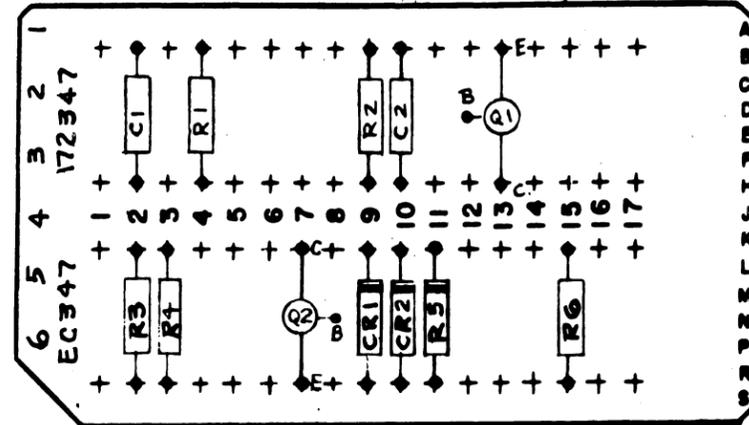
EC 347

172347

PULSE AMPLIFIER (2)

CIRCUIT BOARD EC 347

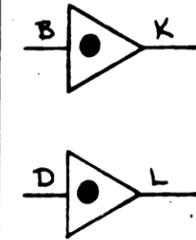
172347



NOTE:
REFER TO 5016 WD FOR MARKING INFORMATION

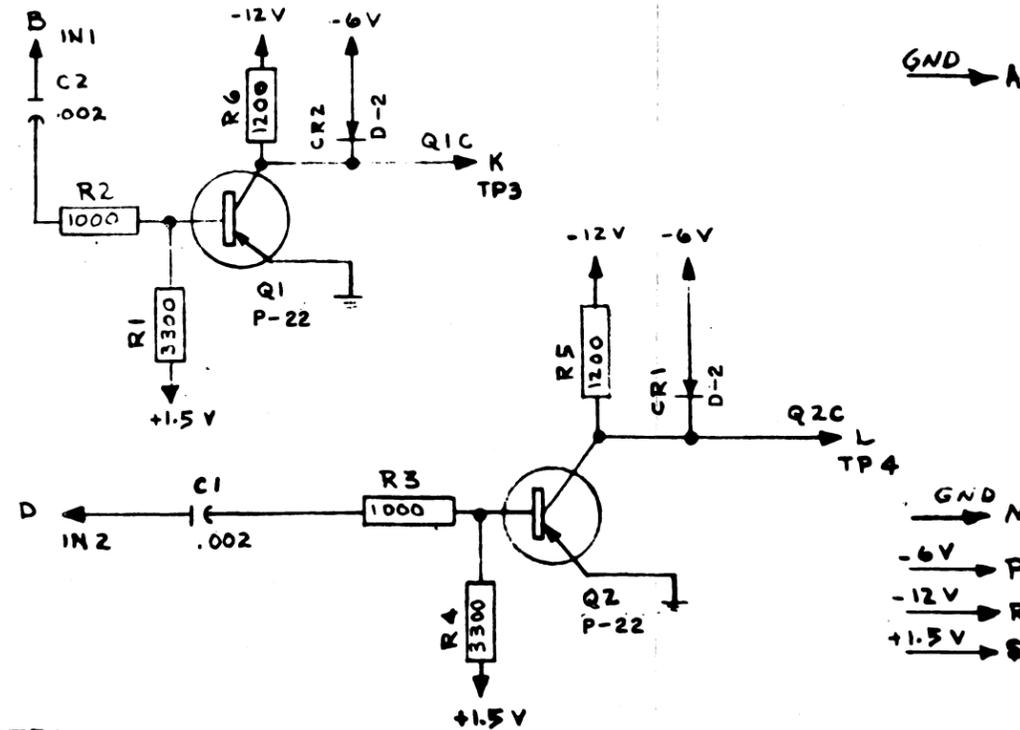
REF. DESIGN.	TELETYPE PART NO.	TOTAL QTY.	NAME AND DESCRIPTION	LOCATING FUNCTION
C1	177332	2	Capacitor, Ceramic .002 MF	Coupling Cap
C2			Same as C1	" "
CR1	177108	2	Diode, D-2	Clamping Diode
CR2			Same as CR1	" "
R1	129851	2	Resistor, Fixed 3300 Ohms	Base Bias
R2	137440	2	" " 1000 "	" "
R3			Same as R2	" "
R4			" " R1	" "
R5	137441	2	Resistor, Fixed 1200 Ohms	Collector Load
R6			Same as R5	" "
Q1	177105	2	Transistor, P-22	Pulse Amplifier
Q2			Same as Q1	" "
EC	172065	1	Circuit Card, Etched	
	144495	2	PAD, TRANSISTOR	

SYMBOLS



ISSUE	DATE	AUTH. NO.
2	8-30-59	HS-1040
3	7-31-59	HS-1072
4	9-8-59	HS-1139
5	11-5-59	HS-1261
6	3-30-60	HS-1700
7	5-26-61	69892
8	11-16-61	71626

This card consists of two common emitter amplifier circuits used to generate narrow pulses having a rapid rise time. The +1.5 V at the base applied through R4 holds Q2 normally cut-off. CR1 clamps the collector at -6 V. With a negative going 6 V transition applied at D, base current flows driving Q2 into saturation, causing the collector potential to be at 0 V for the duration of the pulse applied at the base. The theory of operation for Q1 is identical to Q2.



NOTE:
CARD CONNECTIONS ARE REPRESENTED BY LETTERS
TEST POINTS ARE REPRESENTED BY NUMBERS

APPROVALS	
D AND R	E OF M
<i>[Signature]</i>	<i>[Signature]</i>
E-NUMBER	
PROD. NO. 172347	
DATE:	
P.D. FILE NO.	
DRAWN <i>[Signature]</i>	CHKD.
ENGR. S.S.	APPD. <i>[Signature]</i>
TELETYPE CORPORATION	
172347	

EC351

172351

VARIABLE PULSE

DELAY
(.41 TO 1.3MS)

THE PURPOSE OF THIS CIRCUIT IS TO GENERATE A SIGNAL OF VARIABLE WIDTH AS DETERMINED BY THE INPUT SIGNAL APPLIED AT POINT A.

Q2 IS NORMALLY CONDUCTING, RECEIVING ITS BIAS CURRENT THROUGH R10 AND R2 IN PARALLEL WITH CR5, R3 AND R8. THE COLLECTOR OF Q2 IS APPROXIMATELY AT 0 VOLTS AND Q1, COLLECTOR IS AT -6V Q1 IS MAINTAINED IN CUT-OFF STATE BY CROSS COUPLING RESISTOR R6 AND R7 AND RETURNING TO +1.5 VOLTS HOLDING BASE POTENTIAL AT APPROXIMATELY +1 VOLT.

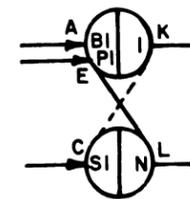
CAPACITOR C1, R1 AND CR1 COMBINE TO FORM GATE WHERE BY WHEN -6V IS APPLIES TO E AND 6 VOLT POSITIVE PULSE APPLIED TO TERMINAL C WILL FAIL TO TRIGGER CIRCUIT, HOWEVER, IF TERMINAL E IS AT 0 VOLTS A POSITIVE PULSE WILL TURN Q2 OFF AND REMAIN CUT-OFF UNTIL C3 CAN DISCHARGE TO A LEVEL THROUGH R3 AND R11 TO PERMIT Q2 TO CONDUCT.

THE AIMING POTENTIAL IS VARIED BY APPLYING 0 OR -6 VOLTS ON TERMINAL A SINCE R11 IS PART OF DISCHARGE PATH THUS INCREASING OR DECREASING TIME OUT OF THE CIRCUIT. WITH -6 VOLTS AT A TIME OUT IS APPROXIMATELY .41 MILLISECONDS. WITH 0 VOLTS APPLIED THE TIME OUT IS APPROXIMATELY 1.3 MILLISECONDS.

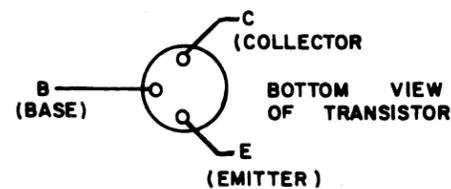
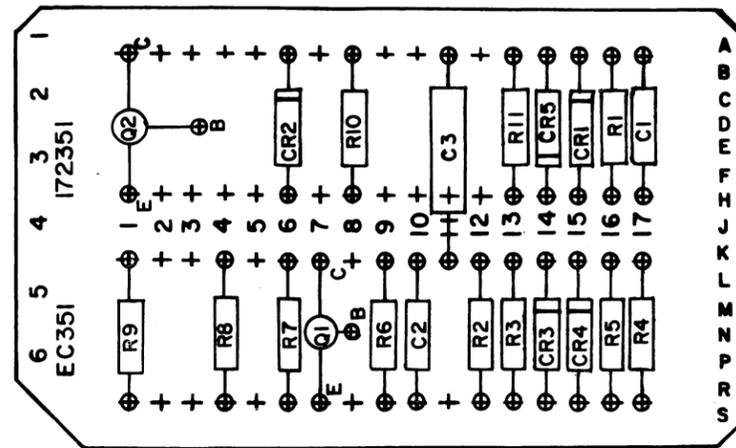
CIRCUIT BOARD EC 351

172351

SYMBOLS

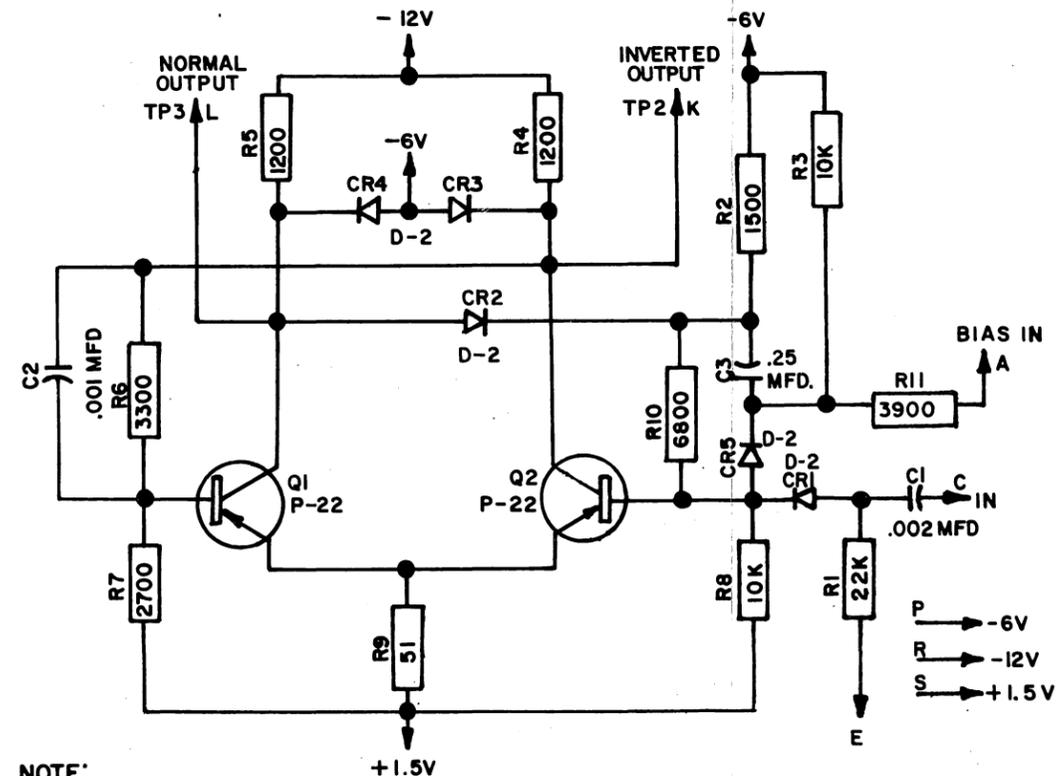


REVISIONS		
ISSUE	DATE	AUTH. NO.
5	5-26-61	69892
6	11-16-61	71626
7	2-6-64	80254
8	6-7-68	97629



NOTE: REFER TO 5016 WD FOR MARKING INFORMATION.

REF. DESIGN.	TELETYPE PART NO.	TOTAL QTY.	NAME AND DESCRIPTION	LOCATING	FUNCTION
C1	177332	1	CAPACITOR, CERAMIC .002 MFD		COUPLING
C2	177331	1	CAPACITOR, CERAMIC .001 MFD		FEEDBACK
C3	171587	1	CAPACITOR MYLAR .25 MFD		DELAY
CR1	177108	5	DIODE D-2		GATE
CR2			SAME AS CR1		COUPLING
CR3			SAME AS CR1		CLAMP
CR4			SAME AS CR1		CLAMP
CR5			SAME AS CR1		GATE
R1	118177	1	RESISTOR, FIXED 22K OHMS		BIAS
R2	137442	1	RESISTOR, FIXED 1500 OHMS		BIAS
R3	118180	2	RESISTOR, FIXED 10K OHMS		BIAS
R4	137441	2	RESISTOR, FIXED 1200 OHMS		COLLECTOR LOAD
R5			SAME AS R4		COLLECTOR LOAD
R6	129851	1	RESISTOR, FIXED 3300 OHMS		FEEDBACK
R7	118144	1	RESISTOR, FIXED 2700 OHMS		BIAS
R8			SAME AS R3		BIAS
R9	143656	1	RESISTOR, FIXED 51 OHMS		COMMON EMITTER
R10	118147	1	RESISTOR, FIXED 6800 OHMS		BIAS
R11	143667	1	RESISTOR, FIXED 3900 OHMS		BIAS
Q1	177105	2	TRANSISTOR, P-22		AMPLIFIER
Q2			SAME AS Q1		
EC	172050	1	CIRCUIT CARD, ETCHED		
	144495	2	PAD, TRANSISTOR		



NOTE: CARD CONNECTIONS ARE REPRESENTED BY LETTERS TEST POINTS ARE REPRESENTED BY NUMBERS.

APPROVALS

R AND D: OAL
E OF M: FL

E-NUMBER:
PROD. NO. 172351

DATE 12-7-59
FILE NO. 1-122.134AA

DRAWN: RJP, SW CHKD: EHP
ENG. EHP APPD.

TELETYPE CORPORATION

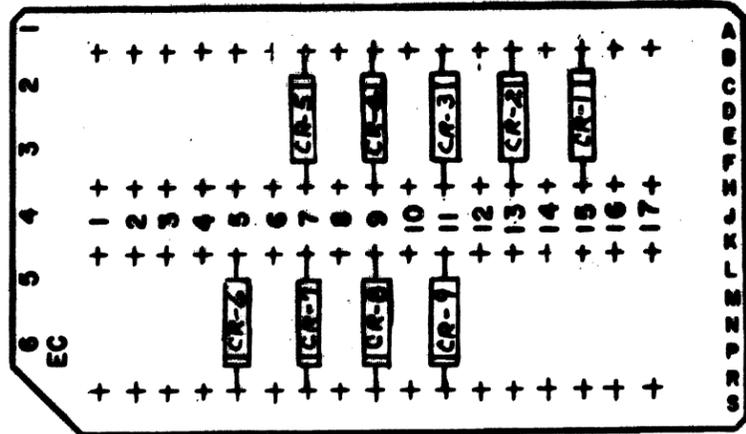
172351

EC 352

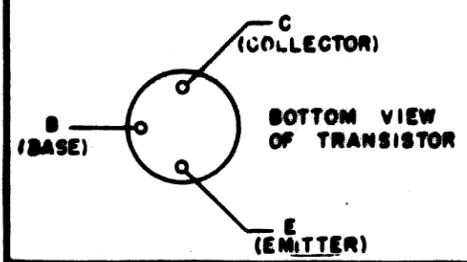
172352

CIRCUIT BOARD EC352

172352



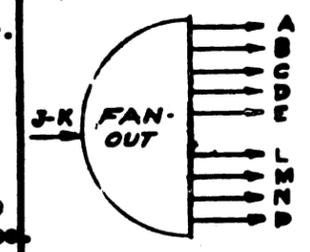
172070



NOTE
REFER TO 5016WD FOR MARKING INFORMATION.

REF. DESIGN.	TELETYPE PART NO.	TOTAL QTY	NAME AND DESCRIPTION	LOCATING	FUNCTION
CR1	177108	9	DIODE D-2	GATE	
CR2			SAME AS CR1	"	
CR3			" " "	"	
CR4			" " "	"	
CR5			" " "	"	
CR6			" " "	"	
CR7			" " "	"	
CR8			" " "	"	
CR9			" " "	"	
EC	172070		CIRCUIT CARD, ETCHED		

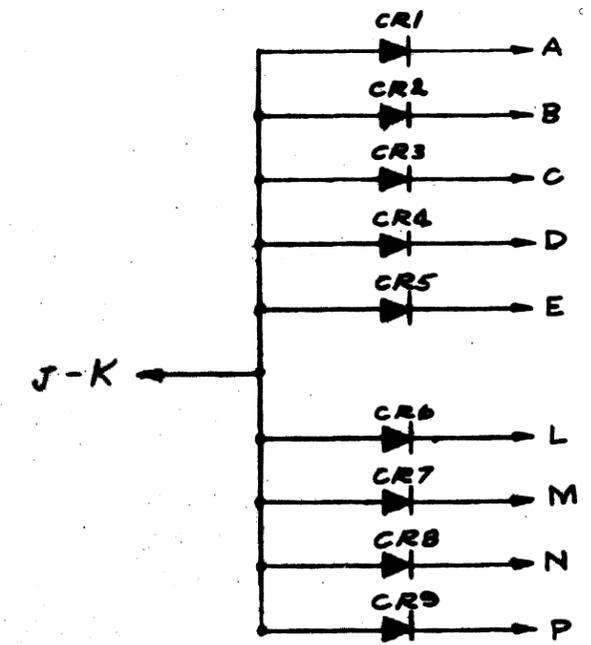
SYMBOLS



This circuit designated as fan-out is, in a sense, an "OR" gate without a biasing resistor.

The gate is used in this manner. When 0 or more positive voltage, i.e. +1.5 volts, is applied to terminal J and K the output terminals A, B, C, D, E, L, M, N and P will all go to +1.5 volts. When the switch is open the outputs A, B, C, etc. are floating unless J-K is clamped by an external source.

The circuit is used to apply reset pulse or signal to a number of circuits, the diodes provide isolation between these circuits.



ALL DIODES ARE D-2

NOTE:
CARD CONNECTIONS ARE REPRESENTED BY LETTERS
TEST POINTS ARE REPRESENTED BY NUMBERS.

REVISIONS

REV.	DATE	AUTH. NO.
2	10-16-61	593923
3	11-14-64	71804

APPROVALS

R AND D: *H* E OF M: *v*

E-NUMBER:
PROD. NO. 172352

DATE 10-MAR.-60
FILE NO. 1-122.134AA
DRAWN S.W. CHKD.
ENGD. E.H.P. APPD.

TELETYPE CORPORATION

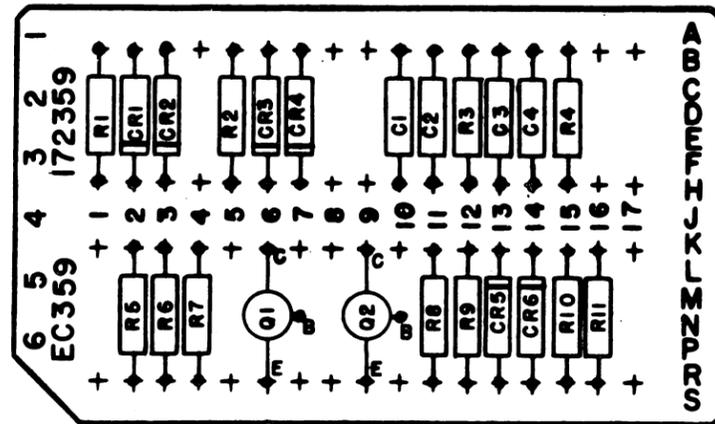
172352

EC 359

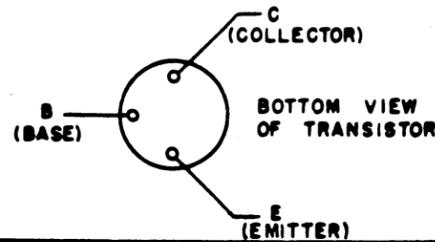
172359

CIRCUIT BOARD EC 359

172359



172062



NOTE: REFER TO 5016WD FOR MARKING INFORMATION

FLIP-FLOP

SYMBOLS



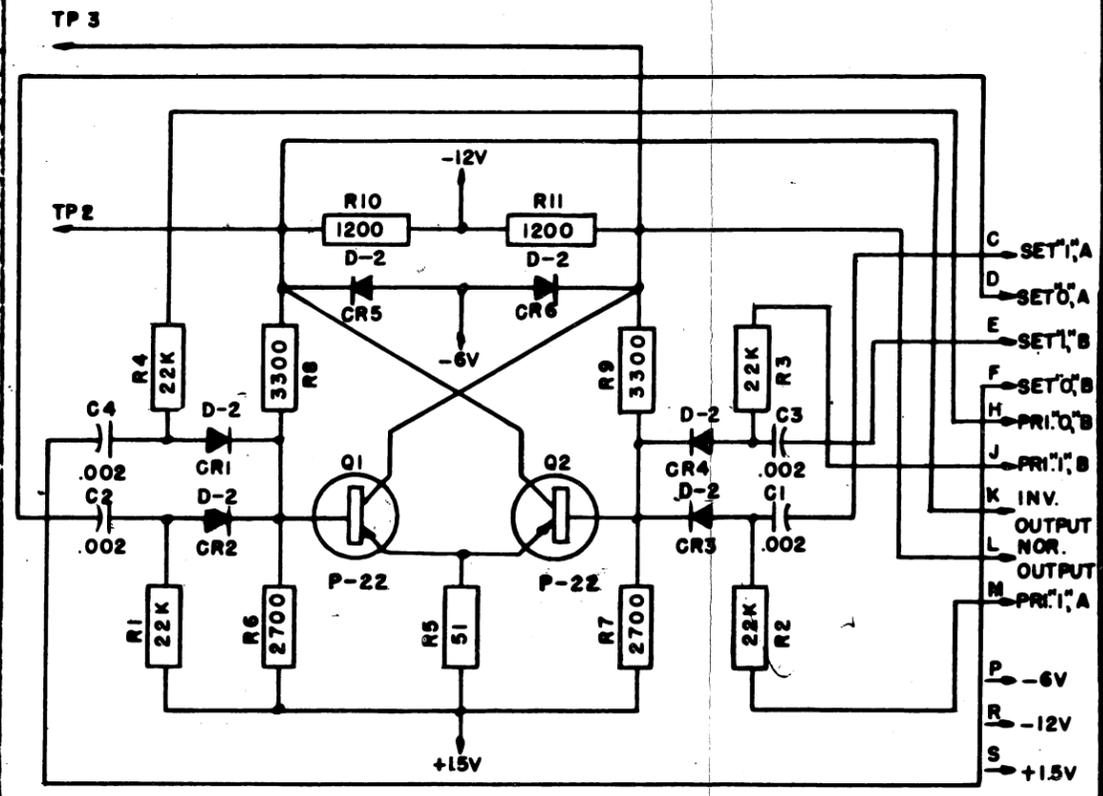
Static Description

The flip-flop employs two PNP junction transistors, so arranged that when one is conducting, the other is held in a cutoff condition. Q1 and Q2 are connected in a symmetrical circuit; each collector has a 1200 ohm load returned to a -12V supply. When either of the transistors is cutoff, collector current will drop to almost zero, and the OFF collector potential will be clamped to -6 volts by action of CR5 or CR6. When either transistor is ON, its collector potential will be approximately +1V. The OFF base will be at +1.23 volts; the common emitter point will be at +1.0 volts and the ON base will be at +.7 volts.

Operation

The circuit is normally driven by applying a positive 6 volts pulse through C1 and CR3, C2 and CR2, C3 and CR4, or C4 and CR1 to the base which is ON. This results in the ON stage turning OFF and the OFF stage turning ON. The flip flop may be driven by either of two pulses applied to each base. The positive pulses may be inhibited by returning R2, R3 and R4 to -6 volts. This prevents diodes CR1, CR3 and CR4 from conducting and coupling the pulse to the base of the corresponding transistor. The resistors R2, R3 and R4 must be returned to ground potential or +1.5V for the drive pulse to be passed by the corresponding diode.

REF. DESIGN.	TELETYPE PART NO.	TOTAL QTY.	NAME AND DESCRIPTION	LOCATING FUNCTION
C1	177332	4	Capacitor, Ceramic .002 mF	differentiating coupling
C2			Same as C1	" " " "
C3			Same as C1	" " " "
C4			Same as C1	" " " "
CR1	177108	6	Diode, D-2	OR gate with CR2
CR2			Same as CR1	" " " CR1
CR3			Same as CR1	" " " CR4
CR4			Same as CR1	" " " CR3
CR5			Diode, D-2	-6 volts clamp
CR6			Same as CR5	" " " "
R1	118177	4	Resistor, Fixed 22K	C2 discharge
R2			Same as R1	C1 discharge-inhibit gate
R3			Same as R1	C3 discharge-inhibit gate
R4			Same as R1	C4 " " " "
R5	113656	1	Resistor, Fixed 51 Ohm	Common emitter bias
R6	118144	2	Resistor, Fixed 2700 Ohm	Base bias
R7			Same as R6	" " " "
R8	129851	2	Resistor, Fixed 3300 Ohm	Base current limiting
R9			Same as R8	" " " "
R10	137441	2	Resistor, Fixed 1200 Ohm	collector load
R11			Same as R10	" " " "
Q1	177105	2	Transistor, P-22	Flip-flop active element
Q2			Same as Q1	" " " "
EC	172062	1	Circuit card, etched	" " " "
	144495	2	PAD, TRANSISTOR	" " " "



ISSUE	DATE	AUTH. NO.
1	9-8-59	185-1159
2	10-28-59	185-1230
3	5-28-61	69 692
4	11-16-61	71626

FLIP-FLOP

APPROVALS

D AND R E OF M

DATE: 2-18-59

P.D. FILE NO.

DRAWN G.J.M. CHKD.

ENGD. R.J.R. APPD.

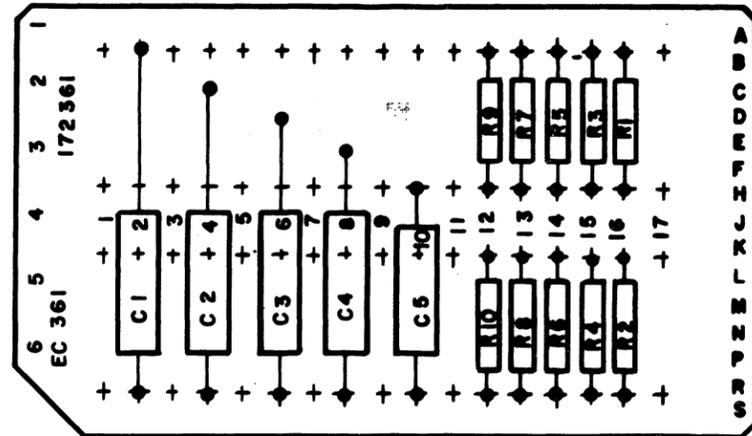
TELETYPE CORPORATION

172359

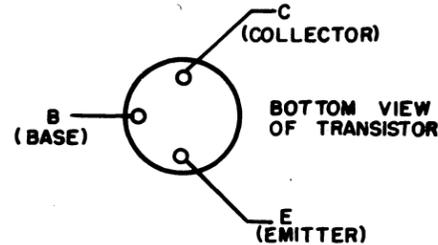
EC 361

CIRCUIT BOARD EC 361

172361



172049



NOTE
REFER TO 5016 WD FOR MARKING INFORMATION

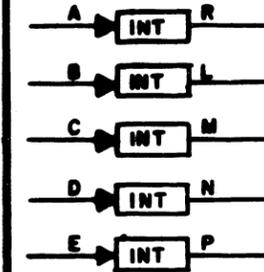
REF. DESIGN	TELETYPE PART NO.	TOTAL QTY.	NAME AND DESCRIPTION	LOCATING FUNCTION
R1	137443	5	RESISTOR, FIXED 1800 OHMS	SERIES DROPPING RESISTOR
R2	137440	5	RESISTOR, FIXED 1000 OHMS	INTEGRATING RESISTOR
R3			SAME AS R1	
R4			SAME AS R2	
R5			SAME AS R1	
R6			SAME AS R2	
R7			SAME AS R1	
R8			SAME AS R2	
R9			SAME AS R1	
R10			SAME AS R2	
C1	171579	5	CAPACITOR, MYLAR .47 MFD.	INTEGRATING CAP.
C2			SAME AS C1	
C3			SAME AS C1	
C4			SAME AS C1	
C5			SAME AS C1	
EC	172049	1	BOARD, ETCHED CIRCUIT	

INTEGRATOR

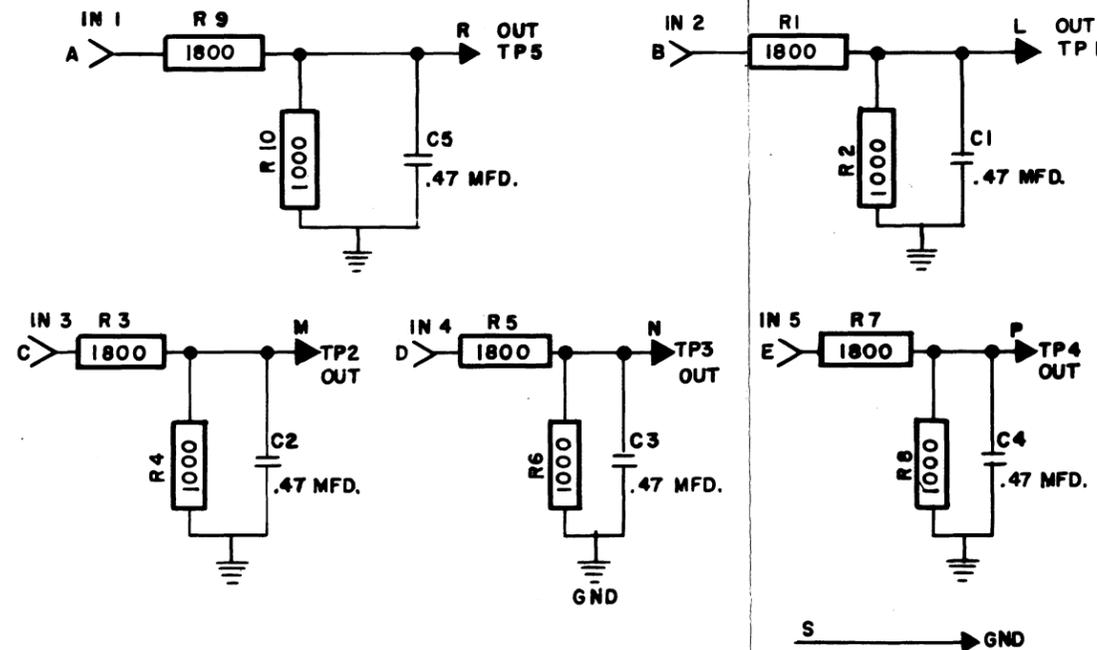
THIS CARD CONSISTS OF FIVE IDENTICAL INTEGRATOR CIRCUITS.

THE INPUT SIGNALS ARE APPLIED THROUGH 1800 OHM DROPPING RESISTOR AT TERMINALS A, B, C, D, AND E. THE LEADING EDGE AND TRAILING EDGE OF THE INPUT SIGNAL WILL BE DELAYED DUE TO RELATIVELY LONG TIME CONSTANT OF THE CAPACITOR AND 1800 OHM RESISTOR. THE CIRCUIT IS DESIGNED FOR INPUT SIGNAL OF 0 TO -28 VOLTS FROM MECHANICALLY OPERATED CONTACTS. THE PURPOSE OF THE CIRCUIT IS TO PREVENT NOISE FROM CONTACT BOUNCE TO GET INTO SUCCEEDING STAGE.

SYMBOLS



ISSUE	DATE	AUTH. NO.



NOTE
CARD CONNECTIONS ARE REPRESENTED BY LETTERS
TEST POINTS ARE REPRESENTED BY NUMBERS.

APPROVALS

D AND R E OF M

E-NUMBER

PROD. NO. 172361

DATE: 1-26-60

P.D. FILE NO. I-II.134 AA

DRAWN: SWL CHKD: [Signature]

ENGD: EHP APPD: [Signature]

TELETYPE CORPORATION

172361

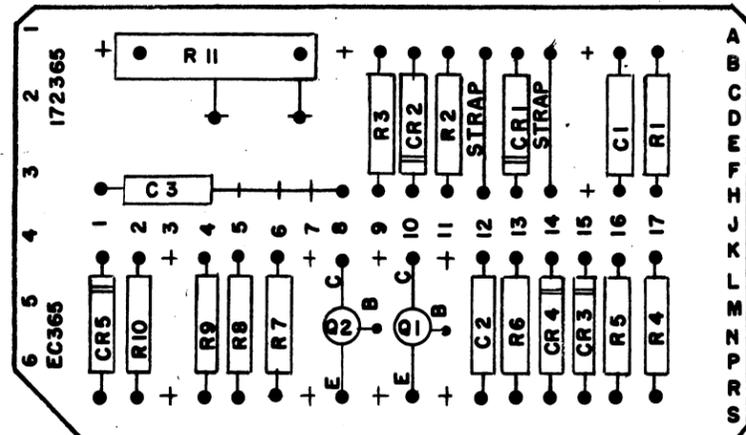
EC 365

172365

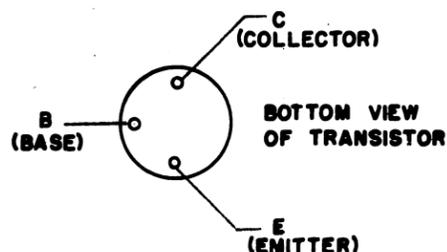
VARIABLE ONE SHOT

CIRCUIT BOARD EC 365

172365



172063

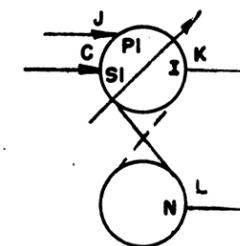


NOTE

REFER TO 5016 WD FOR MARKING INFORMATION

REF. DESIGN.	TELETYPE PART NO.	TOTAL QTY.	NAME AND DESCRIPTION	LOCATING	FUNCTION
C1	177332	1	CAPACITOR, CERAMIC .002 MF	COUPLING	
C2	177331	1	CAPACITOR, CERAMIC .001 MF	FEEDBACK	
C3	171587	1	CAPACITOR, MYLAR .25 MFD	TIMING	
CR1	177108	5	DIODE, D-2	COUPLING	
CR2			DIODE, D-2	GATE	
CR3			SAME AS CR2	CLAMP	
CR4			SAME AS CR2	CLAMP	
CR5			SAME AS CR2	GATE	
R1	118177	1	RESISTOR, FIXED 22K OHMS	GATE	
R2	137442	1	RESISTOR, FIXED 1500 OHMS	BIAS	
R3	143667	1	RESISTOR, FIXED 3900 OHMS	TIMING	
R4	137441	2	RESISTOR, FIXED 1200 OHMS	COLLECTOR LOAD	
R5			SAME AS R4	COLLECTOR LOAD	
R6	129851	1	RESISTOR, FIXED 3300 OHMS	FEEDBACK	
R7	118144	1	RESISTOR, FIXED 2700 OHMS	BIAS	
R8	118180	1	RESISTOR, FIXED 10K OHMS	BIAS	
R9	143656	1	RESISTOR, FIXED 51 OHMS	COMMON EMITTER LOAD	
R10	118147	1	RESISTOR, FIXED 6800 OHMS	BIAS	
R11	171565	1	RESISTOR, VARIABLE 10K OHMS	TIMING	
Q1	177105	2	TRANSISTOR, P-22	SWITCH	
Q2			SAME AS Q1	SWITCH	
EC	172063	1	CIRCUIT CARD, ETCHED		
		2	STRAP 24 AWG BARE		
	1178	2	SCREW, 2-56 x .431, FIL.		
	110446	2	NUT, 2-56, HEX.		
	144495	2	PAD, TRANSISTOR		

SYMBOLS

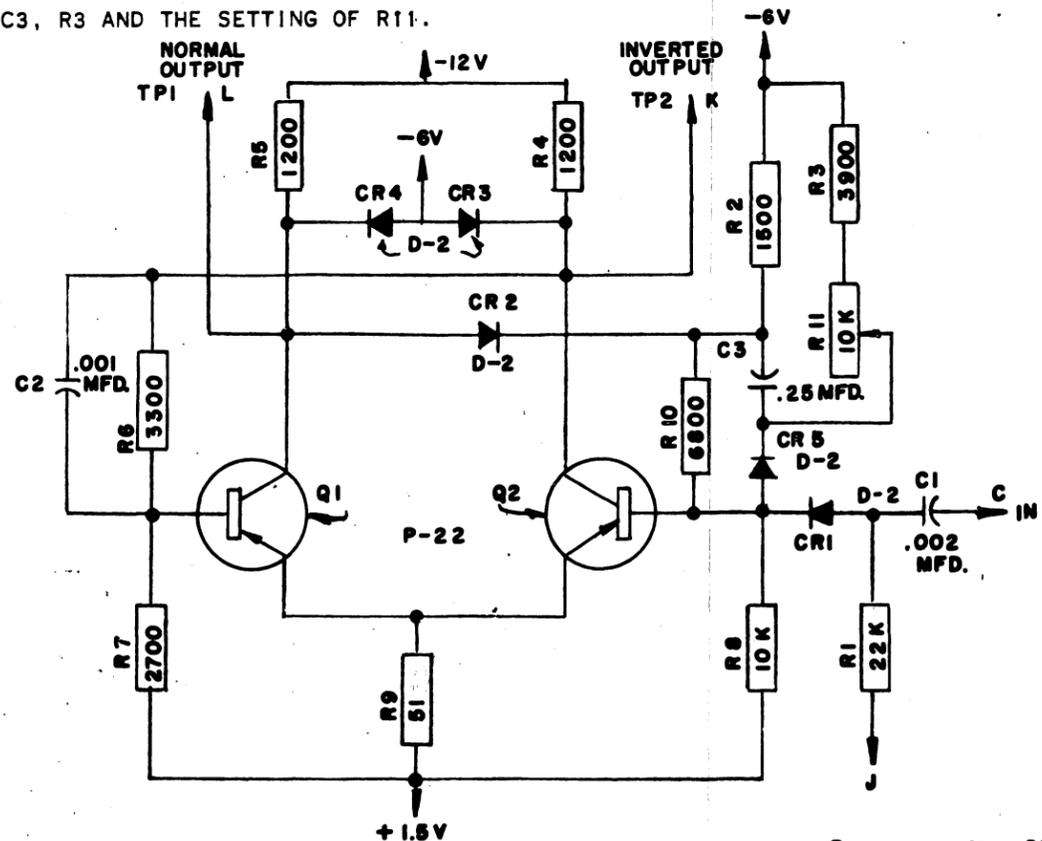


.65 TO 2.2 MS
 THE PURPOSE OF THIS CIRCUIT IS TO GENERATE A PULSE OF KNOWN WIDTH IN THE RANGE OF .65 MILLISECONDS TO 2.2 MILLISECONDS IN RESPONSE TO AN INPUT. NORMAL (POSITIVE GOING) AND INVERTED OUTPUTS ARE PROVIDED.

THE QUIESCENT STATE OF THIS CIRCUIT IS THAT Q2 IS SATURATED, RECEIVING ITS BIAS CURRENT PRIMARILY THROUGH R2 AND R10 CONNECTED IN PARALLEL WITH CR5, R3 AND R11 TO -6V. THE COLLECTOR OF Q2 IS APPROXIMATELY AT ZERO VOLTS AND THE COLLECTOR OF Q1 IS -6V. Q1 IS MAINTAINED CUT-OFF BY CROSS COUPLING RESISTOR R6 AND RESISTOR R7 RETURNED TO +1.5V, HOLDING THE BASE POTENTIAL OF Q1 AT APPROXIMATELY +1V. THE COMMON EMITTER POTENTIAL IS ZERO VOLTS SINCE Q2 IS SATURATED.

CAPACITOR C1, R1 AND CR1 COMBINE TO FORM AN INHIBIT GATE, WHEREBY WHEN -6V IS APPLIED AT POINT J, INPUTS RECEIVED AT POINT C WILL FAIL TO TRIGGER THE CIRCUIT. CONVERSELY THE CIRCUIT IS ENABLED WHEN POINT J IS RETURNED TO 0V SINCE CR1 WILL NOW PASS POSITIVE GOING TRANSITIONS.

THE CIRCUIT IS TRIGGERED AS FOLLOWS: A POSITIVE TRANSITION APPLIED AT POINT C DRIVES Q2 INTO CUT-OFF WHICH, IN TURN, ALLOWS Q1 TO CONDUCT. AS THE COLLECTOR OF Q1 APPROACHES 0V, CR2 CONDUCTS CHARGING C3, AND MAINTAINING Q2 IN CUT-OFF. Q2 REMAINS CUT-OFF UNTIL C3 CAN DISCHARGE SUFFICIENTLY THROUGH VARIABLE RESISTOR R11 AND R3 TO PERMIT CONDUCTION OF Q2. THE PERIOD OF CONDUCTION OF Q1 IS PRIMARILY DETERMINED BY THE SIZE OF C3, R3 AND THE SETTING OF R11.



NOTE

CARD CONNECTIONS ARE REPRESENTED BY LETTERS
 TEST POINTS ARE REPRESENTED BY NUMBERS



ISSUE	DATE	AUTH. NO.
2	5-26-61	69892
3	11-16-61	71626

APPROVALS

D AND R E OF M

E-NUMBER

PROD. NO. 172365

DATE: 2-1-60

P.D. FILE NO. 1-11-134AA

DRAWN: RLW CHKD. [Signature]

ENGD. EMP APPD.

TELETYPE CORPORATION

172365

185 F7

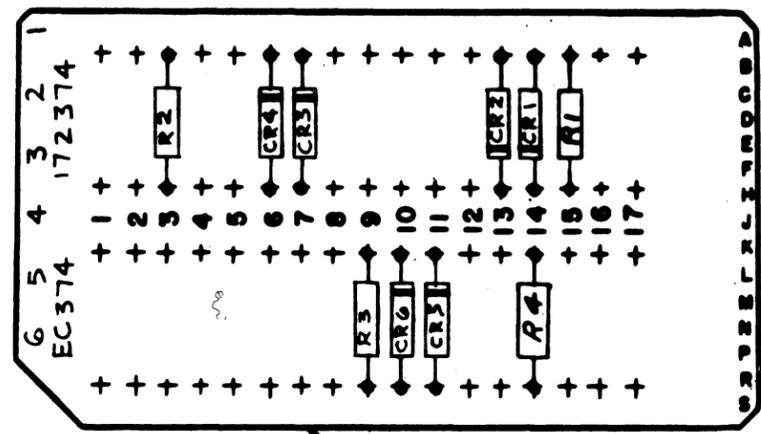
EC 374

DIODE GATES (3)

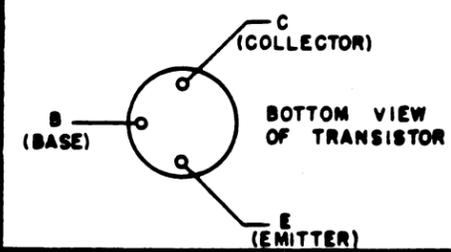
CIRCUIT BOARD EC 374

172374

172374

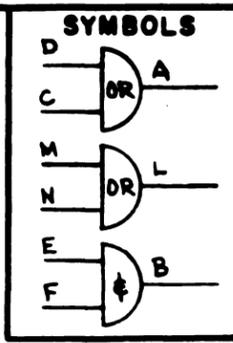


172066



NOTE:
REFER TO 5016 WD FOR MARKING INFORMATION

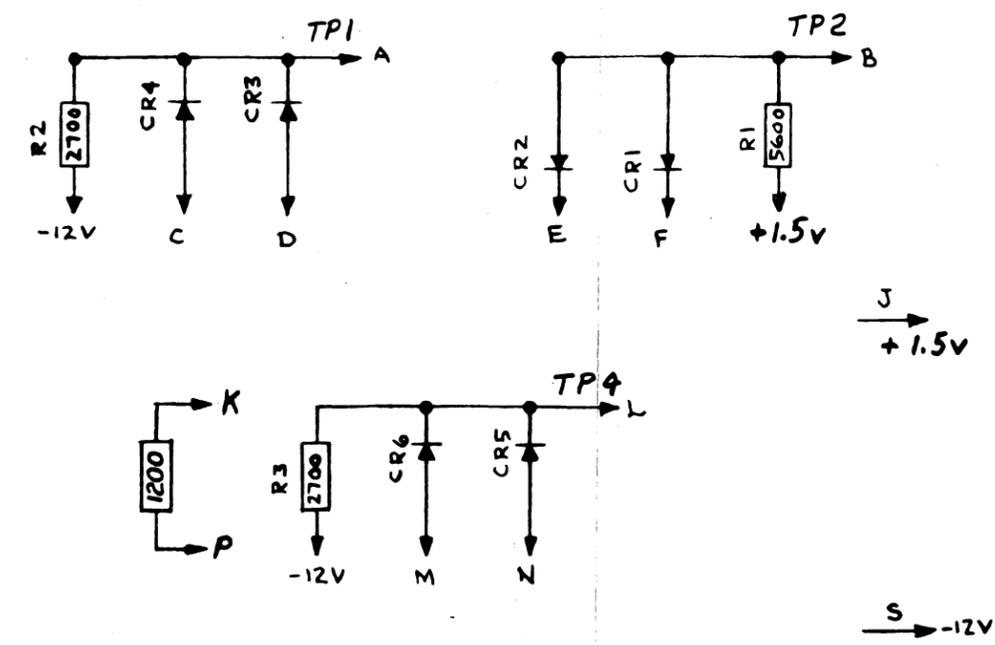
REF. DESIGN.	TELETYPE PART NO.	TOTAL QTY.	NAME AND DESCRIPTION	LOCATING FUNCTION
CR1	177108	6	Diode, D-2	Gate
CR2			Same as CR1	"
CR3			" " "	"
CR4			" " "	"
CR5			" " "	"
CR6			" " "	"
R1	118186	1	Resistor, Fixed 5600 Ohms	Bias Resistor
R2	118114	2	Resistor, Fixed 2700 "	" "
R3			Same as R2	" "
R4	137441	1	RESISTOR, FIXED 1200 OHMS	" "
EC	172066	1	Circuit Card, Etched	



This card consists of two "OR" gates and one "AND" gate. Diode CR3 and CR4, together with R2 comprise one "OR" gate, while diodes CR5 and CR6 together with R3 comprise the second "OR" gate. CR1 and CR2 together with R1 comprise the "AND" gate.

When 0 volts is applied to any one or more of the inputs of an "OR" gate (C, D, M and N) the output of that gate is 0 volts (A and L). When -6 volts is applied to all inputs of an "OR" gate, the output is -6 volts.

When -6 V is applied to any one or more of the inputs to an "AND" gate (E and F), the output of that gate is -6 volts (B). When 0 volts is applied to all inputs of an "AND" gate, the output is 0 volts.



NOTE:
CARD CONNECTIONS ARE REPRESENTED BY LETTERS
TEST POINTS ARE REPRESENTED BY NUMBERS

ISSUE	DATE	AUTH. NO.
2	6-30-59	H.S.-1040
3	9-8-59	H.S.-1139
4	10-28-59	H.S.-1230
5	10-28-59	H.S.-1230
6	8-18-60	H.S.-1457
7	5-26-61	69892
8	4-5-62	73031

APPROVALS

D AND E OF M

E-NUMBER

PROD. NO. 172374

DATE:

P.D. FILE NO.

DRAWN - R.S. CHKD.

ENGD. S.S. APPD. K

TELETYPE CORPORATION

172374

ET-191481

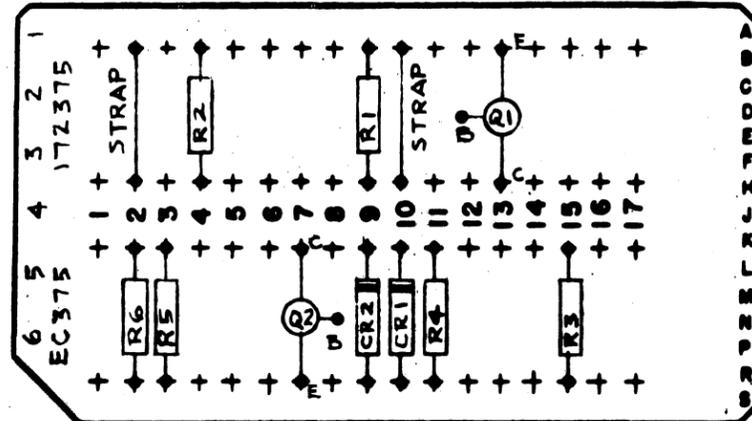
EC 375

INHIBIT GATE (2)

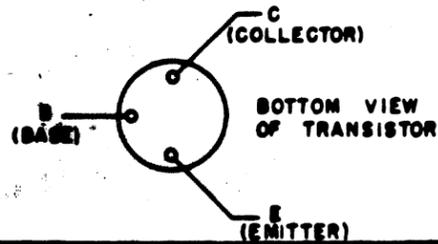
CIRCUIT BOARD EC 375

172375

172375



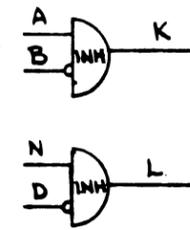
172065



NOTE:
REFER TO 5016 WD FOR MARKING INFORMATION

REF. DESIGN.	TELETYPE PART NO.	TOTAL QTY.	NAME AND DESCRIPTION	LOCATING FUNCTION
CR1	177108	2	Diode, D-2	Clamping Diode
CR2			Same as CR1	"
R1	118125	1	Resistor, Fixed 5600 Ohms	Base Bias
R2	118125	2	10K	Collector Load
R3			Same as R1	"
R4			Same as R1	"
R5			Same as R2	Base Bias
R6			Same as R1	"
Q1	177108	2	Transistor, P-22	Gate
Q2			Same as Q1	"
EC	172065	1	Circuit Card, Etched	
		2	Straps Bare 24 Avg.	
	144495	2	PAD, TRANSISTOR	

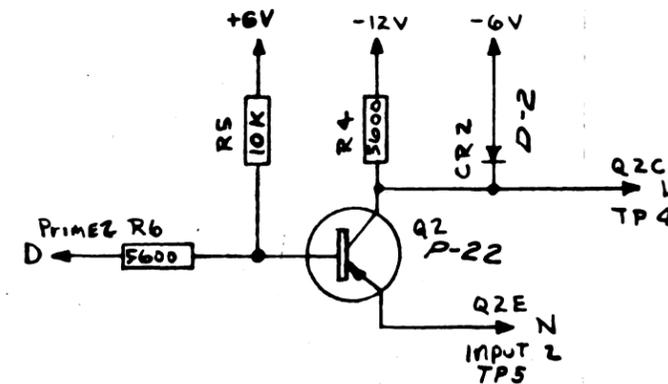
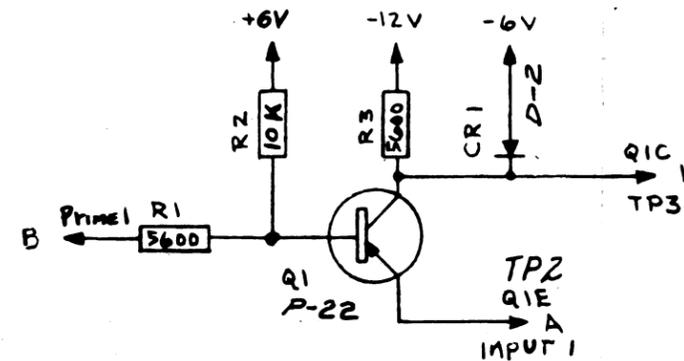
SYMBOLS



This card consists of two identical circuits. They are basically common emitter amplifiers which may be connected to function as inhibit (and) gates.

The base and emitter potentials vary from -6 to 0 volts independently. In order for Q1 and Q2 to conduct, there must be a coincidence of -6 volts applied at points B and D and 0 volts applied at points A and N. When this condition is met, Q1 and Q2 conduct and the collector output is 0 volts (K and L). CR1 and CR2 clamp the collectors at -6 volts when non-conducting.

ISSUE	DATE	AUTH. NO.
2	8-13-59	MS-1086
3	9-8-59	MS-1133
4	10-28-59	MS-1238
5	5-26-61	69892



NOTE:
CARD CONNECTIONS ARE REPRESENTED BY LETTERS
TEST POINTS ARE REPRESENTED BY NUMBERS

P → -6V
R → -12V
S → +6V

APPROVALS

D AND R E OF M

[Handwritten signatures]

PROB. NO. 172375

DATE:
P.D. FILE NO.

DRAWN *[Signature]* CHKD. *[Signature]*
ENGD. *[Signature]* APPD. *[Signature]*

TELETYPE CORPORATION

172375

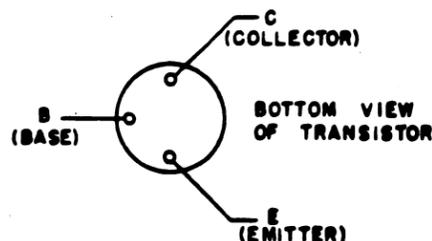
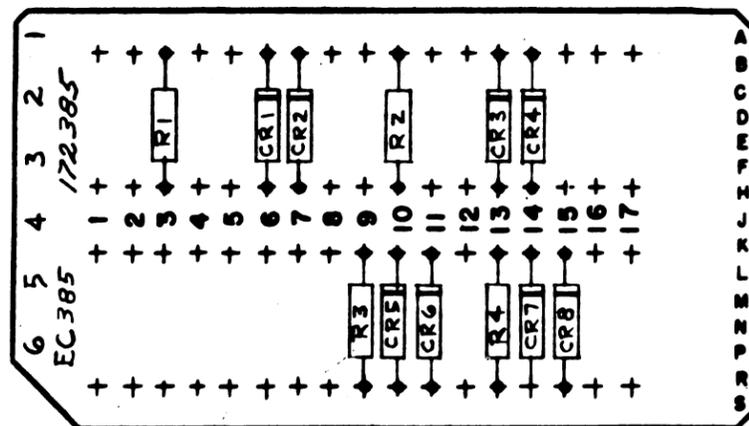
EC 385

DIODE GATES (4)

CIRCUIT BOARD EC 385

172385

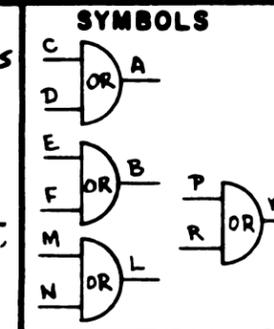
172385



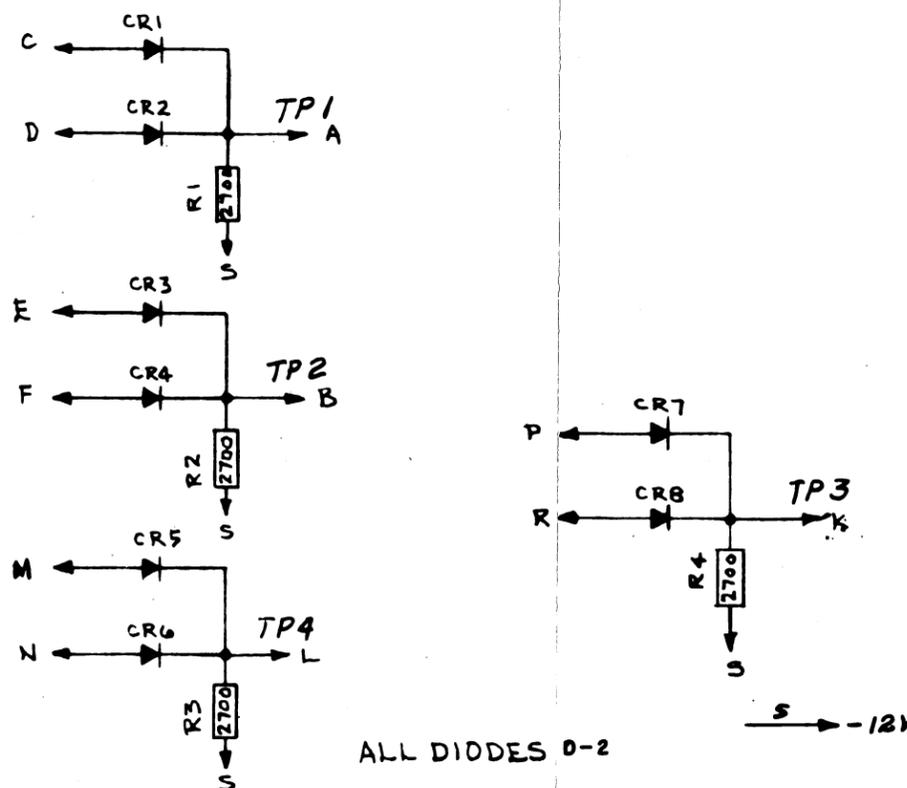
NOTE:
REFER TO 5016 WD FOR MARKING INFORMATION

REF. DESIGN.	TELETYPE PART NO.	TOTAL QTY.	NAME AND DESCRIPTION	LOCATING	FUNCTION
CR1	177108	8	Diode, D-2		Gate
CR2			Same as CR1	"	"
CR3			Same as CR1	"	"
CR4			Same as CR1	"	"
CR5			Same as CR1	"	"
CR6			Same as CR1	"	"
CR7			Same as CR1	"	"
CR8			Same as CR1	"	"
R1	118144	4	Resistor, Fixed 2700 Ohms		Bias Resistor
R2			Same as R1	"	"
R3			Same as R1	"	"
R4			Same as R1	"	"
EC	172066	1	Circuit Card, Etched		

THIS CARD CONSISTS OF FOUR 'OR' GATES
 WHEN 0 VOLTS IS APPLIED TO ANY ONE OR MORE OF THE INPUTS OF THE GATES (C,D,E,F, M,N) THE OUTPUT OF THAT GATE IS 0 VOLTS A, B, K AND L. WHEN -6 VOLTS IS APPLIED TO ALL INPUTS OF AN OR GATE, THE OUTPUT IS AT -6 VOLTS.



ISSUE	DATE	AUTH. NO.
2	6-30-58	NS-1040
3	9-8-59	NS-1139
4	10-6-59	NS-1187
5	9-15-60	NS-1206
6	5-26-61	69892



NOTE:
 ALL DIODES D-2
 CARD CONNECTIONS ARE REPRESENTED BY LETTERS
 TEST POINTS ARE REPRESENTED BY NUMBERS

APPROVALS

D AND E OF M

NUMBER

PROD. NO. 172385

DATE:

P.D. FILE NO.

DRAWN: R.S. CHKD.

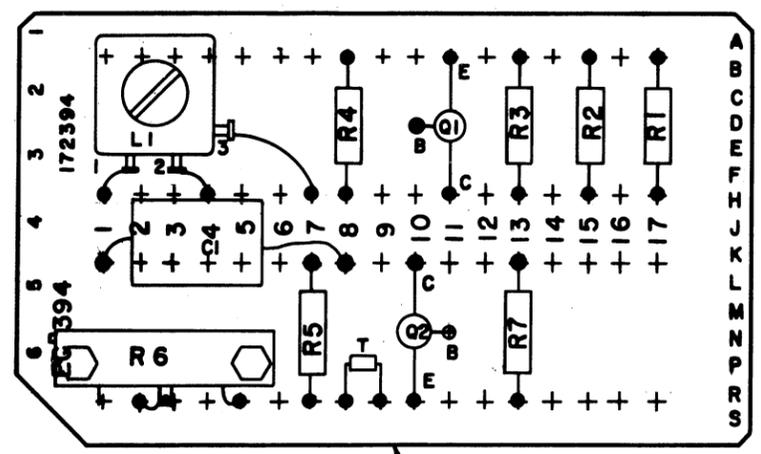
ENGD. JJD APPD.

TELETYPE CORPORATION

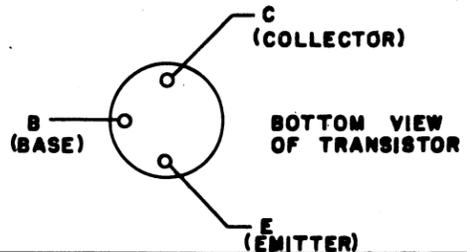
172385

EC 394
172394

CIRCUIT BOARD EC 394 172394



172047



NOTE
REFER TO 5016WD FOR MARKING
INFORMATION

REF. DESIGN	TELETYPE PART NO.	TOTAL QTY.	NAME AND DESCRIPTION	LOCATING FUNCTION
R1	118147	1	RESISTOR FIXED 6800 OHMS	BASE RESISTANCE
R2	129856	1	RESISTOR FIXED 150 OHMS	EMITTER BIAS
R3	129856	1	RESISTOR FIXED 150 OHMS	EMITTER BIAS
R4	137442	1	RESISTOR FIXED 1500 OHMS	COLLECTOR LOAD
R5	137441	1	RESISTOR FIXED 1200 OHMS	FEED BACK SHUNT
R6	171565	1	RESISTOR VARIABLE 10K OHMS	FEED BACK ADJ.
R7	129852	1	RESISTOR FIXED 2200 OHMS	EMITTER LOAD
T	171830	1	THERMISTOR 10K OHMS	FEED BACK
C1	171834	1	CAPACITOR, .050 MFD ± 5%	TANK CAPACITANCE
L1	171686	1	ADJUSTROID .475 H	TANK INDUCTANCE
Q1	177105	2	TRANSISTOR P-22	SWITCH
Q2			SAME AS Q1	AMPLIFIER
EC	172047	1	CIRCUIT CARD, ETCHED	POLYSTYRENE
	121018	2	NUT 4-40 HEX	
	90951	2	LOCKWASHER	
	1178	2	SCREW 2-56 X .431 FIL.	
	110446	2	NUT 2-56 HEX.	
	144495	2	PAD, TRANSISTOR	

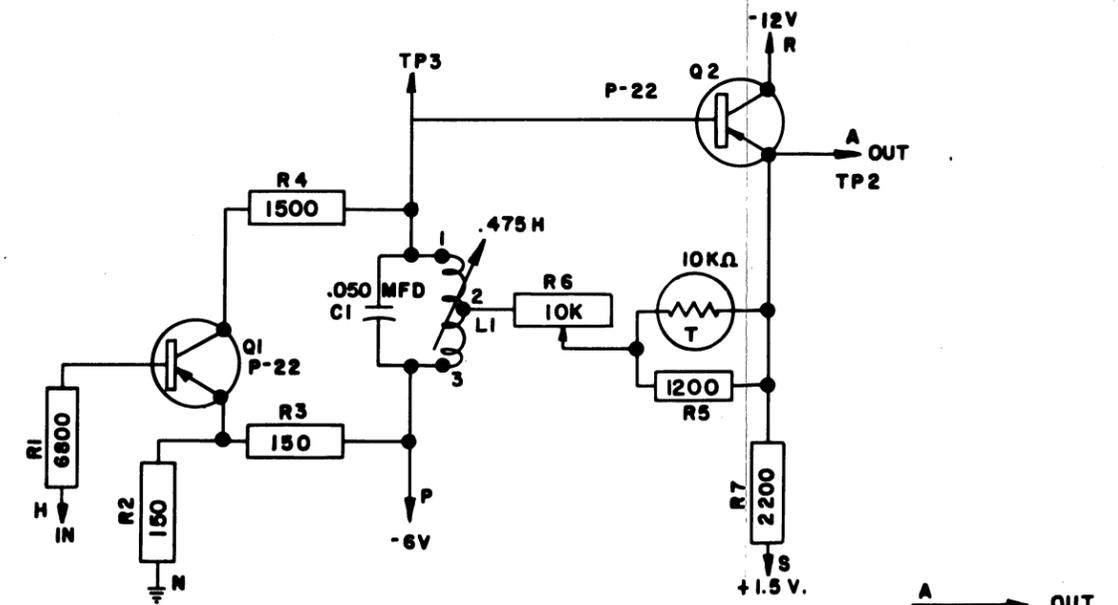
START-STOP OSCILLATOR (1050 BAUD)

THIS CIRCUIT IS A SINE WAVE OSCILLATOR ARRANGED TO START OR STOP UNDER CONTROL OF AN EXTERNAL SIGNAL AND TO OSCILLATE AT A FREQUENCY OF 1050 CPS. THE NEGATIVE HALF CYCLE OF THE SINE WAVE IS PRODUCED IMMEDIATELY WHEN 0 VOLTS (GROUND) IS APPLIED AT THE INPUT. THE CIRCUIT EMPLOYS TWO PNP JUNCTION TRANSISTORS. Q2 IS CONNECTED AS A HARTLEY OSCILLATOR WITH THE OUTPUT TAKEN FROM ITS EMITTER. Q1 IS ARRANGED TO ACT AS A DAMPER ACROSS THE RESONANT CIRCUIT L1-C1. WHEN THE INPUT IS AT -6V, Q1 IS CONDUCTING AND THE CIRCUIT IS PREVENTED FROM OSCILLATING DUE TO LOW RESISTANCE IN PARALLEL WITH RESONANT CIRCUIT (ITS Q DOWN TO A VALUE TOO LOW TO SUSTAIN OSCILLATION). IN THE STATIC CONDITION THE OUTPUT IS CLAMPED AT APPROXIMATELY -5.5V. DURING SUSTAINED OSCILLATION THE OUTPUT SWINGS BETWEEN -1 AND -9 VOLTS. A SMALL RANGE OF ADJUSTMENT FOR FREQUENCY IS PROVIDED BY MEANS OF A VARIABLE INDUCTOR. A VARIABLE RESISTOR IS PROVIDED TO ADJUST FEEDBACK CURRENT TO SUSTAIN OSCILLATION.

SYMBOLS



ISSUE	DATE	AUTH. NO.
2	5-26-61	69892
3	10-11-61	71305
4	12-6-61	71869
5	2-10-64	80306



NOTE
CARD CONNECTIONS ARE REPRESENTED BY LETTERS
TEST POINTS ARE REPRESENTED BY NUMBERS

- A → OUT
- H → IN
- N → GND
- P → -6V
- R → -12V
- S → +1.5V

APPROVALS

D AND R: [Signature]
E OF M: [Signature]

E-NUMBER

PROD. NO. 172394

DATE: 3-1-60

P.D. FILE NO. 1-11.134 AA

DRAWN S.W. F.C.S. CHKD [Signature]

ENG. E.H.P. APPD [Signature]

TELETYPE CORPORATION

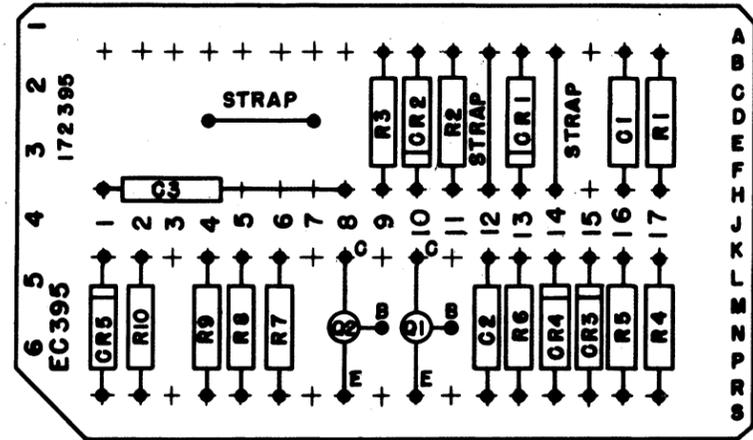
172394

EC 395
172395

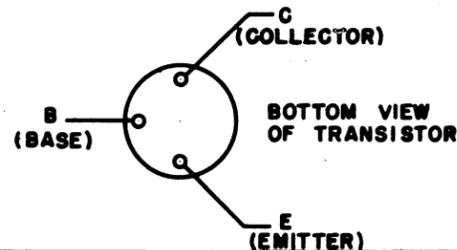
FIXED ONE - SHOT
200 μ S

CIRCUIT BOARD EC 395

172395



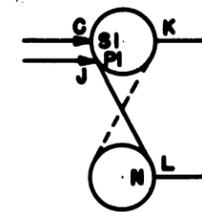
172063



NOTE
REFER TO 5016WD FOR MARKING INFORMATION

REF. DESIGN.	TELETYPE PART NO.	TOTAL QTY.	NAME AND DESCRIPTION	LOCATING	FUNCTION
C1	177332	1	CAPACITOR, CERAMIC .002MF	COUPLING	
C2	177331	1	CAPACITOR, CERAMIC .001 MF	FEED BACK	
C3	171680	1	CAPACITOR, CERAMIC .047MF	TIMING	
CR1	177108	5	DIODE, D-2	COUPLING	
CR2			DIODE, D-2	GATE	
CR3			SAME AS CR2	CLAMP	
CR4			SAME AS CR2	CLAMP	
CR5			SAME AS CR2	GATE	
R1	118177	1	RESISTOR, FIXED 22K OHM	GATE	
R2	137442	1	RESISTOR, FIXED 1500 OHM	BIAS	
R3	137444	1	RESISTOR, FIXED 6200 OHM	TIMING	
R4	137441	2	RESISTOR, FIXED 1200 OHM	COLLECTOR LOAD	
R5			SAME AS R4	COLLECTOR LOAD	
R6	129851	1	RESISTOR, FIXED 3300 OHM	FEED BACK	
R7	118144	1	RESISTOR, FIXED 2700 OHM	BIAS	
R8	118180	1	RESISTOR, FIXED 10K OHM	BIAS	
R9	143656	1	RESISTOR, FIXED 51 OHM	COMMON EMITTER LOAD	
R10	118147	1	RESISTOR, FIXED 6800 OHM	BIAS	
Q1	177105	2	TRANSISTOR, P-22	SWITCH	
Q2			SAME AS Q1	SWITCH	
EC	172063	1	CIRCUIT CARD, ETCHED		
		3	STRAP 24499 BARE		
	144495	2	PAD, TRANSISTOR		

SYMBOLS



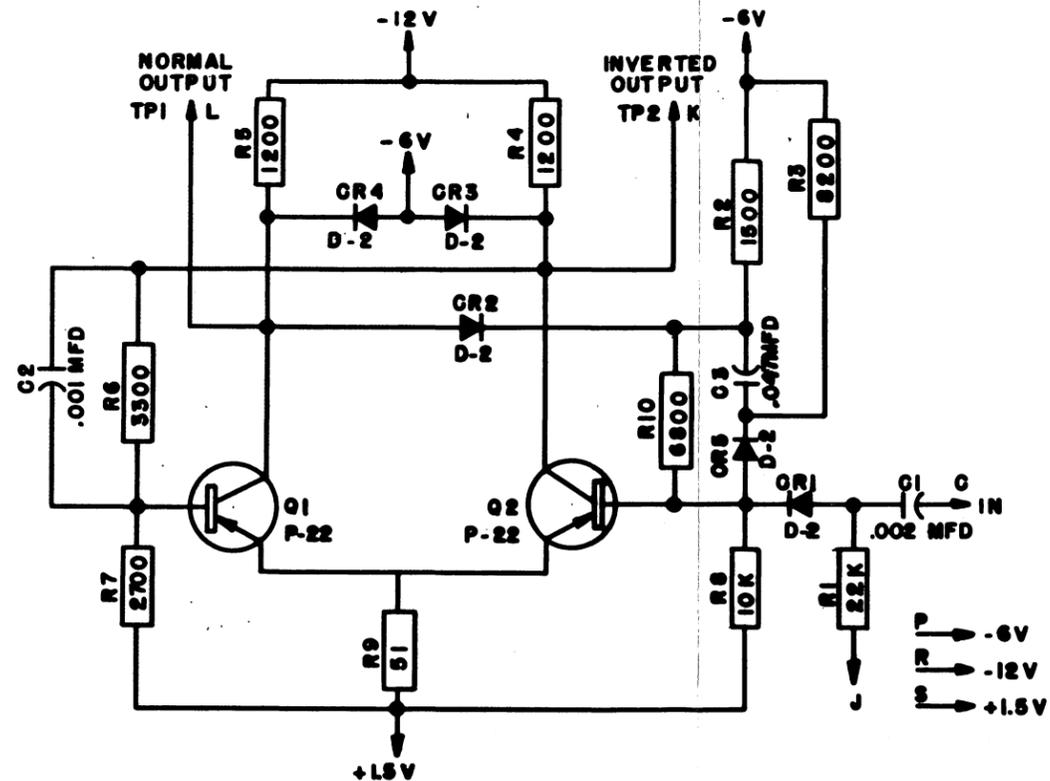
ISSUE	DATE	AUTH. NO.
2	5-26-61	69892
3	11-16-61	71626
4	1-15-64	80001

THE PURPOSE OF THIS CIRCUIT IS TO GENERATE A PULSE OF 200 MICROSECONDS IN WIDTH IN RESPONSE TO AN INPUT. NORMAL (POSITIVE GOING) AND INVERTED OUTPUTS ARE PROVIDED.

THE QUIESCENT STATE OF THIS CIRCUIT IS THAT Q2 IS SATURATED, RECEIVING ITS BIAS CURRENT PRIMARILY THROUGH R2 AND R10 CONNECTED IN PARALLEL WITH CR5, R3 TO -6V. THE COLLECTOR OF Q2 IS APPROXIMATELY 0V AND THE COLLECTOR OF Q1 IS -6V. Q1 IS MAINTAINED CUT-OFF BY CROSS COUPLING OF R6 AND R7 RETURNED TO +1.5V, HOLDING THE BASE POTENTIAL OF Q1 AT APPROXIMATELY +1V. THE COMMON EMITTER POTENTIAL IS 0V SINCE Q2 IS SATURATED.

CAPACITOR C1, R1 AND CR1 COMBINE TO FORM AN INHIBIT GATE, WHEREBY WHEN -6V IS APPLIED AT POINT J, INPUTS RECEIVED AT POINT C WILL FAIL TO TRIGGER THE CIRCUIT. CONVERSELY THE CIRCUIT IS ENABLED WHEN POINT J IS RETURNED TO 0V SINCE CR1 WILL NOW PASS POSITIVE GOING TRANSITIONS.

THE CIRCUIT IS TRIGGERED AS FOLLOWS: A POSITIVE TRANSITION APPLIED AT POINT C DRIVES Q2 INTO CUT-OFF WHICH, IN TURN, ALLOWS Q1 TO CONDUCT. AS THE COLLECTOR OF Q1 APPROACHES 0V, CR2 CONDUCTS CHARGING C3, AND MAINTAINING Q2 IN CUT-OFF. Q2 REMAINS CUT-OFF UNTIL C3 CAN DISCHARGE SUFFICIENTLY THROUGH R3 TO PERMIT CONDUCTION OF Q2. THE PERIOD OF CONDUCTION OF Q1 IS PRIMARILY DETERMINED BY THE SIZE OF C3 AND R3.



NOTE
CARD CONNECTIONS ARE REPRESENTED BY LETTERS
TEST POINTS ARE REPRESENTED BY NUMBERS

APPROVALS

D AND R E OF M

E-NUMBER

PROD. NO. 172395

DATE: 3-1-60

P.D. FILE NO. I-11.134AA

DRAWN. AS CHKE

ENG. E.H.P. APPD.

TELETYPE CORPORATION

172395

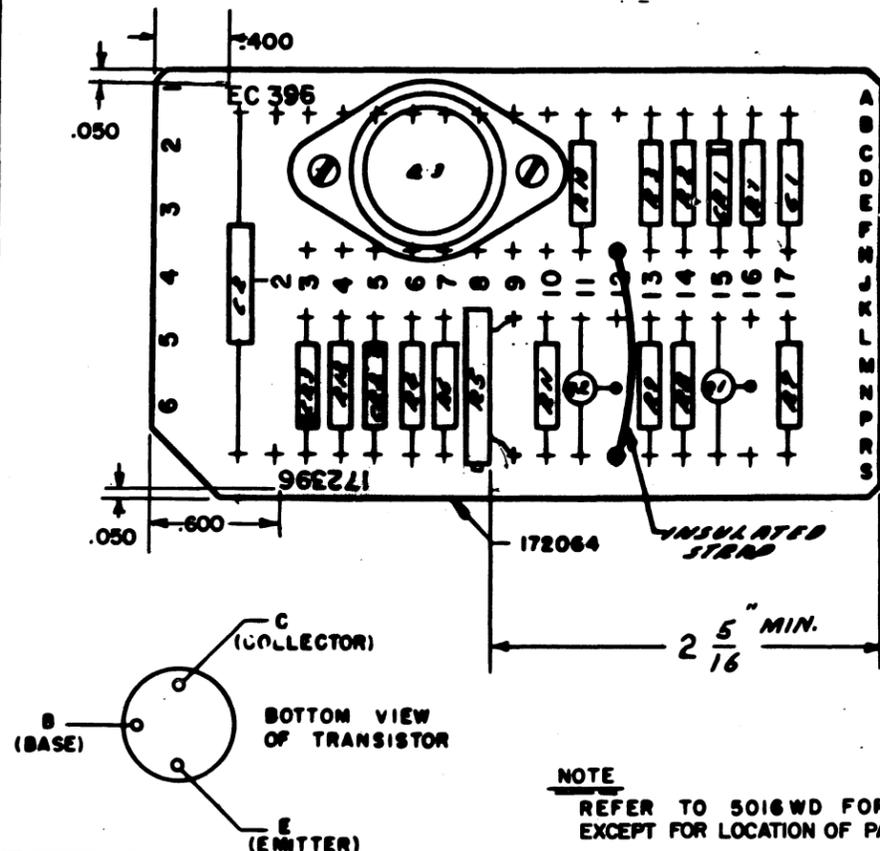
EC 396

MAGNET PULSER

CIRCUIT BOARD EC 396

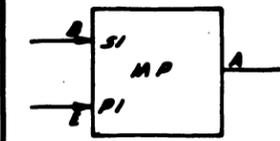
172396

172396



REF. DESIGN.	TELETYPE PART NO.	TOTAL QTY.	NAME AND DESCRIPTION	LOCATING FUNCTION
C1	171587	1	Capacitor, Ceramic .005 Mfd.	Coupling Capacitor
C2	171579	1	Capacitor, Mylar .47 Mfd.	Timing
CR1	177108	3	Diode D-2	Gate
CR2			Same as CR1	Gate
CR3			Same as CR1	Gate
R1	118180	1	Resistor, Fixed 10K	Bias
R2	118144	1	Resistor, Fixed 2700 Ohms	Bias
R3	118177	1	RESISTOR, FIXED 22K	Bias
R4	118147	1	Resistor, Fixed 6800 Ohms	Bias
R5	171145	1	Resistor, VARIABLE 25K OHMS	Timing Resistor
R6	137441	2	Resistor, Fixed 1200 Ohms	Bias
R7			Same as R6	Collector Load
R8	137442	1	Resistor, Fixed 1500 Ohms	Bias
R9	118146	1	Resistor, Fixed 4700 Ohms	Bias
R10	129850	1	Resistor, Fixed 680 Ohms	Emitter Load
R11	137601	1	Resistor, Fixed 68 Ohms	Limiting
R12	171589	1	Resistor, Fixed 1 Ohm	Limiting
Q1	177105	2	Transistor, P-22	Amplifier
Q2			Same as Q1	Amplifier
Q3	171607	1	Transistor, 2N380	Amplifier
	111017	2	Screws 6-40 F11.	
	92250	2	Lock Washer 10-32 Hex.	
	80728	2	Nuts 6-40 Hex.	
EC	172064	1	Etched Circuit Card	
		1	Strap #24 Gauge Insulated	
	144495	2	PAD, TRANSISTOR	

SYMBOLS



ISSUE	DATE	AUTH NO
2	8-22-60	MS 1941
3	8-29-60	MS 1936
4	9-7-60	MS 1936
5	5-26-61	69892
6	3-28-62	72927
7	1-21-66	89415

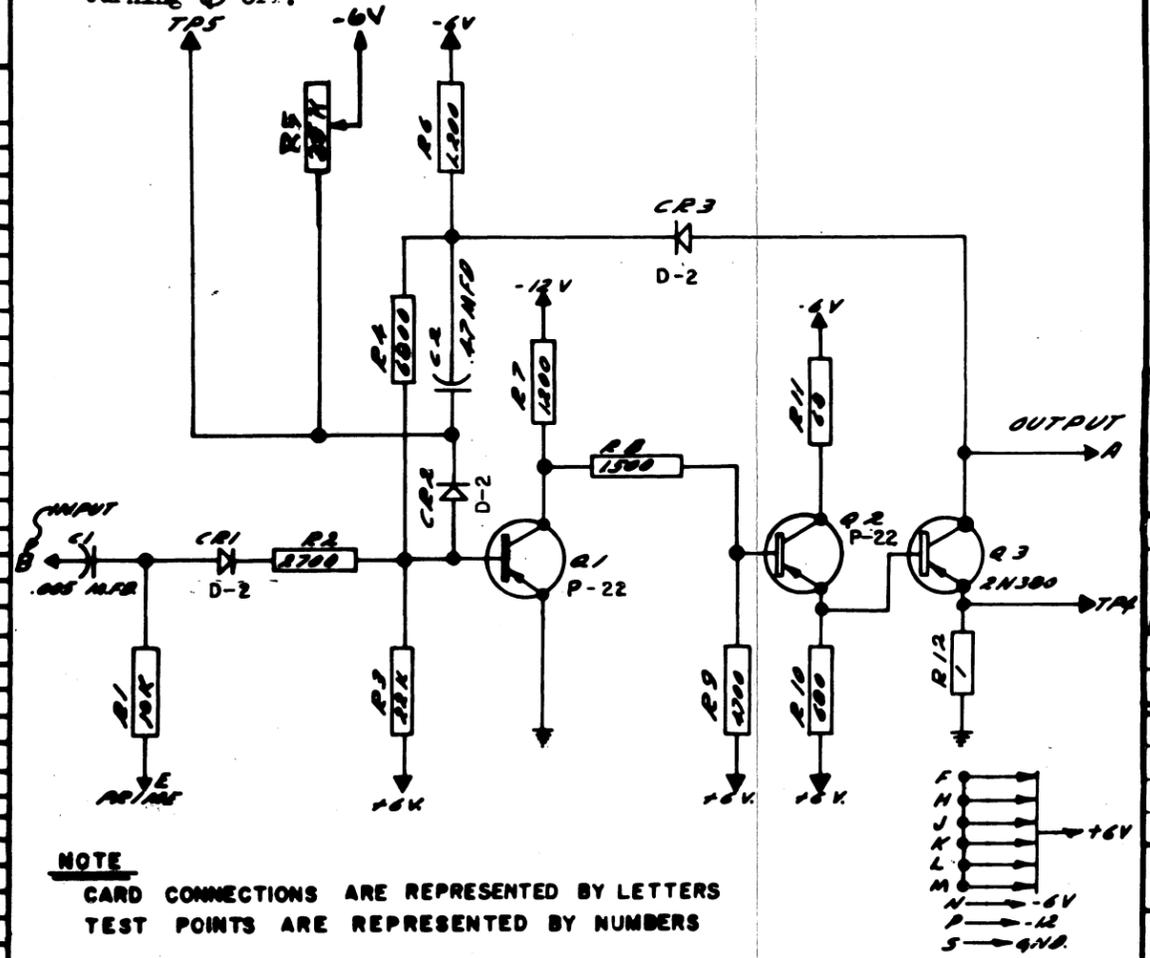
This circuit is essentially a power one shot which is preceded by an "AND" gate. The circuit is designed to provide a -28 V to 0 signal to BRPE magnet coils.

STATIC CONDITION

In static condition Q1 is biased on by DC path through R3, R4 and R6. Q2 is an emitter follower holding Q3 in cut-off condition. The output is at -28 volts with this voltage being applied to the collector load (magnet coils).

OPERATION

A positive pulse (-6 V to 0) applied to the input gate at C1 will be passed only when the prime (Terminal E) of the gate is at 0 volts or slightly positive. The signal passes through CR1 and R2 and is impressed on C2 and the base of Q1 thus turning Q1 off. When Q1 is turned off, Q2 emitter goes negative to approximately -1.5 volts thus Q3 is turned on applying 0 volts to CR3 and C2. The timing capacitor C2 has approximately a +2.5 volt charge on base side and begins to discharge through R5 and aims toward -6V. Four TO FIVE m.Sec later when CR2 reaches a potential slightly less than ground, Q1 is turned on and its collector swings to ground. Consequently Q2 emitter goes to approximately 1 volt turning Q3 off.



APPROVALS

D AND R	E OF M
<i>[Signature]</i>	<i>[Signature]</i>

E-NUMBER

PROD. NO. 172396

DATE: 7-6-60

P.D. FILE NO 19-225AA

DRAWN R.F.L. CHKD

ENGD E.H.A. APPD

TELETYPE CORPORATION

172396

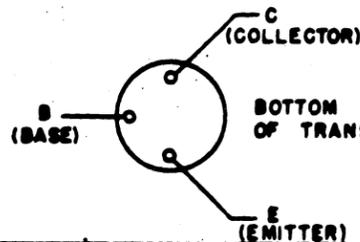
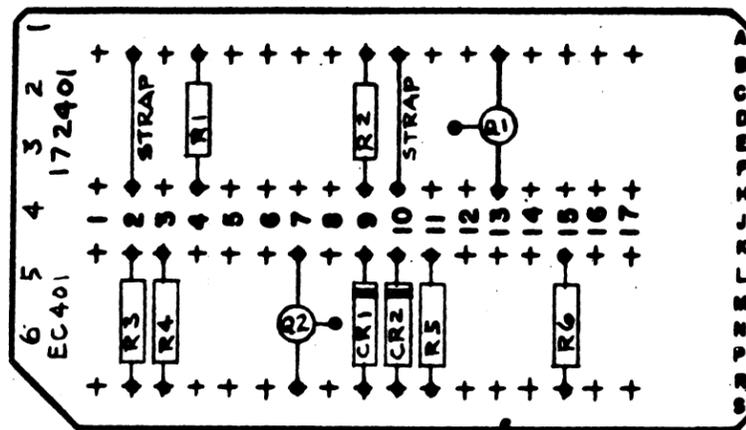
EC 401

(PNP) INVERTER (2)

CIRCUIT BOARD EC 401

172401

172401



NOTE:
REFER TO 5016 WD FOR MARKING INFORMATION

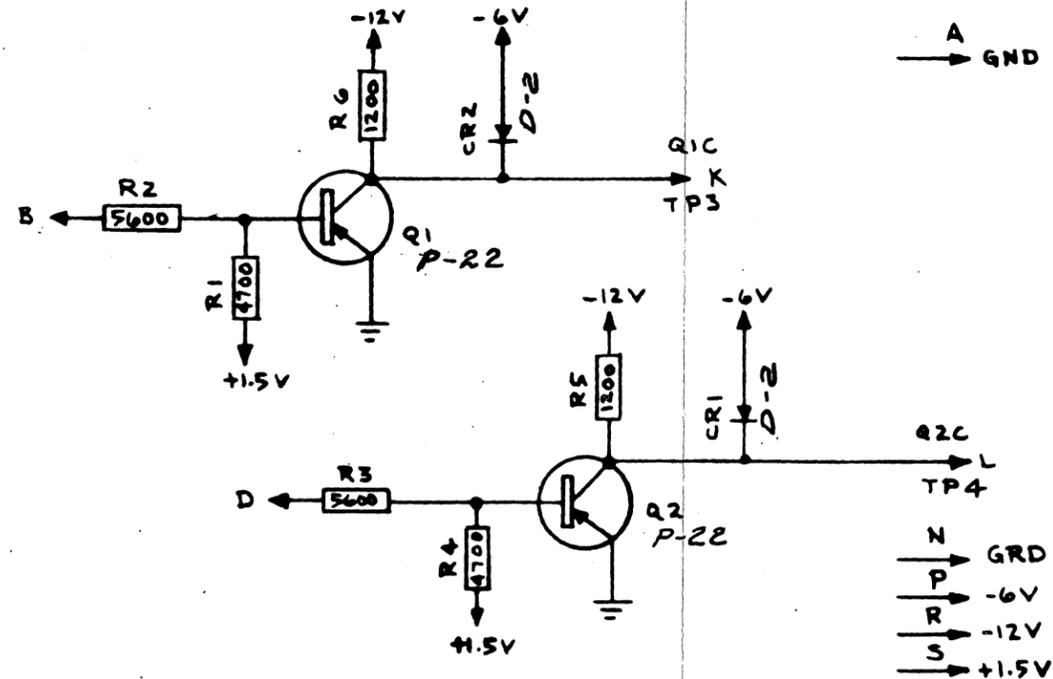
REF. DESIGN.	TELETYPE PART NO.	TOTAL QTY.	NAME AND DESCRIPTION	LOCATING FUNCTION
CR1	177108	2	Diode, D-2	Clamping Diode
CR2			Same as CR1	
R1	118116	2	Resistor, Fixed 1700 Ohms	Base Bias
R2	118186	2	5600	" "
R3			Same as R2	" "
R4			Same as R1	" "
R5	137111	2	Resistor, Fixed 1200 Ohms	Collector Load
R6			Same as R5	
Q1	177105	2	Transistor (PNP) P-22	Inverter
Q2			Same as Q1	
EC	172065	1	Circuit Card, Etched	
		2	Strap Bars 24 AWG.	
	144495	2	PAD, TRANSISTOR	

SYMBOLS



This card consists of two identical PNP common emitter amplifiers which provides an inverted output signal.

Q1 and Q2 has a reverse bias of approximately 1.5 volts, the collectors of Q1 and Q2 are clamped at -6 volts by CR1 and CR2. With a negative 6 volts signal applied at point B and D, Q1 and Q2 are driven into saturation, causing the collector potentials to rise (-6 V to 0 V) for the duration of the input signal.



NOTE:

CARD CONNECTIONS ARE REPRESENTED BY LETTERS
TEST POINTS ARE REPRESENTED BY NUMBERS

ISSUE	DATE	AUTH. NO.
2	9-11-59	NS-1159
3	10-28-59	NS-1234
4	6-26-61	69892

APPROVALS

D AND E OF M

E-NUMBER
PROD. NO. 172401

DATE:
P.D. FILE NO.

DRAWN 4/31 CHKD.
ENGD. S.S. APPD.

TELETYPE CORPORATION

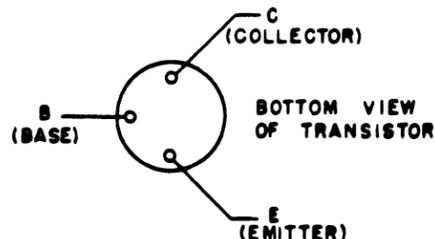
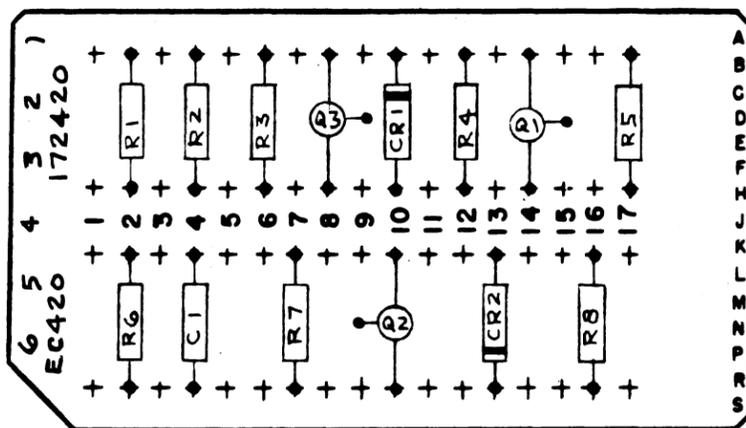
172401

EC 420
172420

SQUARING AMPLIFIER

CIRCUIT BOARD EC 420

172420



NOTE

Refer to 5016WD for marking information.

REF. DESIGN.	TELETYPE PART NO.	TOTAL QTY.	NAME AND DESCRIPTION	LOCATING	FUNCTION
C1	171567	1	Capacitor, Ceramic .005 Mc	Coupling	
CR1	177108	2	Diode, D-2	Clamping Diode	
CR2			Same as CR1	"	"
R1	129851	1	Resistor, Fixed 3300 Ohms	Base Bias	
R2	137440	1	" " 1000 "	"	"
R3	137441	1	" " 1200 "	Collector Load	
R4	118180	1	" " 10 K "	Base Bias	
R5	118147	2	" " 6800 "	"	"
R6			Same as R5	Collector Load	
R7	137442	1	Resistor, Fixed 1500 Ohms	"	"
R8	118156	1	" " 56 K Ohms	Feed Back Resistor	
Q1	177106	1	Transistor, N-33	Amplifier	
Q2	177105	2	Transistor, P-22	Amplifier	
Q3			Same as Q2	Amplifier	
EC	172068	1	Circuit Card, Etched		
	144495	3	PAD, TRANSISTOR		

SYMBOLS

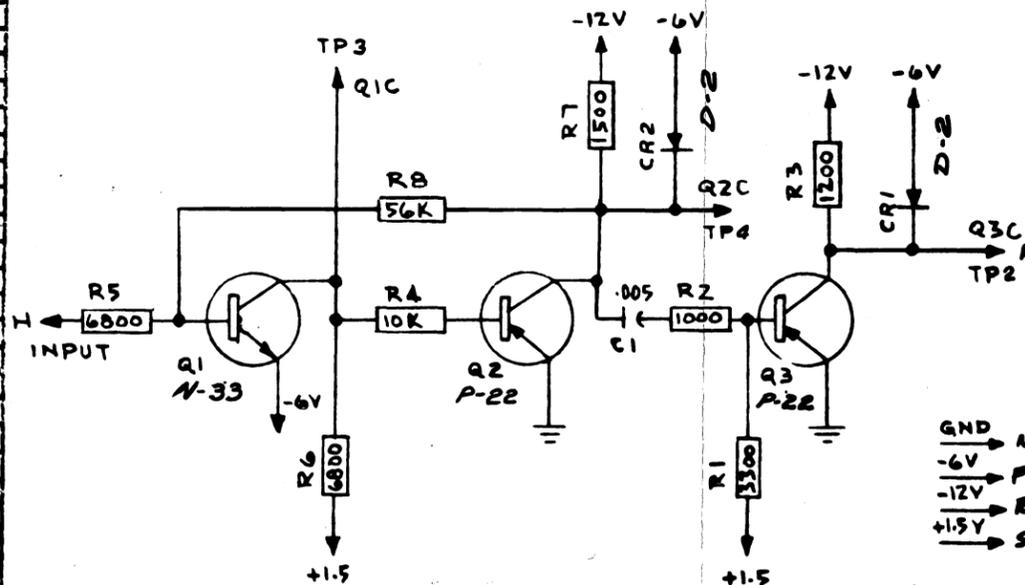


ISSUE	DATE	AUTH. NO.
2	9-19-60	NS-1905
3	5-26-61	69892
4	4-5-62	73031

This circuit is designed to operate in conjunction with the start-stop oscillator (172391 to 172394). The circuit is basically a two-stage regenerative amplifier and a capacitively coupled pulse amplifier. The circuit converts the sinusoidal input into narrow output pulses.

In the static condition -5.5 volts on Terminal H, Q1 and Q2 are conducting Q3 is off and the output on Terminal A is at -6 volts. With a sinusoidal input (0 to approximately -12 volts) applied to Terminal H, the following action takes place. When the signal reaches the -6 volt level, Q1 turns off and the collector goes to +1.5 volts which consequently reverse biases the emitter-base junction of Q2 and thus Q2 turns off. When transistor Q2 turns off its collector goes to -6 volts since its collector is clamped at -6 volts by CR2. With a negative going transition applied to C1, a differentiating capacitor, the base potential of Q3 will go negative for a short duration of time. This causes Q3 to conduct and its collector potential will go to 0 volts during this time. A narrow positive pulse will be produced once for every cycle of operation of the oscillator.

When the input goes positive and reaches a voltage level slightly higher than -6 V, Q1 will conduct and its collector will go to -6 V which will turn Q2 on and its collector will go to 0 volts. Since this is a positive transition, Q3 will not conduct and no pulse will appear at output Terminal A.



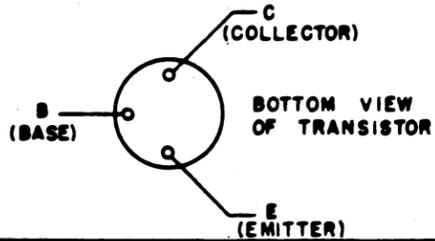
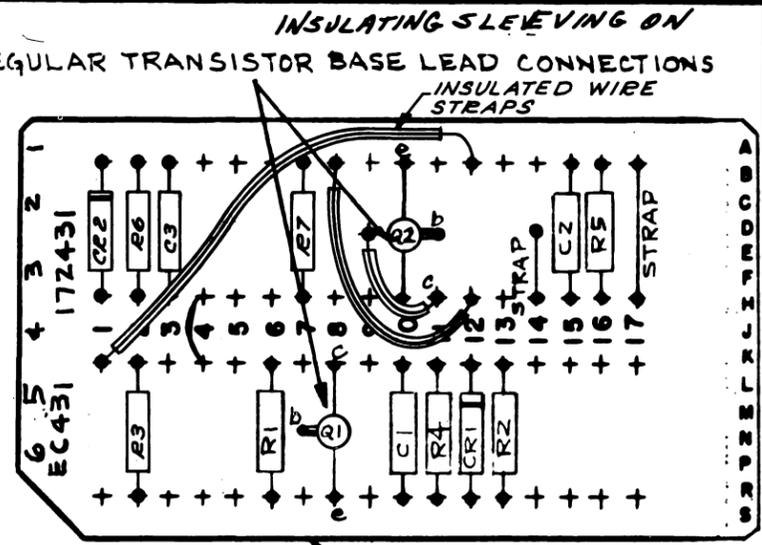
NOTE:

CARD CONNECTIONS ARE REPRESENTED BY LETTERS
TEST POINTS ARE REPRESENTED BY NUMBERS

B1457
1 TO 1

APPROVALS
D AND E OF M
E-NUMBER
PROD. NO. 172420
DATE:
P.D. FILE NO.
DRAWN BY: [Signature] CHKD.
ENGD. [Signature] APPD. [Signature]
TELETYPE CORPORATION
172420

NOTE: IRREGULAR TRANSISTOR BASE LEAD CONNECTIONS



NOTE: REFER TO 5016 WD FOR MARKING INFORMATION

REF. DESIGN.	TELETYPE PART NO.	TOTAL QTY.	NAME AND DESCRIPTION	LOCATING FUNCTION
C1	171566	1	Capacitor, Ceramic .01 MF	Integrating Capacitor
C2	171567	1	Capacitor, Ceramic .005 MF	Bypass
C3	171585	1	CAPACITOR,MYLAR .22MFD.	INTEGRATING
CR1	177108	1	Diode D-2	Clamping Diode
CR2	177108	1	DIODE D-2	ISOLATION
R1	118144	1	Resistor, Fixed 2700 Ohms	Collector Load
R2	137441	1	Resistor, Fixed 1200 Ohms	" "
R3	129852	1	Resistor, Fixed 2200 Ohms	Bias Resistor
R4	118180	1	Resistor, Fixed 10K Ohms	" "
R5	118186	1	Resistor, Fixed 5600 Ohms	" "
R6	137440	1	RESISTOR, FIXED 1000 OHMS	INTEGRATING
Q1	177106	1	Transistor (NPN) N-33	Amplifier
Q2	177105	1	Transistor (PNP) P-22	" "
R7	118177	1	RESISTOR FIXED 22K OHMS	FEEDBACK
EC	172067	1	Circuit Card, Etched	
		3	Straps, Bare 24 AWG.	
		3	STRAPS, INSULATED 24AWG	
	144495	2	PAD, TRANSISTOR	
		2	INSULATING SLEEVING	

EC431

PICKUP AMPLIFIER

CIRCUIT BOARD EC 431

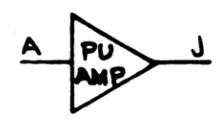
172431

This card consists of two common emitter amplifiers which generates a pulse of rapid rise time from an integrated input. The input at point A is connected through a magnetic pick-up to a -6 V supply. The output of Q1 is strapped to the input of Q2 in the connector (F and L).

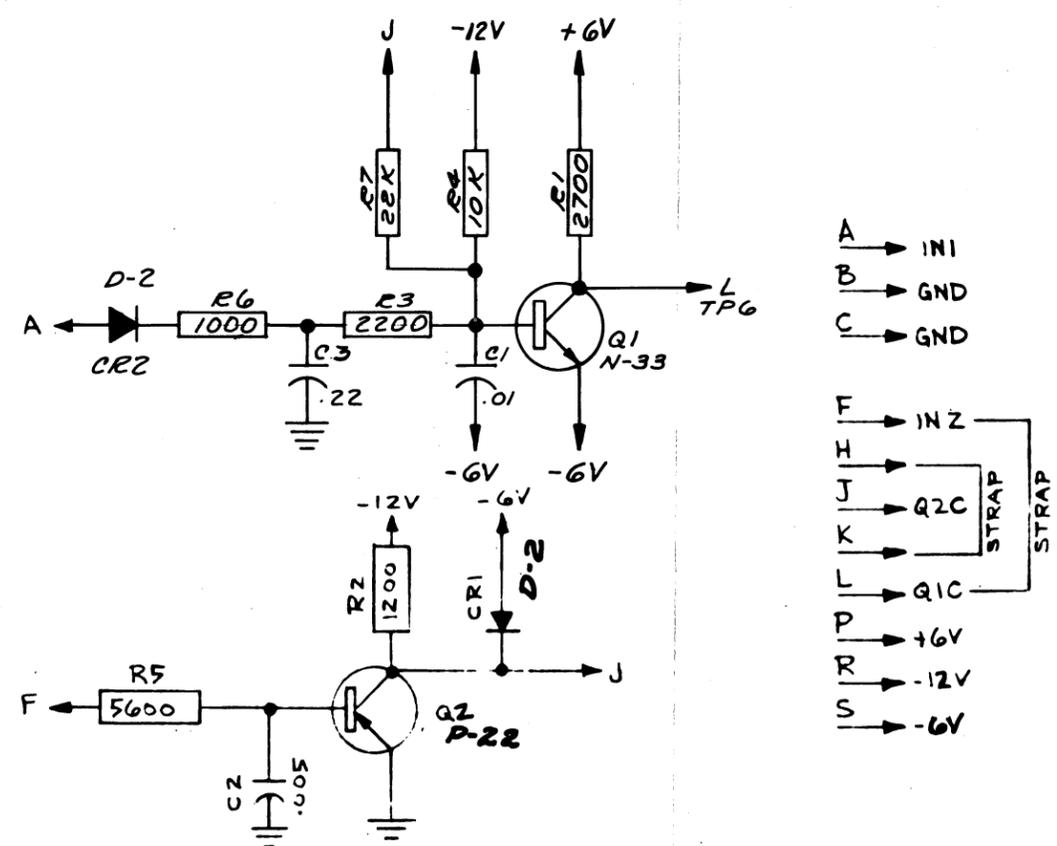
When the sinusoidal input at point A goes negative, CR2 BECOMES REVERSED BIASED Q1 is biased at cut-off by R4 RETURNED TO -12 VOLTS. THE COLLECTOR OF Q1 IS +6 VOLTS AT THIS TIME AND IS APPLIED TO THE BASE OF Q2 BY VIRTUE OF THE EXTERNAL STRAP BETWEEN L AND F. Q2 IS BIASED TO CUTOFF. CR1 CLAMPS THE COLLECTOR TO -6 VOLTS.

WHEN THE INPUT GOES POSITIVE, CR2 IS FORWARD BIASED, R6 AND C3 INTEGRATES THE INPUT AS WELL AS R3 AND C1. Q1 BECOMES FORWARD BIASED, ITS COLLECTOR POTENTIAL DROPS TO -6 VOLTS. THIS FORWARD BIASES Q2 PLACING ITS COLLECTOR AT GROUND.

SYMBOLS



DATE	DATE	AUTH. NO.
2	9-8-59	H.S. 1139
3	10-20-59	H.S. 1239
4	12-3-59	H.S. 1357
5	12-16-59	H.S. 1386
6	1-8-60	H.S. 1461
7	1-19-60	H.S. 1490
8	4-3-61	69357
9	5-26-61	69892
10	4-5-62	73031
11	8-2-62	74065
12	5-6-63	76821
13	5-13-64	81739



NOTE: CARD CONNECTIONS ARE REPRESENTED BY LETTERS. TEST POINTS ARE REPRESENTED BY NUMBERS.

APPROVALS

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<i>[Signature]</i>	<i>[Signature]</i>
E. NUMBER	
PROD. NO. 172431	
DATE: 10-23-59	
P.D. FILE NO.	
DRAWN. <i>[Signature]</i>	CHKD.
ENGD.	APPD.

TELETYPE CORPORATION

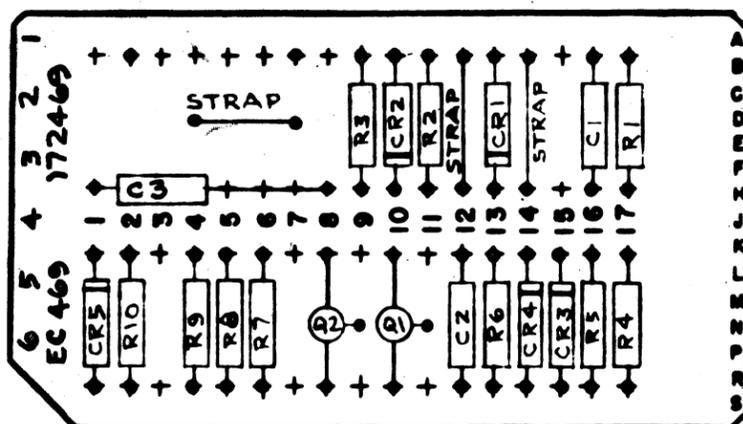
172431

EC 469

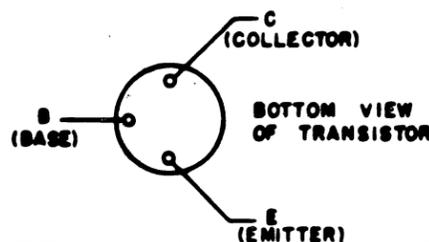
172469

CIRCUIT BOARD EC469

172469



172063



NOTE: REFER TO 5016 WD FOR MARKING INFORMATION

REF. DESIGN.	TELETYPE PART NO.	TOTAL QTY.	NAME AND DESCRIPTION	LOCATING FUNCTION
C1	177332	1	Capacitor, Ceramic .002 MF	Coupling
C2	177331	1	" " .001 "	Feed Back
C3	137311	1	" TUMBLAR .02 MF	Timing
CR1	177108	5	Diode, D-2	Coupling
CR2			DIODE, D-2	Gate
CR3			Same as CR2	Clamp
CR4			Same as CR2	"
CR5			Same as CR2	Gate
R1	118177	1	Resistor, Fixed 22K Ohm	Gate
R2	137142	1	" " 1500 "	Bias
R3	137144	1	" " 8200 "	Timing
R4	137143	2	" " 1200 Ohm	Collector Load
R5			Same as R4	"
R6	129851	1	Resistor, Fixed 3300 Ohm	Feed Back
R7	118144	1	" " 2700 "	Bias
R8	118180	1	" " 10K Ohm	"
R9	113656	1	" " 51 Ohm	Common Emitter Load
R10	118147	1	" " 6800 Ohm	Bias
Q1	177105	2	Transistor P-22	Switch
Q2			Same as Q1	"
EC	172063	1	Circuit Card Etched	
		3	STRAP 24AWG BARE	
	144495	2	PAD, TRANSISTOR	

FIXED ONE-SHOT

100 μs

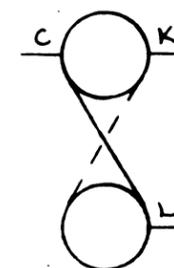
The purpose of this circuit is to generate a pulse of 100 micro seconds in width in response to an input. Normal (positive going) and inverted outputs are provided.

The quiescent state of this circuit is that Q2 is saturated, receiving its bias current primarily through R2 and R10 connected in parallel with CR5 and 0 V and the collector of Q1 is -6 V. Q1 is maintained cut-off by cross coupling of R6 and R7 returned to +1.5V, holding the base potential of Q1 at approximately +1 V. The common emitter potential is 0 V since Q2 is saturated.

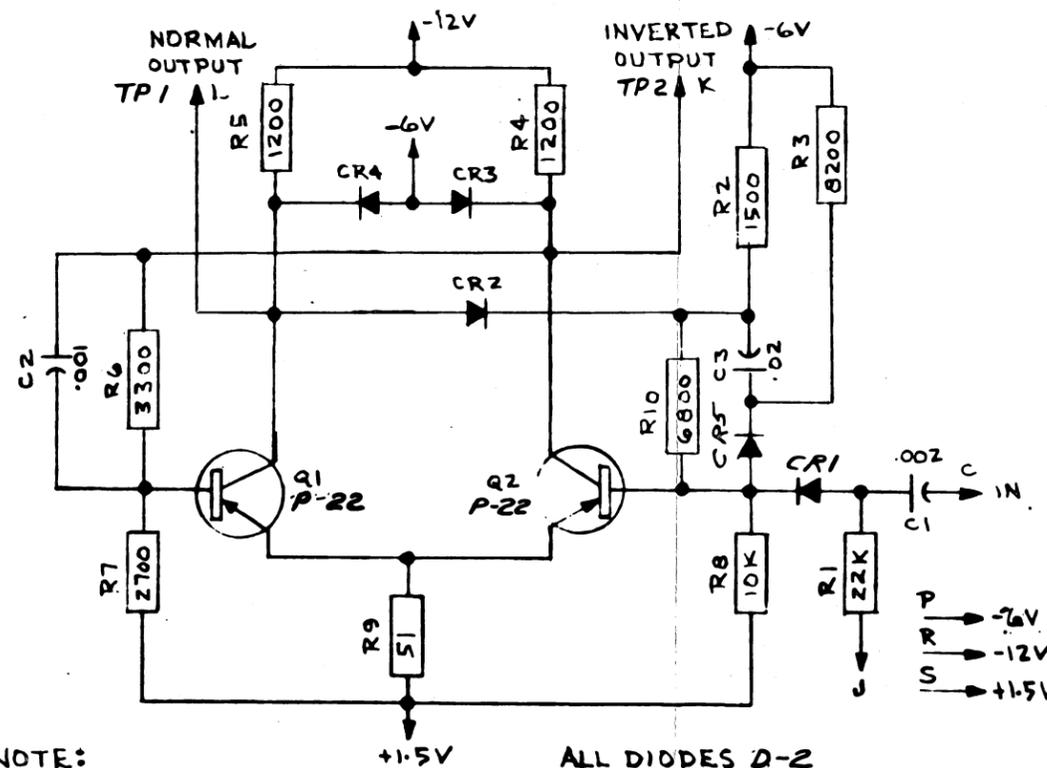
Capacitor C1, R1 and CR1 combine to form an inhibit gate, whereby when -6 V is applied at point J, inputs received at point C will fail to trigger the circuit. Conversely the circuit is enabled when point J is returned to 0 V since CR1 will now pass positive going transitions.

The circuit is triggered as follows: A positive transition applied at point C drives Q2 into cut-off which, in turn, allows Q1 to conduct. As the collector of Q1 approaches 0 V, CR2 conducts charging C3, and maintaining Q2 in cut-off. Q2 remains cut-off until C3 can discharge sufficiently through R3 to permit conduction of Q2. The period of conduction of Q1 is primarily determined by the size of C3 and R3.

SYMBOLS



ISSUE	DATE	AUTH. NO.
2	6-30-59	HS-1040
3	9-8-59	HS-1139
4	10-20-59	HS-1238
5	11-17-59	HS-1296
6	11-25-59	HS-1314
7	5-26-61	69892
8	11-16-61	71626



NOTE:

CARD CONNECTIONS ARE REPRESENTED BY LETTERS
TEST POINTS ARE REPRESENTED BY NUMBERS

APPROVALS

D AND E OF M	
PROB. NO. 172469	
DATE:	
P.D. FILE NO.	
DRAWN R.S. CHKD. J.B.	
ENGD. J.D. APPD. J.A.	

TELETYPE CORPORATION

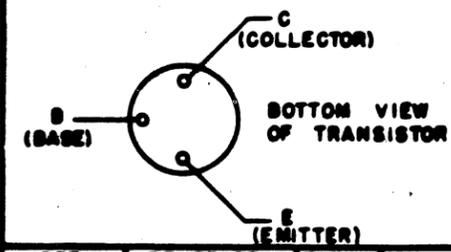
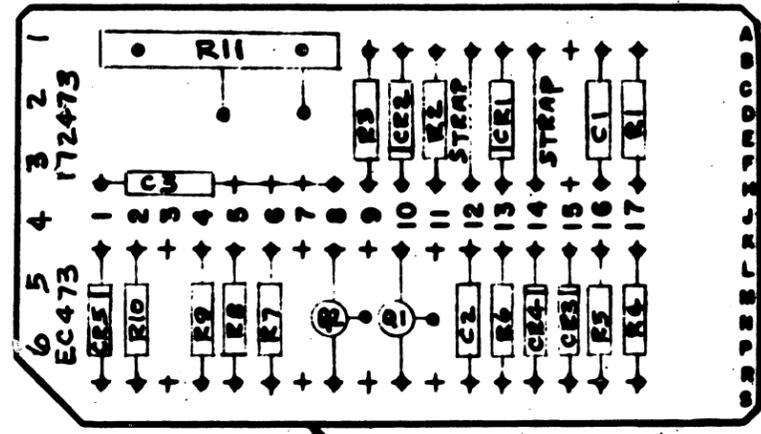
172469

EC 473
172473

VARIABLE ONE-SHOT
.45-1.0 MS

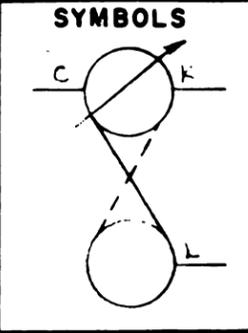
CIRCUIT BOARD EC 473

172473



NOTE: REFER TO 5016 WD FOR MARKING INFORMATION

REF. DESIGN.	TELETYPE PART NO.	TOTAL QTY.	NAME AND DESCRIPTION	LOCATING	FUNCTION
C1	177332	1	Capacitor, Ceramic .002 MF	Coupling	
C2	177331	1	" " .001 MF	Feed Back	
C3	192938	1	" TUBULAR-.15 MF	Timing	
CR1	177108	5	Diode, D-2	Coupling	
CR2			DIODE, D-2	Gate	
CR3			Same as CR2	Clamp	
CR4			Same as CR2	"	
CR5			Same as CR2	Gate	
R1	118177	1	Resistor, Fixed 22K Ohms	Gate	
R2	137442	1	" " 1500 "	Bias	
R3	143667	1	" " 3900 "	Timing	
R4	137443	2	" " 1200 "	Collector Load	
R5			Same as R4	"	
R6	129851	1	Resistor, Fixed 3300 Ohms	Feedback	
R7	118144	1	" " 2700 "	Bias	
R8	118180	1	" " 10K "	"	
R9	143656	1	" " 51 "	Common Emitter Load	
R10	118147	1	" " 6800 "	Bias	
R11	171565	1	Resistor, Variable 10K Ohms	Timing	
Q1	177105	2	Transistor, P-22	Switch	
Q2			Same as Q1	"	
PC	172063	1	Circuit Card, Etched		
	1178	2	SCREW .437-2X56 FIL.		
	110448	2	NUT 2 X56 HEX.		
		2	STRAP 24AWG BARE		
	144495	2	PAD, TRANSISTOR		



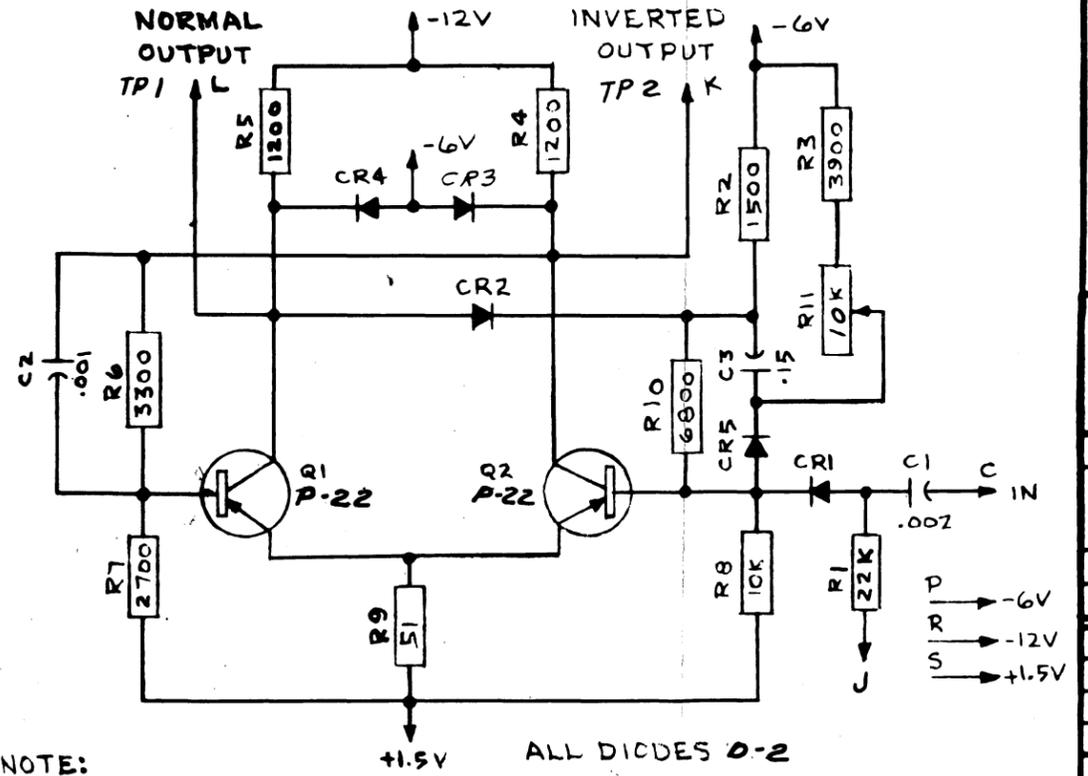
ISSUE	DATE	AUTH. NO.
2	6-30-59	HS-1040
3	9-8-59	HS-1139
4	10-28-59	HS-1238
5	11-17-59	HS-1396
6	11-25-59	HS-1514
7	5-26-61	69892
8	11-16-61	71626
9	4-5-62	73031
10	3-2-63	76172
11	3-20-63	76349
12	6-23-65	87463
13	10-30-68	96207

The purpose of this circuit is to generate a pulse of known width in the range of .45 TO 1.0 milliseconds in response to an input. Normal (positive going) and inverted outputs are provided.

The quiescent state of this circuit is that Q2 is saturated, receiving its bias current primarily through R2 and R10 connected in parallel with CR5, R3 and R11 to -6 V. The collector of Q2 is approximately at zero volts and the collector of Q1 is -6 V. Q1 is maintained cut-off by cross coupling resistor R6 and resistor R7 returned to +1.5V, holding the base potential of Q1 at approximately +1 V. The common emitter potential is zero volts since Q2 is saturated.

Capacitor C1, R1 and CR1 combine to form an inhibit gate, whereby when -6 V is applied at point J, inputs received at point C will fail to trigger the circuit. Conversely the circuit is enable when point J is returned to 0 V since CR1 will now pass positive going transitions.

The circuit is triggered as follows: A positive transition applied at point C drives Q2 into cut-off which, in turn, allows Q1 to conduct. As the collector of Q1 approaches 0 V, CR2 conducts charging C3, and maintaining Q2 in cut-off. Q2 remains cut-off until C3 can discharge sufficiently through variable resistor R11 and R3 to permit conduction of Q2. The period of conduction of Q1 is primarily determined by the size of C3, R3 and the setting of R11



NOTE: CARD CONNECTIONS ARE REPRESENTED BY LETTERS
TEST POINTS ARE REPRESENTED BY NUMBERS

APPROVALS

D AND E OF M

E-NUMBER

PROD. NO. 172473

DATE:

P.D. FILE NO.

DRAWN: R.S. CHKD: J.S.

ENGD: J.S. APPD: J.S.

TELETYPE CORPORATION

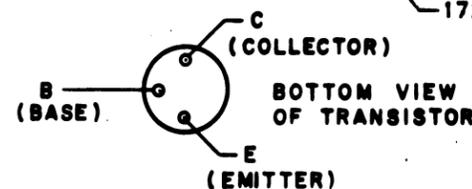
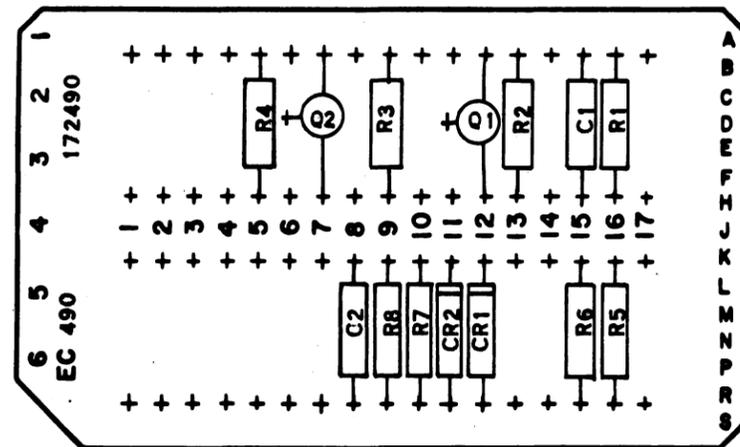
172473

EC 490

172490

CIRCUIT BOARD EC 490

172490



NOTE:
REFER TO 5016WD FOR MARKING
INFORMATION

REF DESIGN	TELETYPE PART NO.	TOTAL QTY.	NAME AND DESCRIPTION	LOCATING FUNCTION
C1	324496	1	CAPACITOR, MYLAR .05 MF	INTEGRATION CAP.
C2	177331	1	CAPACITOR, CERAMIC .001 MF	FEED BACK CAP.
CR1	177108	2	DIODE D-2	CLAMPING DIODE
CR2			SAME AS CR1	CLAMPING DIODE
R1	129851	3	RESISTOR, FIXED 3300 OHMS	BASE BIAS
R2	137440	1	RESISTOR, FIXED 1000 OHMS	BASE BIAS
R3	118186	1	RESISTOR, FIXED 5600 OHMS	BASE BIAS
R4	118146	1	RESISTOR, FIXED 4700 OHMS	BASE BIAS
R5			SAME AS R1	COLLECTOR LOAD
R6	137441	1	RESISTOR, FIXED 1200 OHMS	FEED BACK RESISTOR
R7	118180	1	RESISTOR, FIXED 10 K OHMS	BASE BIAS
R8			SAME AS R1	BASE BIAS
Q1	177105	2	TRANSISTOR, P-22	AMPLIFIER
Q2			SAME AS Q1	
EC	172075	1	CIRCUIT CARD, ETCHED	
	144495	2	PWD, TRANSISTOR	

SIGNAL DELAY
(50 μs)

THIS CIRCUIT CONSISTS OF A RC INTEGRATOR COMPRISED OF R1, R2 AND C1, AND A TWO STAGE REGENERATIVE AMPLIFIER COMPRISED OF Q1 AND Q2. THERE IS NO POLARITY REVERSAL BETWEEN INPUT AND OUTPUT SIGNAL, HOWEVER THERE IS A TIME DELAY BETWEEN TRANSITIONS. THE INTEGRATOR CIRCUIT WILL ONLY PERMIT PULSES OF RELATIVELY LONG DURATION TO BE APPLIED AT Q1 BASE.

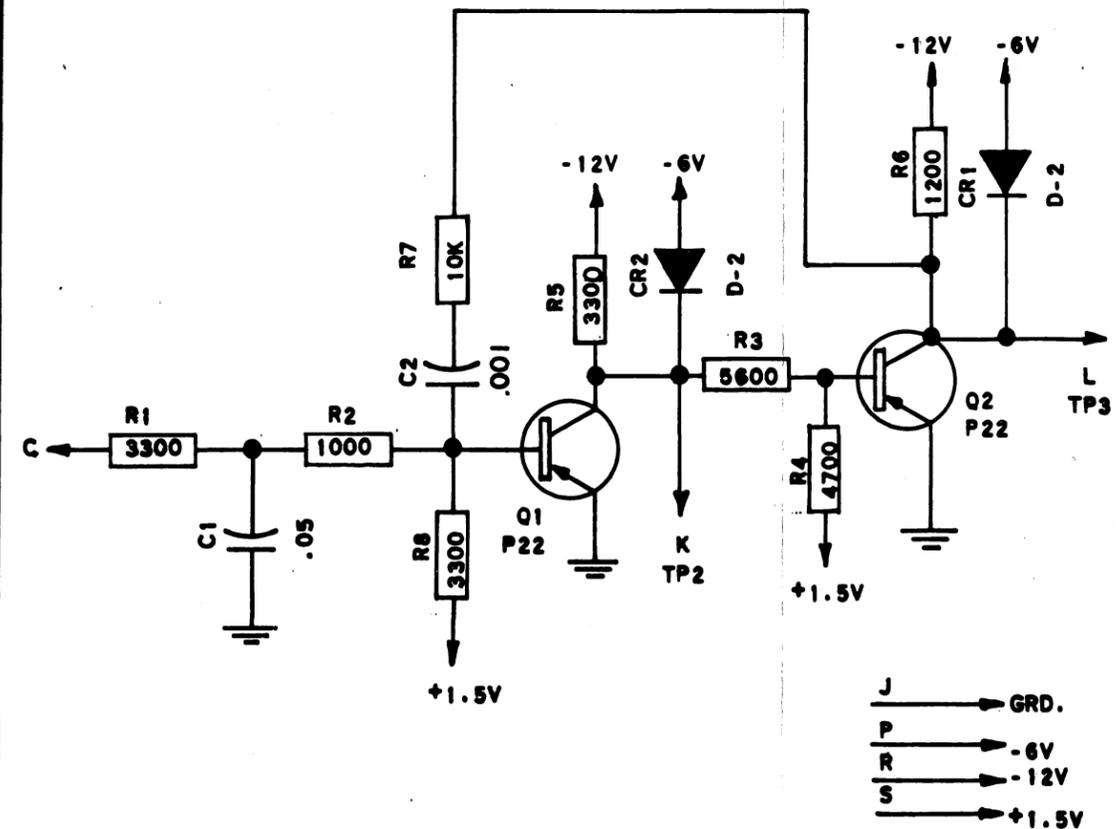
WITH A NEGATIVE 6V POTENTIAL APPLIED AT POINT C, Q1 IS BIASED IN A FORWARD DIRECTION, CAUSING Q2 TO BE BIASED AT CUT-OFF. Q1 AND Q2 COLLECTOR POTENTIALS ARE CLAMPED AT -6V BY CR1 AND CR2.

WITH A POSITIVE 6V TRANSITION APPLIED Q1 WILL CUT-OFF AFTER A TIME DELAY OF 50 MICROSECONDS (±15% WITH ALL VOLTAGES AT THEIR NOMINAL VALUES) DRIVING Q2 INTO CONDUCTION, CAUSING Q2 COLLECTOR POTENTIAL TO RISE FROM -6V TO 0V. C2 AND R7 PROVIDE REGENERATIVE FEEDBACK.

SYMBOLS



ISSUE	DATE	AUTH NO
2	6-30-59	HS-1040
3	9-8-59	HS-1139
4	10-28-59	HS-1238
5	5-26-61	69892
6	11-16-61	71626
7	2-14-67	92188



NOTE:
CARD CONNECTIONS ARE REPRESENTED BY LETTERS
TEST POINTS ARE REPRESENTED BY NUMBERS.

APPROVALS

D AND R E OF M
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E-NUMBER

PROD. NO. 172490

DATE:

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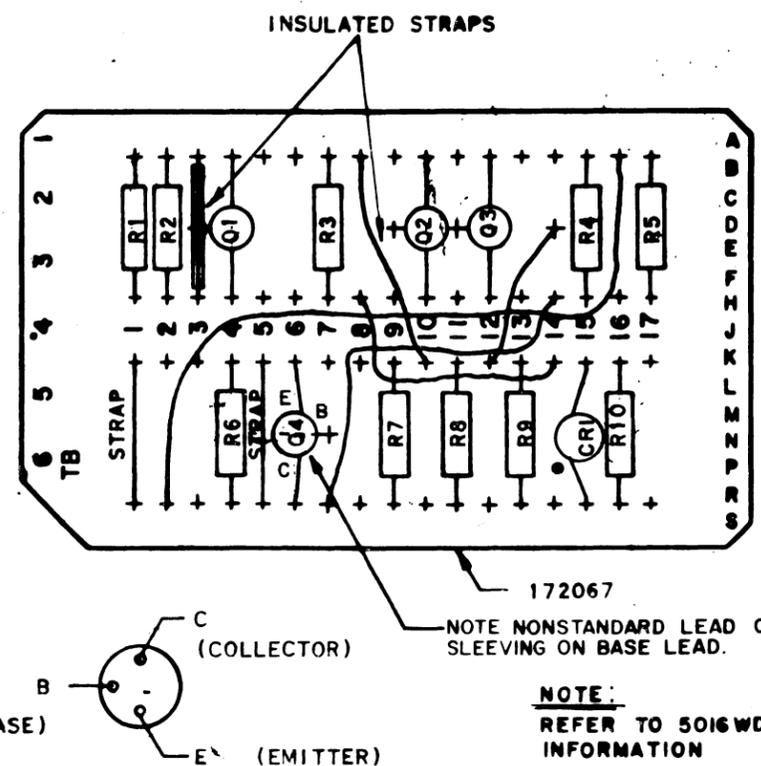
DRAWN RP CHKD

ENGD. SS APPD

TELETYPE CORPORATION

172490

EC 497
172497



REF. DESIGN	TELETYPE PART NO.	TOTAL QTY.	NAME AND DESCRIPTION
R1	118177	2	RESISTOR FIXED 22K
R2			SAME AS R1
R3	118150	1	RESISTOR FIXED 15K
R4	137438	1	RESISTOR FIXED 100
R5	118166	1	RESISTOR FIXED 560K
R6	129851	2	RESISTOR FIXED 3.3K
R7	118149	1	RESISTOR FIXED 12K
R8	118153	1	RESISTOR FIXED 33K
R9			SAME AS R6
R10	199591	1	RESISTOR FIXED 180 OHMS 5 WATTS
CR1	199590	1	DIODE, ZENER, 12V, 1.5 WATTS
Q1	177105	2	TRANSISTOR P22
Q2			SAME AS Q1
Q3	177224	1	TRANSISTOR P41
Q4	177422	1	TRANSISTOR N39
	144495	4	TRANSISTOR PADS
	172067	1	ETCHED CIRCUIT BOARD
		6	STRAP 24 AWG INSULATED
		2	STRAP 24 AWG BARE
	60263 RM		SLEEVING AS REQUIRED

**EMITTER FOLLOWER
RELAY DRIVER**

CIRCUIT BOARD EC 497

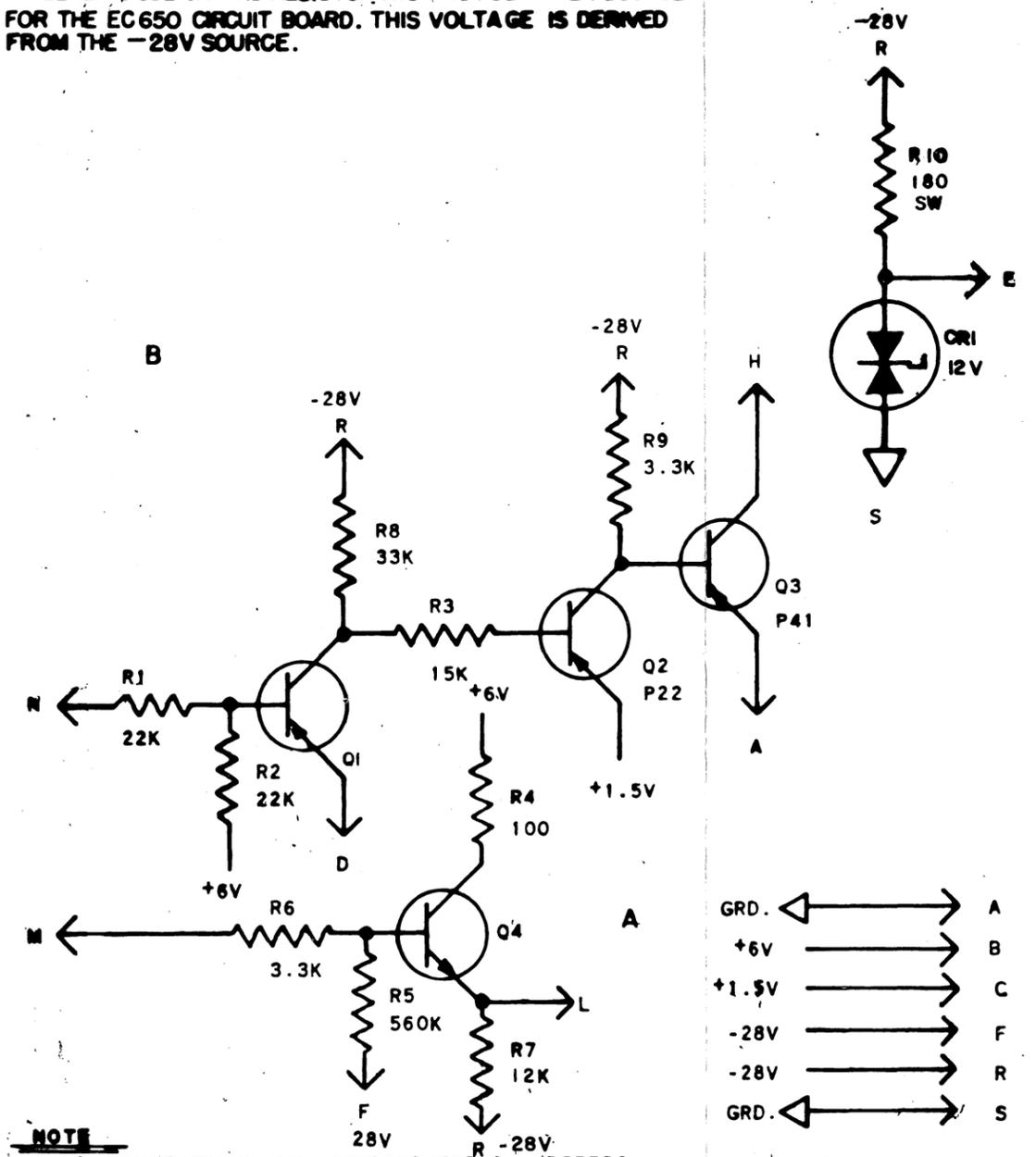
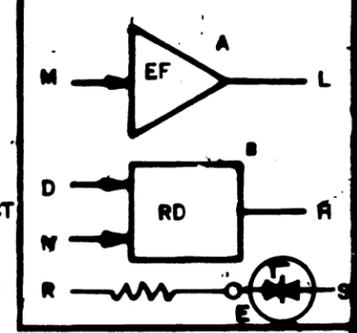
172497

REVISIONS		
ISSUE	DATE	AUTH NO
2	6-8-64	82363
3	6-24-64	82820
4	7-8-64	83186
5	3-5-68	86437
6	3-10-68	85928

THIS CARD CONSISTS OF AN EMITTER FOLLOWER, A RELAY DRIVER, A VOLTAGE DROPPING RESISTOR, AND A FILTER CAPACITOR.

EMITTER FOLLOWER (A) CONNECTS TO THE INTERLOCK OF A TYPE 202 DATA SET AND IS USED TO AMPLIFY ITS +6V. OR 0 SIGNALS. RELAY DRIVER (B) ALSO CONNECTS TO A TYPE 202 DATA SET. THE RELAY DRIVER HAS TWO GATED INPUTS WHICH CONNECT TO THE INTERLOCK AND CARRIER DETECT LEADS OF A DATA SET. THE RELAY DRIVER WILL OPERATE (Q3 CONDUCTS) ONLY WHEN INTERLOCK IS PRESENT (+6V) AND CARRIER DETECT IS NOT PRESENT (-6V).

ZENER DIODE CR1 AND RESISTOR R10 PROVIDE A -12V SOURCE FOR THE EC 650 CIRCUIT BOARD. THIS VOLTAGE IS DERIVED FROM THE -28V SOURCE.



NOTE:
CARD CONNECTIONS ARE REPRESENTED BY LETTERS
TEST POINTS ARE REPRESENTED BY NUMBERS

APPROVALS

D AND R: _____ E OF M: _____

F NUMBER: _____

PROD. NO. 172497

DATE: 4/27/64

P.D. FILE NO: A148/134AA

DRAWN: GJM CHKD: [Signature]

ENGD. WRE APPD: [Signature]

TELETYPE CORPORATION

172497

EC

CIRCUIT BOARD EC

177543

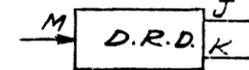
TIME DELAY RELAY DRIVER

This circuit consists basically of two relay drivers, one of which is operated by a time delay circuit. In the static or "off" condition, M is at 0 volts or more negative and Q4 is conducting holding Q5 off. Transistor Q5 collector output (K) is connected to a relay biased to -28 volts. Diode CR1 is forward biased and a small amount of current flows from ground via R1, CR1 and relay to -28 volts. Unijunction Q1 and SCR Q2 are off holding Q3 off. Collector load of Q3 is a relay biased to -28 volts.

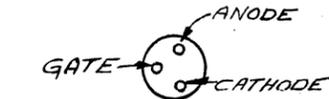
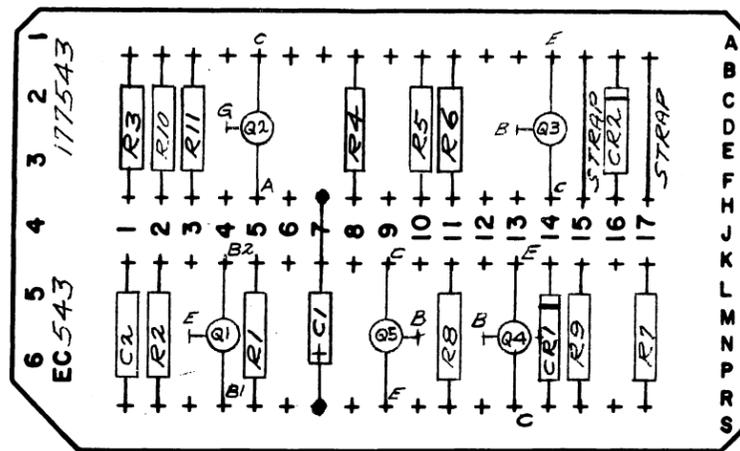
When a +5 volt signal or greater is applied to input M, Q4 is turned off, Q5 is saturated and output K goes to ground energizing the relay (collector load) and reverse biasing CR1. Capacitor C1 begins to charge toward ground via R1. At some voltage (less than half the voltage across Q1) the unijunction will be triggered discharging C1 via emitter and R2. A positive pulse is applied to C2, SCR (Q2), and the SCR will turn on if the external control contact is closed applying a negative voltage on the base of Q3 switching Q3 on which places 0 volts at output J and the second relay is energized. Q3 will be turned off when SCR is cut off by the opening of external control contact. Q5 is turned off by placing a 0 volt signal or more negative on M input. Output F of Q3 provides lead which permits by-passing the circuit card in its intended application.

The delay of this timer may vary between 4.5 to 8.5 seconds depending upon capacitor tolerances and operating temperature.

SYMBOLS



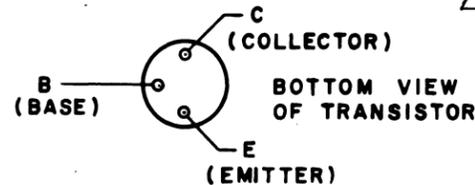
ISSUE	DATE	AUTH NO
2	11-2-62	15010
3	12-10-62	75337
4	4-4-68	95413-5



BOTTOM VIEW OF SILICON CONTROLLED RECTIFIER

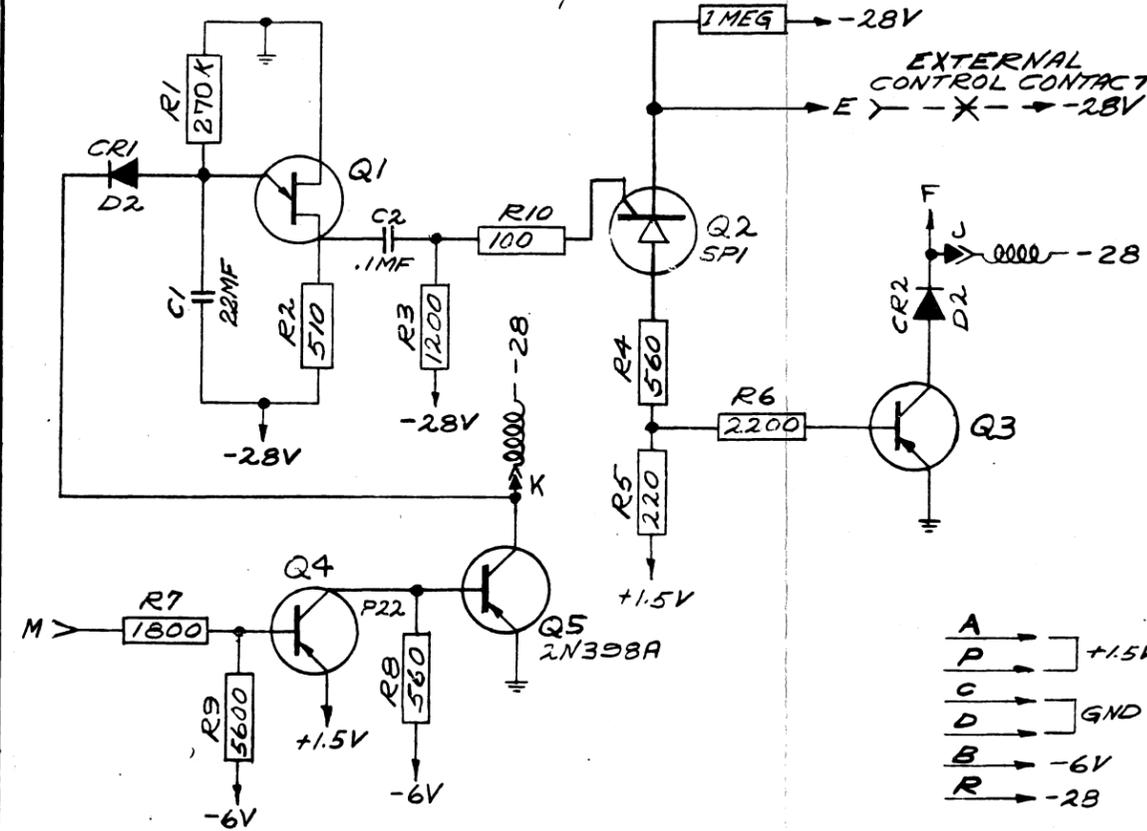


BOTTOM VIEW OF UNIUNCTION TRANSISTOR



NOTE:
REFER TO 5016WD FOR MARKING INFORMATION

REF. DESIGN	TELETYPE PART NO.	TOTAL QTY.	NAME AND DESCRIPTION	LOCATING FUNCTION
R1	118162	1	Resistor fixed 270K ohms	Timing
R2	137603	1	" " 510 ohms	Base 1 Load
R3	137441	1	" " 1.2 K ohms	Bias
R4	143659	2	" " 560 ohms	Divider
R5	118724	1	" " 220 ohms	Divider
R6	129852	1	" " 2.2 K ohms	Current Limiter
R7	137443	1	" " 1.8 K ohms	Base Bias
R8			Same as R4	Collector Load
R9	118186	1	" " 5.6 K ohms	Bias
R10	137438	1	" " 100 ohms	Current Limiter
R11	118169	1	" " 1 meg.	Switch by pass
C1	148165	1	Capacitor 22 MF ± 20%	Timing
C2	148833	1	" .1 MF	Coupling
CR1	177108	2	Diode D2	Input Diode
CR2			Same as CR1	
Q1	177610	1	Unijunction	Oscillator
Q2	177100	1	Silicon Controlled Rec. SP1	Switch
Q3	177224	2	Transistor 2N398A	Power
Q4	177105	1	Transistor P22	Amplifier
Q5			Same as Q3	Power
Strap		2	Strap-Bare #24 AWG	
	144495	5	Pad, Transistor	
EC	193155	1	Circuit Card - etched	



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APPROVALS

D AND R	E OF M
<i>[Signature]</i>	<i>[Signature]</i>
E-NUMBER	
PROD. NO. 177543	
DATE: 8-24-62	
P.D. FILE NO. 1-11.134RA	
DRAWN: <i>[Signature]</i>	CHKD: <i>[Signature]</i>
ENGD. EHP	APPD. <i>[Signature]</i>

TELETYPE CORPORATION

177543

