DATASPEED TAPE TO TAPE SYSTEM

TYPE 1 AND TYPE 2 TAPE SENDERS AND RECEIVERS

ELECTRONIC CIRCUITRY

SCHEMATIC DIAGRAMS AND

CIRCUIT BOARD DRAWINGS

CONTENTS PAGE

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 rearrange text and to include the latest diagram drawing issues.

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 borad 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. Finally, to determine which have been changed from the previous section issue, a cross-reference between section issue and diagram or drawing issue is provided.

Prepared for American Telephone and Telegraph Company by Teletype Corporation

Printed in U. S. A.

3. DIAGRAM INDEX

SUBJECT	DRAWING NUMBER	SECTION ISSUE					
		1	2	3	4	5	6
Sending Signal Converter	3831WD	D	D	D			
Receiving Signal Converter	3833WD	D	D	D			
Line Break and Automatic Answer (Sending)	3843WD	-	-	B			
Automatic Answer (Receiving)	3845WD	-	-	O*			
Sending Distributor	4439WD	C	C	C			
Receiving Distributor	4441WD	D	F	F			
Y-Connector	4799WD	-	-	C			
Sending Signal Converter W/Rubout Delete	5917WD	-	-	A			
Relay Driver (2)	146520	3	3	3			
Relay Driver and Receiving Input Amplifier	146521	2	2	2			
(NPN) Emitter Follower and Inhibit Gate	172321	2	2	2			
Integrator Pulse Shaper	172322	2	2	2			
Symmetrical Emitter Follower	172323	2	2	2			
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Pulse Amplifier and Emitter Follower (PNP)	172326	4	4	4			
(NPN) Emitter Follower (2)	172333	5	5	5			
Pulse Amplifier (2)	172347	8	8	8			
Variable Pulse Delay (0.41 to 1.3 Milliseconds)	172351	6	6	7			
Diode Fan-Out Gate	172352	3	3	3			
Receiver Input Amplifier	172355	2	2	2			
Flip-Flop	172359	5	5	5			
Integrator	172361	O*	O*	O*			
Filter (2)	172363	O*	O*	O*			
Variable One-Shot (0.65 to 2.2 Milliseconds)	172365	3	3	3			
Diode Gates (3)	172374	7	8	8			
Inhibit Gate (2)	172375	5	5	5			
Diode Gates (4)	172385	6	6	6			
Start-Stop Oscillator (1050 Baud)	172394	4	4	5			
Fixed One-Shot (200 Microseconds)	172395	3	3	4			
Magnet Pulser	172396	6	6	6			
(PNP) Inverter (2)	172401	4	4	4			
Squaring Amplifier	172420	3	4	4			
Pick-Up Amplifier	172431	9	11	12			
Fixed One-Shot (100 Microseconds)	172469	8	8	8			
Variable One-Shot (0.9 to 1.5 Milliseconds)	172473	9	9	11			
Single Delay (50 Microseconds)	172490	6	6	6			
Time Delay Relay Driver	177543	-	-	3			

*Original Issue

Attached:
Teletype Corporation
Wiring Diagrams (WD)
Circuit Board Drawings (EC)

3831WD		
REVISIONS		
ISSUE	DATE	AUTH. NO.
A	1-28-52	72617
B	11-1-51	71487
C	6-9-52	72830
D	4-8-53	73699

SCHEMATIC DIAGRAM FOR HIGH SPEED TRANSMITTING SIGNAL CONVERTER

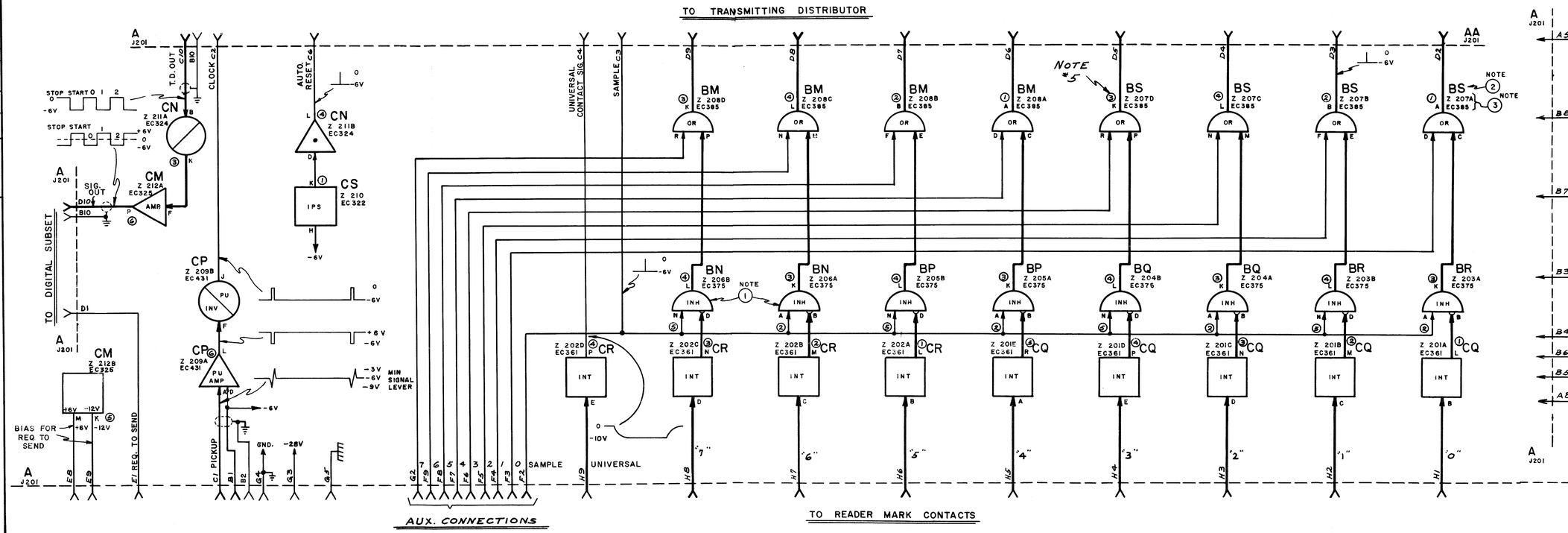
TTSC 500 AND TTSC 800

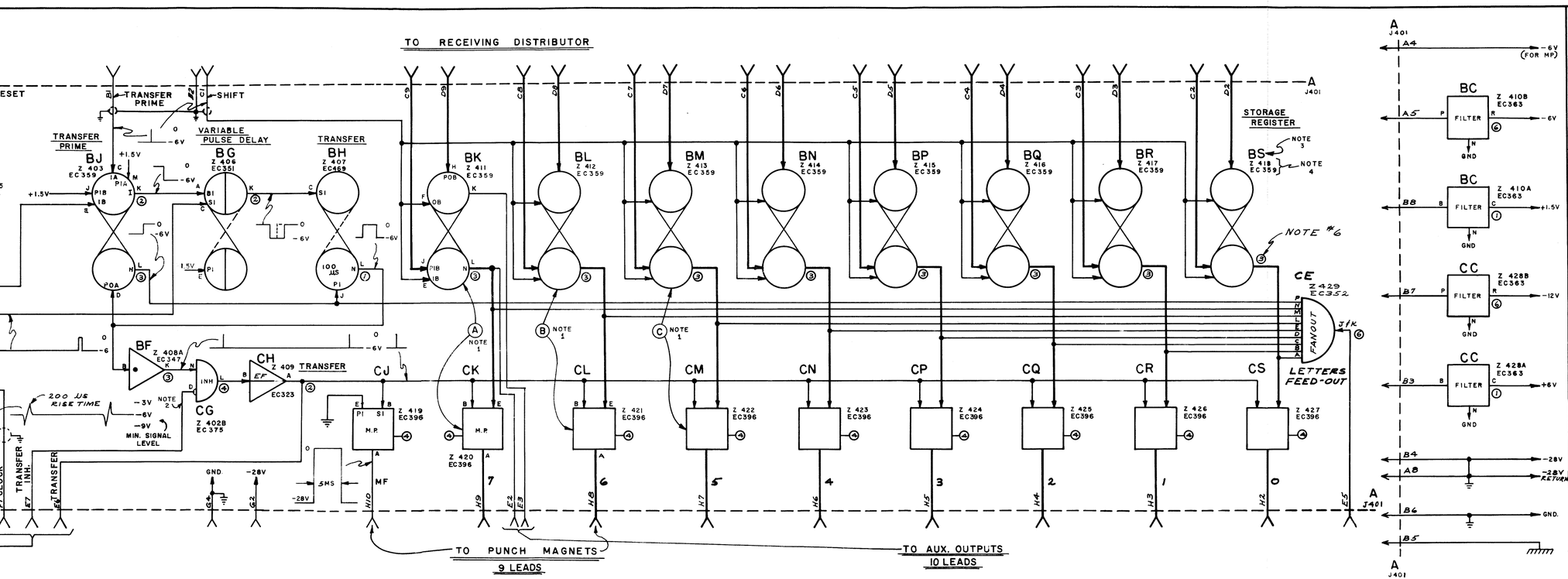
DATE: 12-7-53
P.D. FILE NO. 1-11.134AA
DRAWN: S.W. CHKD. C.H.
ENGD. R.H.P. APPD.

TELETYPE CORPORATION

3831WD

NO	NOTES
1	TTSC 500(5&6 LEVEL CODE)- CIRCUIT ELEMENTS Z 206A & Z 206B ARE OMITTED— TTSC 800(7&8 LEVEL CODE) Z 206AAND Z 206BARE 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 AMPLIFER





VARIATIONS IN APPARATUS CODES CHART

COMPONENTS OMITTED OR INCLUDED	– OMIT	X INCLUDE		
CODE – TRSC	500	600	700	800
LEVEL	5	6	7	8
A EC359 & EC396	—	—	—	X
B EC359 & EC396	—	—	X	X
C EC359 & EC396	—	X	X	X

3833WD

REVISIONS

ISSUE	DATE	AUTH. NO.
A	6-19-61	70238
B	10-26-61	71476
C	8-9-62	72430
D	4-6-62	73039

SCHEMATIC DIAGRAM FOR HIGH SPEED RECEIVING SIGNAL CONVERTER

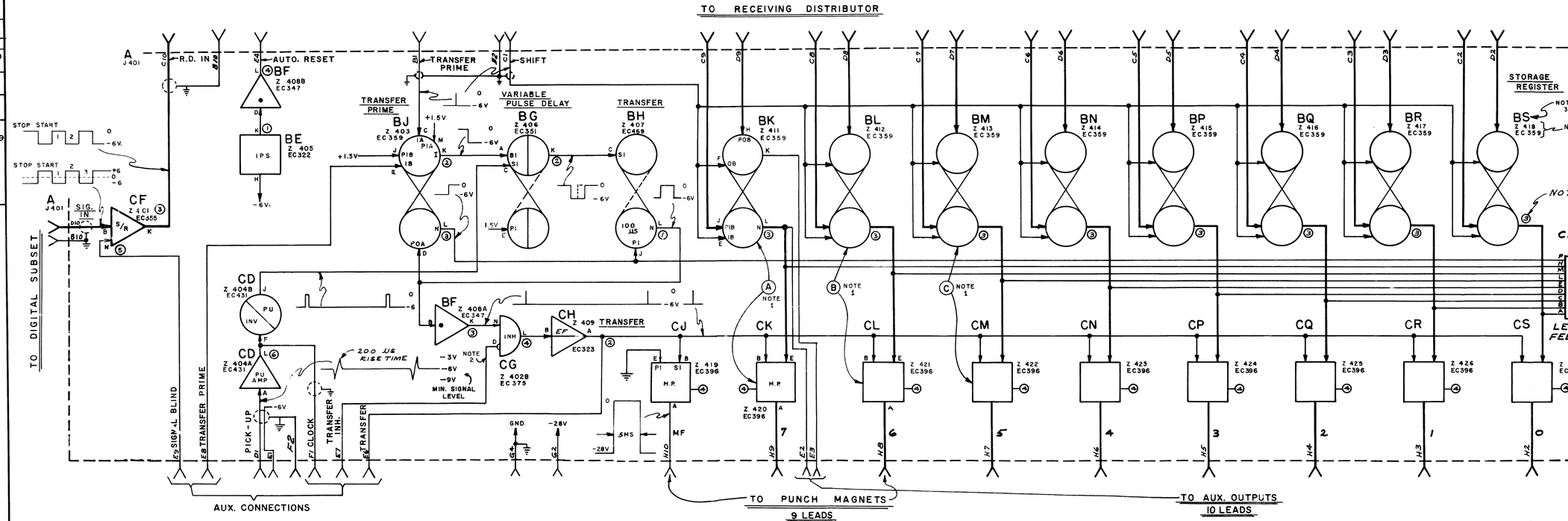
TRSC 500 600 700 800

DATE 11-27-59
P.D. FILE NO. 1-47.134 AA
DRAWN SW CHKD. [illegible]
ENGD. ENP APPD. [illegible]

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 EC349 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.



NO.	NOTES
1.	FOR ACTUAL WIRING DIAGRAM REFER TO 3842WD
2.	EC NUMBER DENOTES CIRCUIT CARD NUMBER.
3.	Z NUMBER DENOTES CIRCUIT ELEMENT.

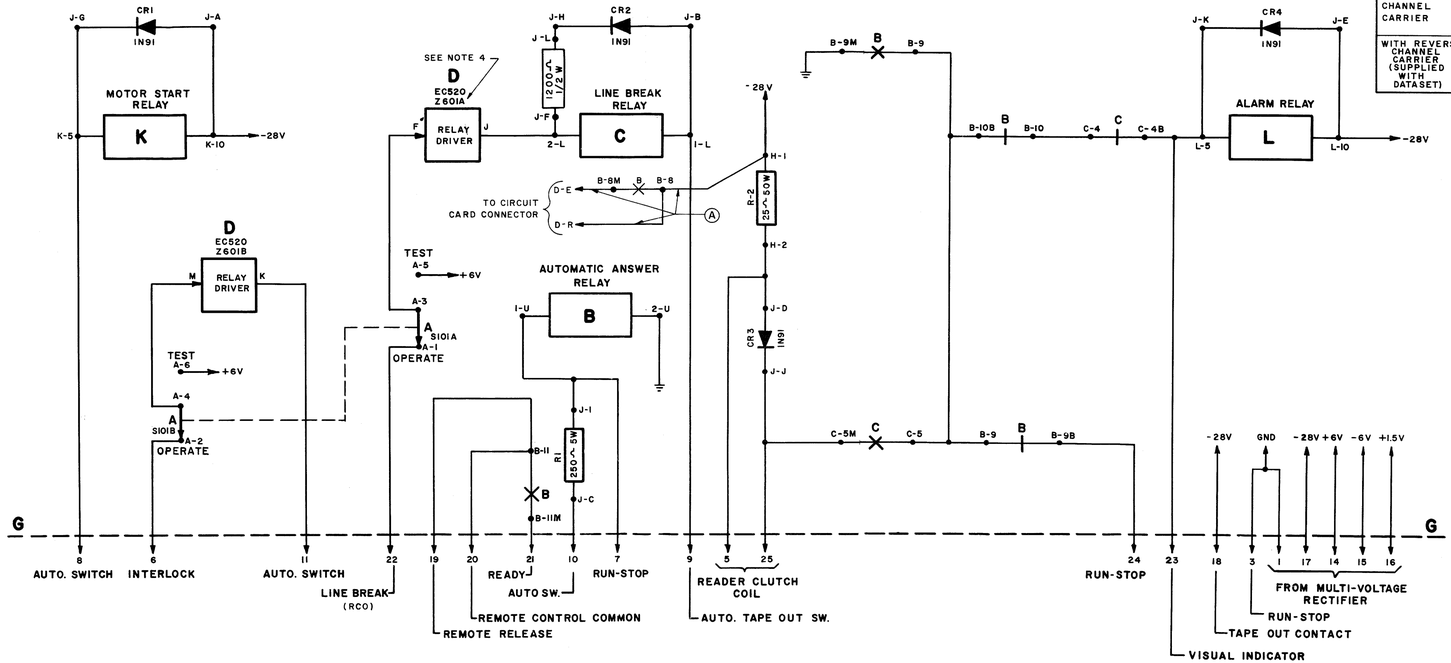


CHART-TRANSMITTING TERMINAL OPERATING CONDITIONS

CONDITIONS		CIRCUIT CARD USED	WIRING CHANGE	TEST-OPERATE SWITCH	AUTOMATIC MANUAL SWITCH
WITHOUT REVERSE CHANNEL CARRIER	MANUAL	EC520	NONE REQUIRED	TEST	MANUAL
	AUTOMATIC ANSWER	EC543	* REQUIRED ON UNITS NOT STAMPED AA.	OPERATE	AUTOMATIC
	MANUAL			TEST	MANUAL
WITH REVERSE CHANNEL CARRIER (SUPPLIED WITH DATASET)	MANUAL	EC520	NONE	OPERATE	MANUAL
	AUTOMATIC ANSWER	EC520	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.
A	5-4-62	73356
B	10-4-62	74728

APPROVALS

D AND R | E OF M

E-NUMBER

PROD. NO. 3843 WD

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

DATE: 19-OCT-61

P.D. FILE NO. 1-11.13444

DRAWN SW | CHKD.

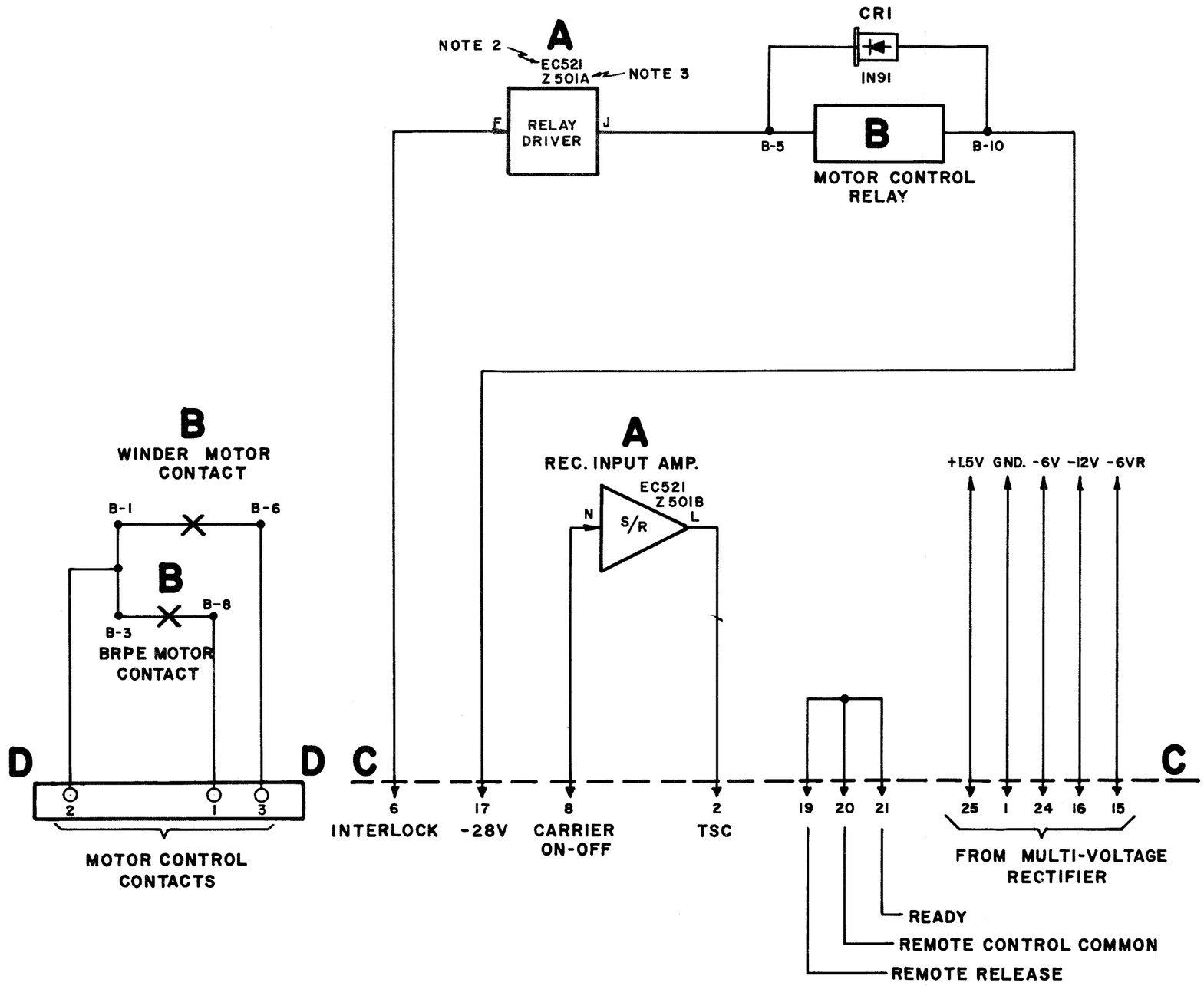
ENGD. CJR | APPD.

TELETYPE CORPORATION

3843 WD

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

3845 WD		
ISSUE	DATE	AUTH. NO.



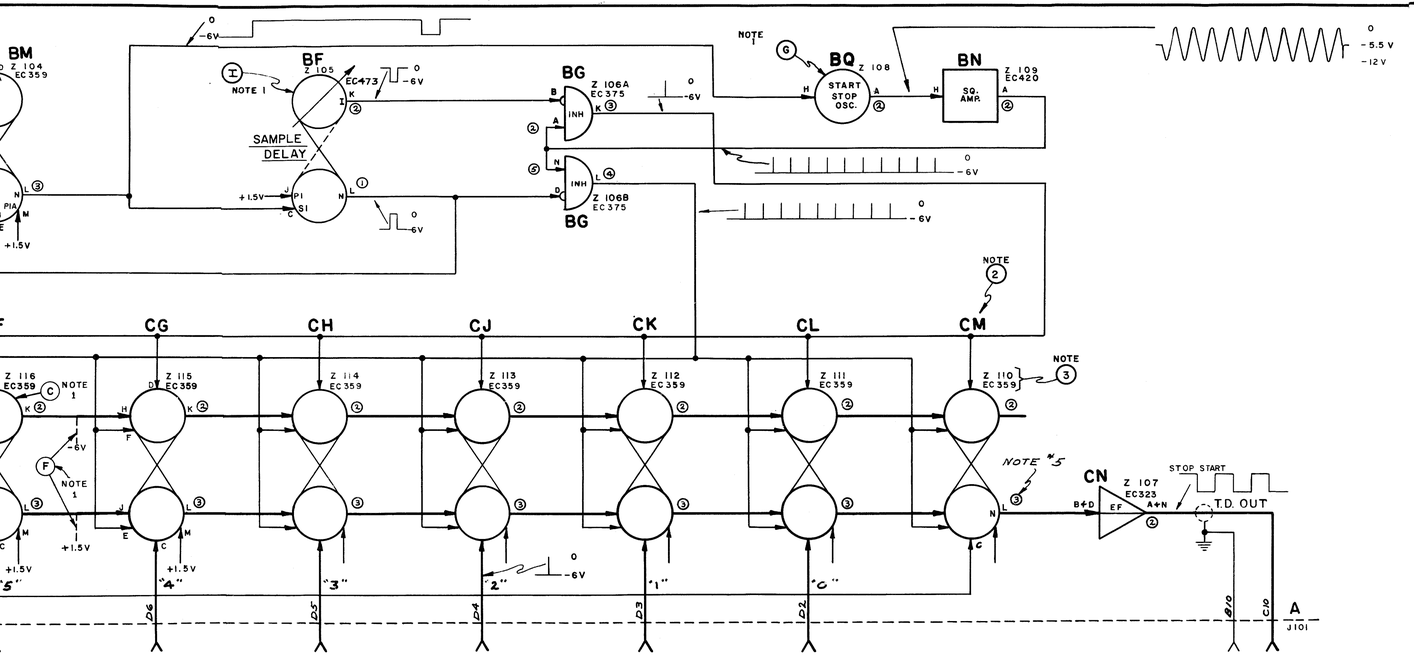
SCHEMATIC WIRING DIAGRAM FOR DATASPEED AUTOMATIC ANSWER. (RECEIVER)

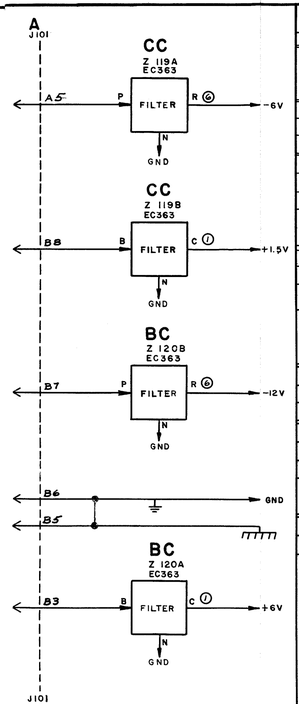
APPROVALS	
D AND R	E OF M
E-NUMBER	
PROD. NO. 3845WD	
DATE: 16-OCT.-61	
P.D. FILE NO. 1-11.134AA	
DRAWN. SW	CHKD.
ENGD. CJR	APPD.

TELETYPE CORPORATION

3845 WD

ET:08147
TC255(6-54)





VARIATIONS IN APPARATUS CODES CHART

	CODE-TTD	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 (.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	X
D	STRAPS	—
E	STRAPS	X
F	STRAPS	—
G	START-STOP OSCILLATOR	EC394 0.952MS
H	ADJUST TO	900µs
I	ADJUST TO	475µs

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 WAVEFORMES 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.

4439WD

REVISIONS

ISSUE	DATE	AUTH. NO.
A	11-1-61	7487
B	2-9-62	7242 B
C	4-6-62	73039

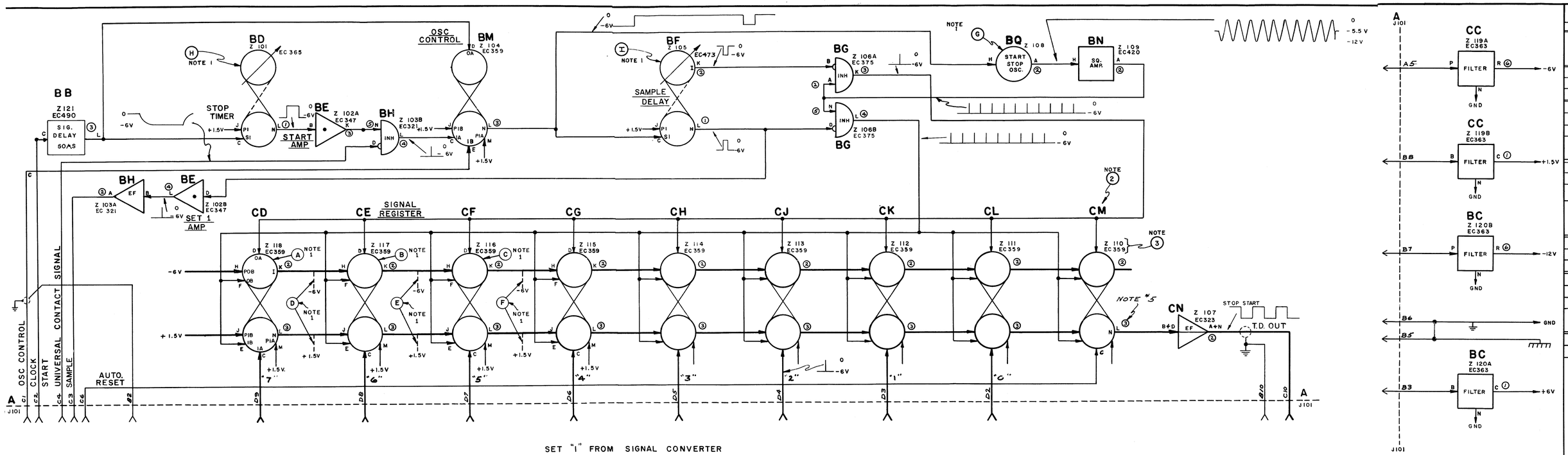
SCHEMATIC DIAGRAM FOR HIGH SPEED TRANSMITTING DISTRIBUTOR

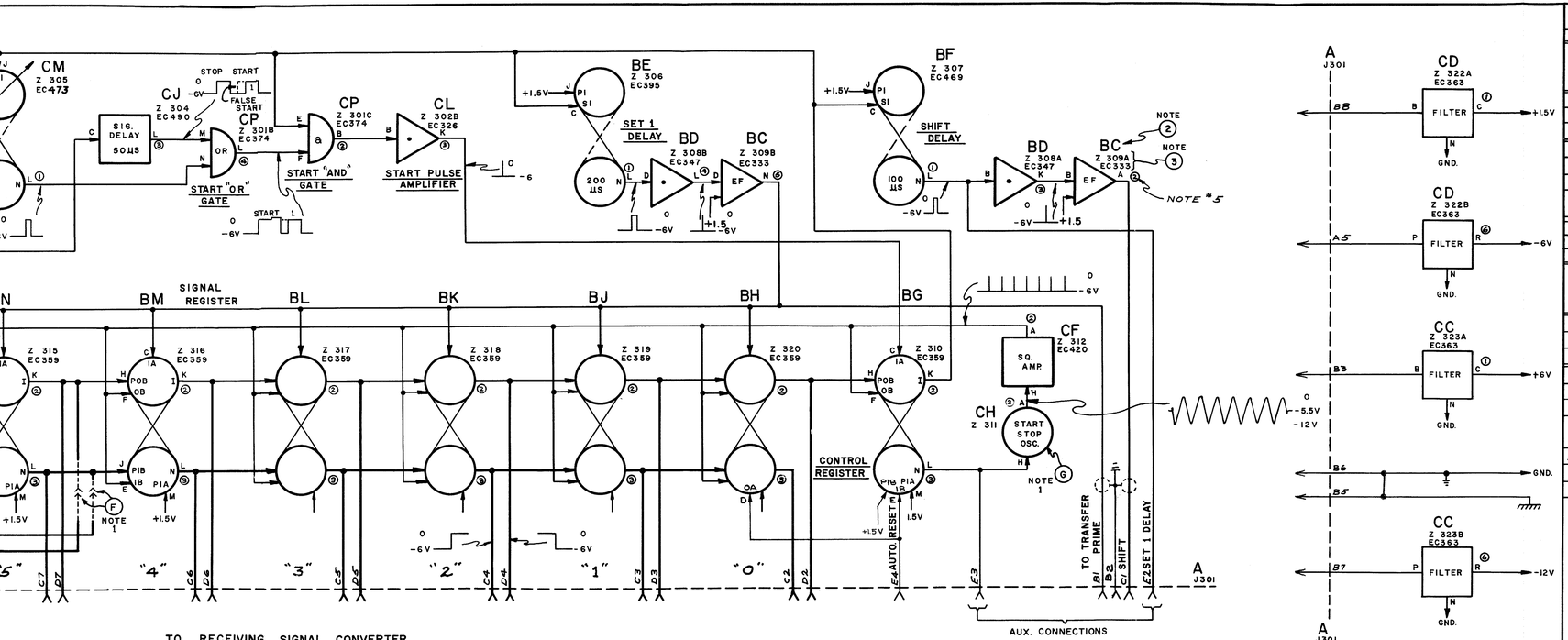
TTD 501 TO 502
601 TO 603
701 TO 703
801 TO 804

DATE 14-APRIL-61
P.D. FILE NO. -/-/134AA
DRAWN SW CHKD
ENGD. EKP APPD

TELETYPE CORPORATION

4439WD


BB
Z 121
EC490
SIG. DELAY 50 AS
BD
Z 101
EC 365
NOTE 1
STOP TIMER
BE
Z 102A
EC 347
START AMP
BH
Z 103B
EC321
OSC CONTROL
BM
Z 104
EC 359
BF
Z 105
EC473
SAMPLE DELAY
BG
Z 106A
EC 375
Z 106B
EC 375
BQ
Z 108
START STOP OSC.
BN
Z 109
EC420
SQ. AMP
BH
Z 103A
EC 321
BE
Z 102B
EC347
SET 1 AMP
CD
CE
SIGNAL REGISTER
CF
CG
CH
CJ
CK
CL
CM
Z 118 EC359
Z 117 EC359
Z 116 EC359
Z 115 EC359
Z 114 EC359
Z 113 EC359
Z 112 EC359
Z 111 EC359
Z 110 EC359
CN
Z 107
EC323
STOP START
T.D. OUT
NOTE "5"
-6V
+1.5V
0
-5.5 V
-12 V
"7"
"6"
"5"
"4"
"3"
"2"
"1"
"0"
OSC CONTROL
CLOCK
START
UNIVERSAL CONTACT SIGNAL
SAMPLE
AUTO. RESET
SET "1" FROM SIGNAL CONVERTER
CC
Z 119A
EC363
FILTER
GND
-6V
CC
Z 119B
EC363
+1.5V
BC
Z 120B
EC363
-12V
BC
Z 120A
EC363
+6V



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	1600 µs ± 100 µs				1330 µs ± 100 µs				1110 µs ± 100 µs		1000 µs ± 50 µs
I	ADJUST TO	825 µs				650 µs				500 µs		475 µs
J	EQUIP. WITH	EC365				EC365				EC365		EC365

	CODE-TRD	603
	BAUD	1050
	LEVEL	6
A	EC359	—
B	EC359	—
C	EC359	X
D	STRAPS	—
E	STRAPS	X
F	STRAPS	—
G	START-STOP OSCILLATOR	EC394 (0.95MS)
H	ADJUST TO	2.9 MS ± 1 µS
I	ADJUST TO	475 µS
J	EQUIP. WITH	EC475

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

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	74193
F	10-8-62	74731

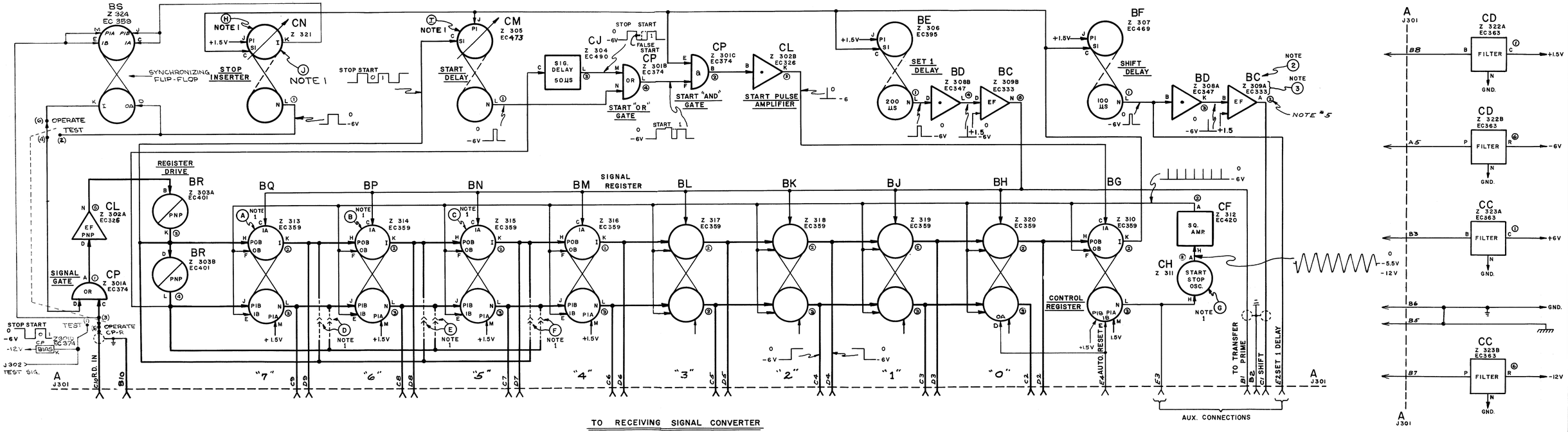
SCHEMATIC DIAGRAM FOR HIGH SPEED RECEIVING DISTRIBUTOR

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

DATE: 13-APRIL-61
P.D. FILE NO. 1-122.134AA
DRAWN: JS | CHKD: EJH
ENGD: EXP | APPD:

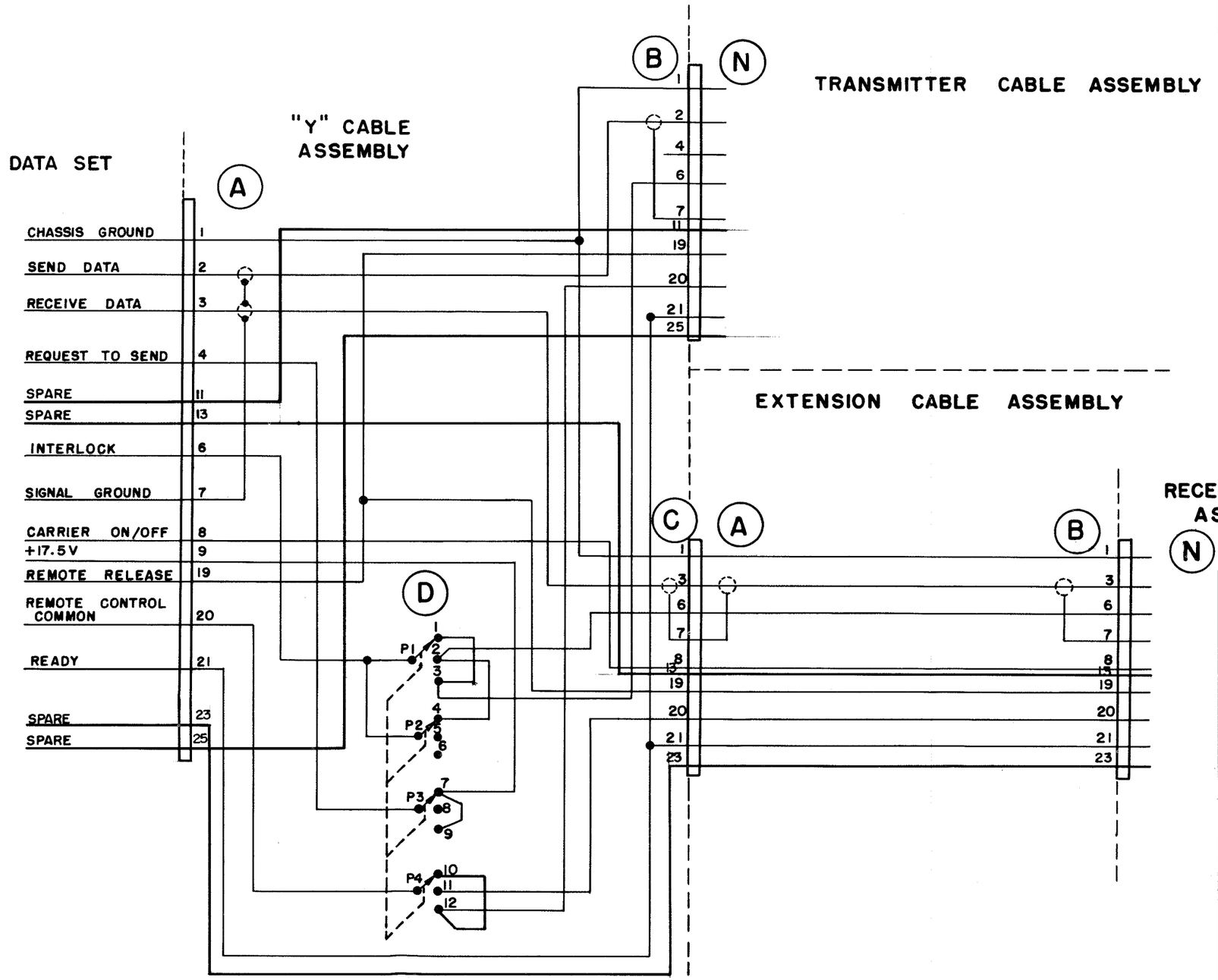
TELETYPE CORPORATION

4441WD


BS Z 324 EC 359
CN Z 321
NOTE 1
SYNCHRONIZING FLIP-FLOP
STOP INSERTER
OPERATE
TEST
CM Z 305 EC473
START DELAY
SIG. DELAY 50µS
CJ Z 304 EC490
FALSE START
START "OR" GATE
CP Z 301B EC374
START "AND" GATE
CL Z 302B EC326
START PULSE AMPLIFIER
BE Z 306 EC395
SET 1 DELAY
BD Z 308B EC347
BC Z 309B EC333
BF Z 307 EC469
SHIFT DELAY
BD Z 308A EC347
BC Z 309A EC333
NOTE #5
REGISTER DRIVE
BR Z 303A EC401
BR Z 303B EC401
CL Z 302A EC326
SIGNAL GATE
CP Z 301A EC374
SIGNAL REGISTER
BQ
BP
BN
BM
BL
BK
BJ
BH
BG
Z 313 EC359
Z 314 EC359
Z 315 EC359
Z 316 EC359
Z 317 EC359
Z 318 EC359
Z 319 EC359
Z 320 EC359
Z 310 EC359
CF Z 312 EC420
SQ. AMP.
CH Z 311
START STOP OSC.
CONTROL REGISTER
"7"
"6"
"5"
"4"
"3"
"2"
"1"
"0"
TO TRANSFER PRIME
AUX. CONNECTIONS
CD Z 322A EC363
CD Z 322B EC363
CC Z 323A EC363
CC Z 323B EC363
FILTER
GND.
+1.5V
-6V
+6V
-12V
-5.5V
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



SCHEMATIC DIAGRAM FOR TRANSMIT-RECEIVE TERMINAL MODIFICATION KIT

APPROVALS

D AND R	E OF M

E-NUMBER

PROD. NO. 4799 WD

DATE

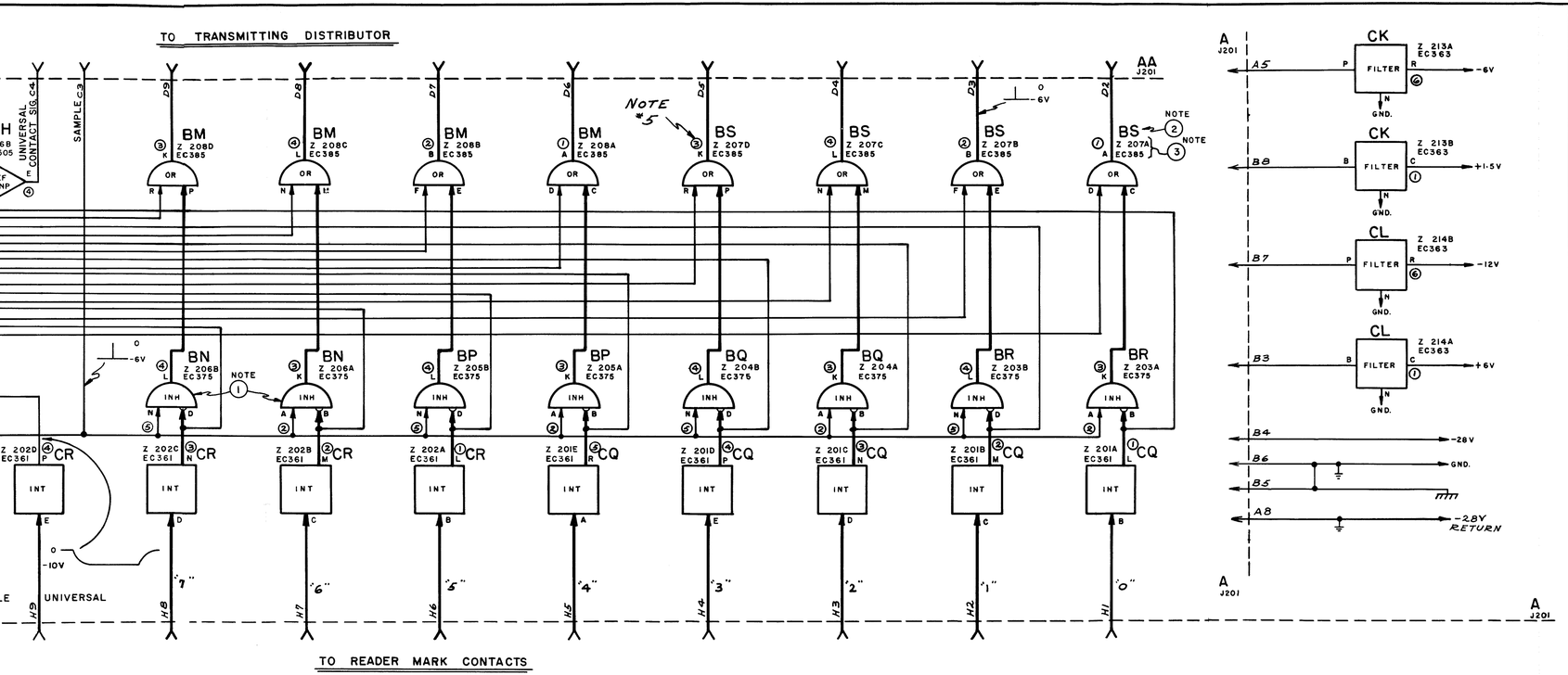
P.D. FILE NO. 1-22.134AR

DRAWN. E. E.	CHKD. O.L.H.
ENGD. O.L.H.	APPD.

TELETYPE CORPORATION

4799 WD

ET108147
TC255(6-54)



NO	NOTES
1	TTSC 501 (5 & 6 LEVEL CODE) - CIRCUIT ELEMENTS Z 206A & Z 206B ARE OMITTED - TTSC 801 (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 5916 WD
5.	NUMBER IN CIRCLE DENOTES TEST POINT ON CIRCUIT CARD.
6	WITH REGARD TO OUTPUT WAVEFORMS ALL RISE TIMES SHOULD BE 6 μ SECS OR LESS WITH VOLTAGE LEVELS OF -6V ±.4V TO 0V WITH THE EXCEPTION OF INTEGRATOR EC361, SIGNAL OUT EC325, AND PICKUP AMPLIFER
7.	FOR TYPE 2, 5 LEVEL OPERATION, THE LEAD ON BJ-C MUST BE REMOVED. TYPE 1, 5 LEVEL OPERATION IS IDENTICAL TO TYPE 2, - 6, 7 & 8 LEVEL OPERATION.

5917 WD

REVISIONS

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

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

PROD. NO. 5917 WD

DATE: 10-26-62

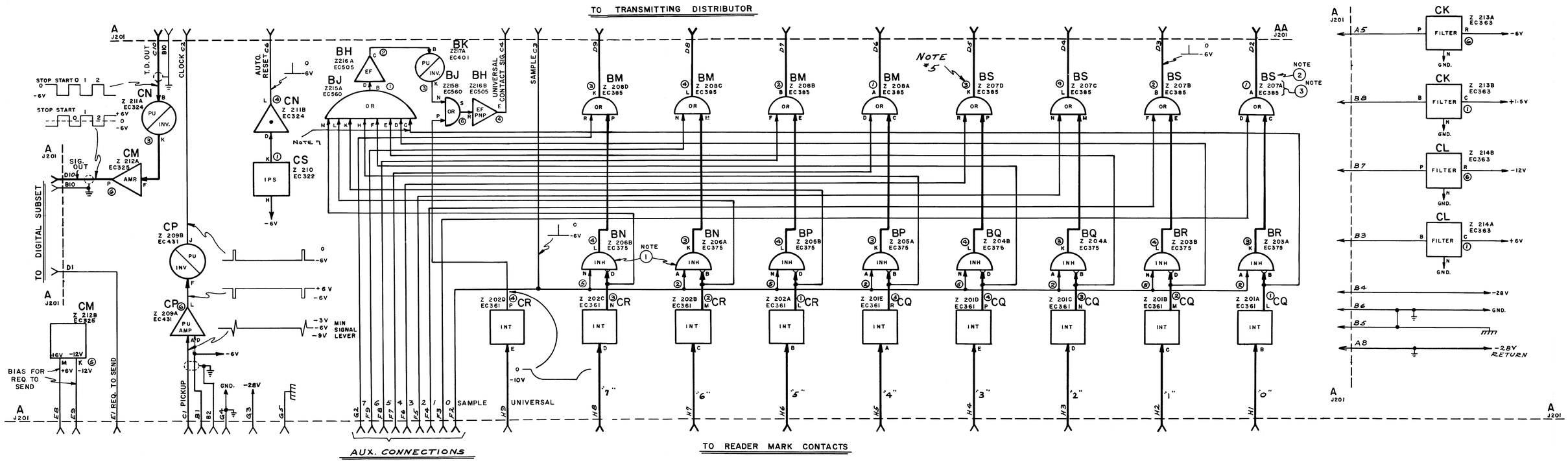
P.D. FILE NO. 1-11,134A

DRAWN: S.W. CHKD: JBF

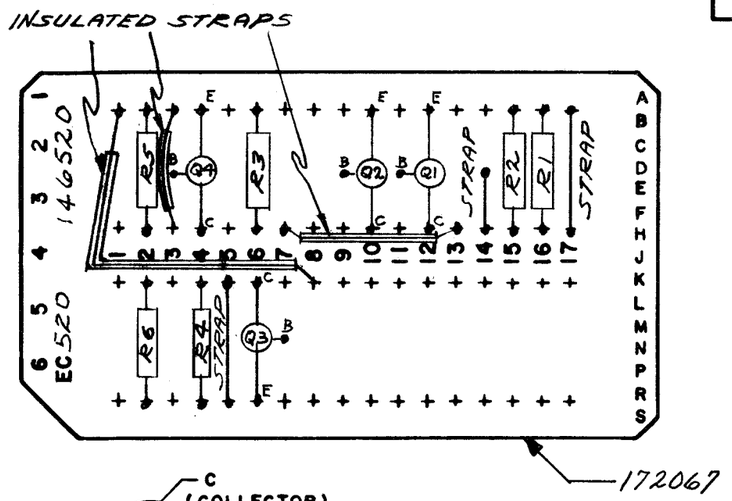
ENGD: E.H.P. APPD: R.R.

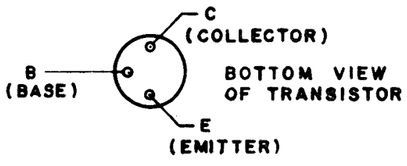
TELETYPE CORPORATION

5917 WD


TO TRANSMITTING DISTRIBUTOR
A J201
T.D. OUT C20
B10
CLOCK C2
AUTO. RESET C6
SAMPLE C3
UNIVERSAL CONTACT SIG. C4
STOP START
CN Z 211A EC324
CN Z 211B EC324
CM Z 212A EC325
SIG. OUT
B10
B7
P
E
TO DIGITAL SUBSET
D1
CM Z 212B EC325
+6V -12V
BIAS FOR REQ TO SEND
E8
E9
E1 REQ. TO SEND
CP Z 209B EC431
CP Z 209A EC431
PU INV.
PU AMP
AMP
-6V
+6V
-3V
-6V
-9V
MIN SIGNAL LEVER
C1 PICKUP
B1
B2
G4
GND.
G3
-28V
G5
BH Z216A EC505
BJ Z216A EC560
EF
OR
BK Z217A EC401
BJ Z215B EC560
BH Z216B EC505
EF PNP
NOTE 7
CS Z 210 EC322
IPS
-6V
G2 7 F9 6 F8 5 F7 4 F6 3 F5 2 F4 1 F3 0 F2 SAMPLE
AUX. CONNECTIONS
BM Z 208D EC385
BM Z 208C EC385
BM Z 208B EC385
BM Z 208A EC385
BS Z 207D EC385
BS Z 207C EC385
BS Z 207B EC385
BS Z 207A EC385
NOTE #5
NOTE
OR
D9
D8
D7
D6
D5
D4
D3
D2
AA J201
BN Z 206B EC375
BN Z 206A EC375
BP Z 205B EC375
BP Z 205A EC375
BQ Z 204B EC375
BQ Z 204A EC375
BR Z 203B EC375
BR Z 203A EC375
INH
NOTE 1
Z 202D EC361 CR
Z 202C EC361 CR
Z 202B EC361 CR
Z 202A EC361 CR
Z 201E EC361 CQ
Z 201D EC361 CQ
Z 201C EC361 CQ
Z 201B EC361 CQ
Z 201A EC361 CQ
INT
-10V
UNIVERSAL
I18 "7"
I17 "6"
I16 "5"
I15 "4"
I14 "3"
I13 "2"
I12 "1"
I11 "0"
TO READER MARK CONTACTS
CK Z 213A EC363
CK Z 213B EC363
CL Z 214B EC363
CL Z 214A EC363
FILTER
GND.
A5
B8
B7
B3
+1.5V
-12V
+6V
B4
-28V
B6
GND.
B5
A8
-28V RETURN

EC520





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	

ET-04147
TC255 6-541

RELAY DRIVER (2)

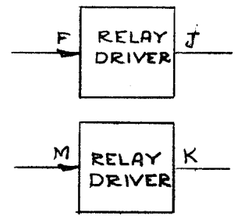
CIRCUIT BOARD EC520

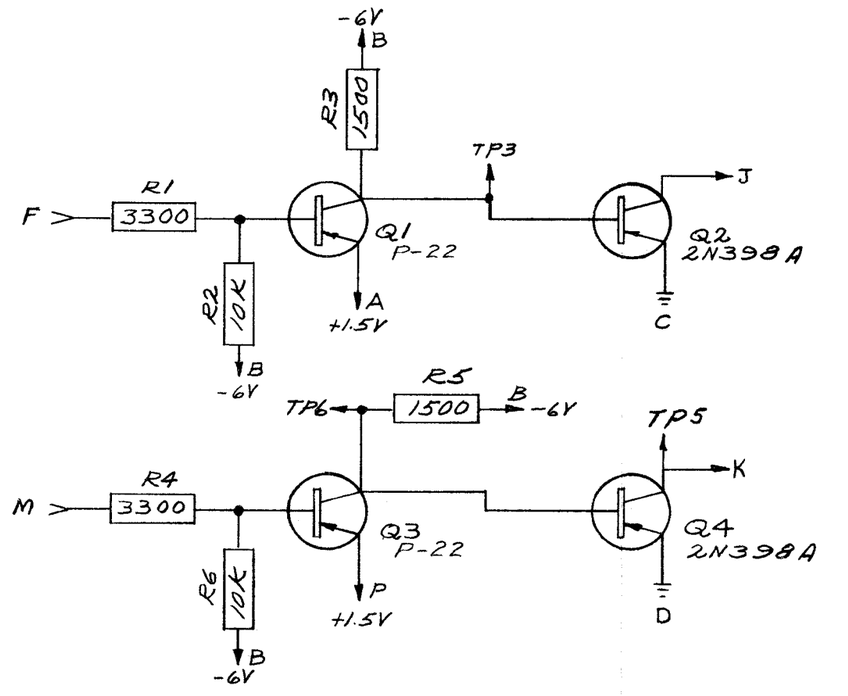
146520

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





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

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

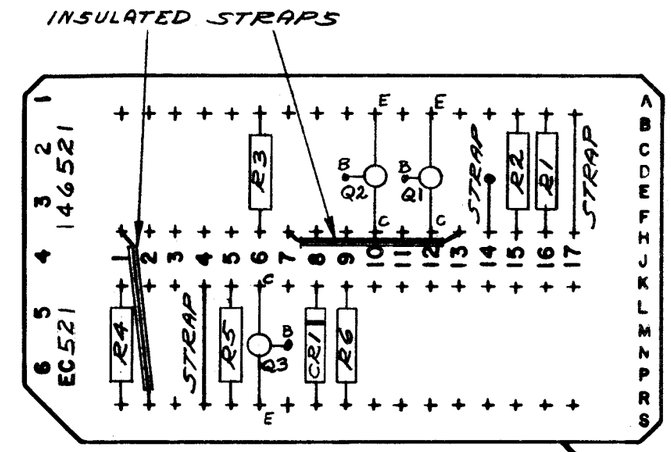
APPROVALS	
D AND R	E OF M
E-NUMBER	
PROD. NO.	146520
DATE	10-OCT-61
P.D. FILE NO	1-11.134AA
DRAWN SW	CHKD GW
ENGD CJR	APPD

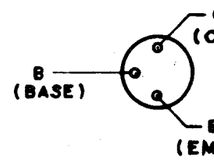
TELETYPE CORPORATION

146520

ET-11451

EC521





NOTE:
REFER TO 5016WD FOR MARKING INFORMATION

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	

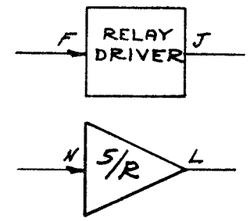
ET-04167
TC25516-541

RELAY DRIVER & REC. INPUT AMPLIFIER

CIRCUIT BOARD EC521

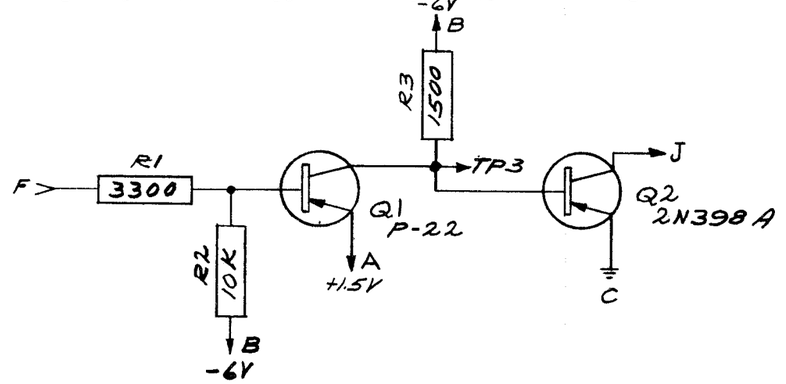
146521

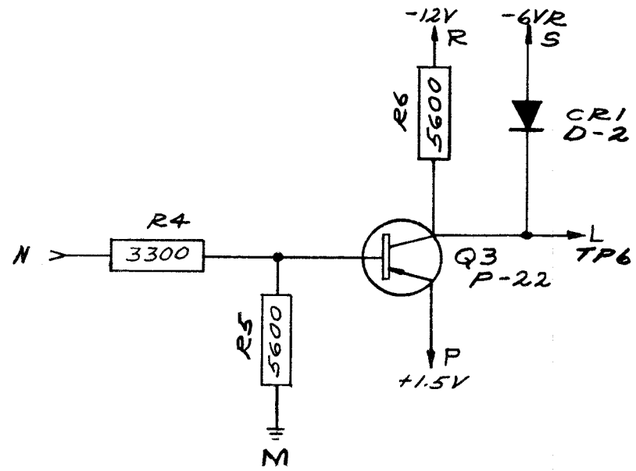
SYMBOLS

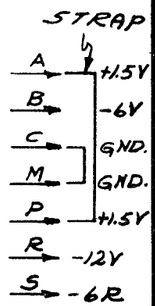


This card consists of one Relay Driver Circuit and one Receiving Input Amplifier. The Relay Driver consists of Q1 and Q2 with Q2 not to be loaded greater than 30 volts or 100 ma. The circuit will operate with inputs of +8 and Gnd. With +8 volts applied at input (F) Q1 is biased "OFF" and -6 volts appears 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.







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

ISSUE	DATE	AUTH. NO.
2	1-2568	78157

APPROVALS

D AND R	E OF M

E-NUMBER

PROD. NO. 146521

DATE 10-OCT-61

PD FILE NO 1-11.134AA

DRAWN SY | CHKD

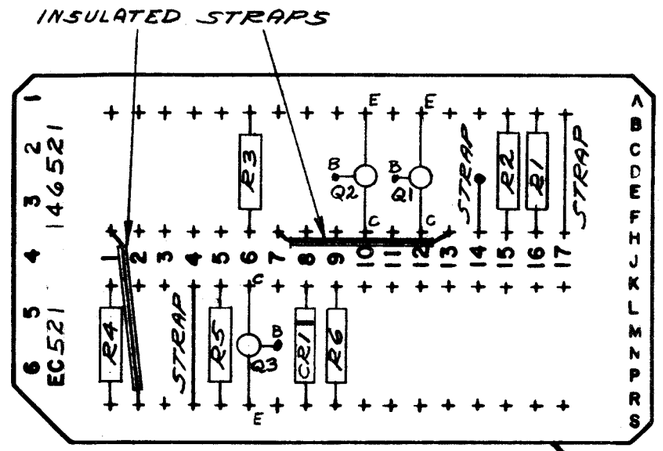
ENGD CJR | APPD

TELETYPE CORPORATION

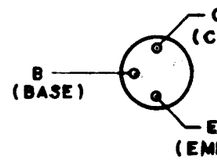
146521

ET-11451

EC521



172067



NOTE:
REFER TO 5016WD FOR MARKING INFORMATION

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	

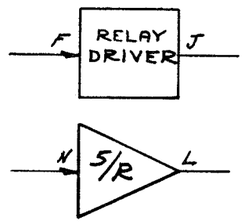
ET-04167
TC25516-541

RELAY DRIVER & REC. INPUT AMPLIFIER

CIRCUIT BOARD EC521

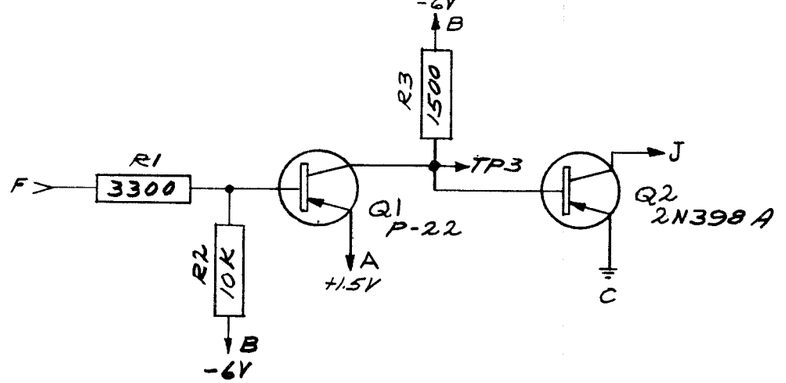
146521

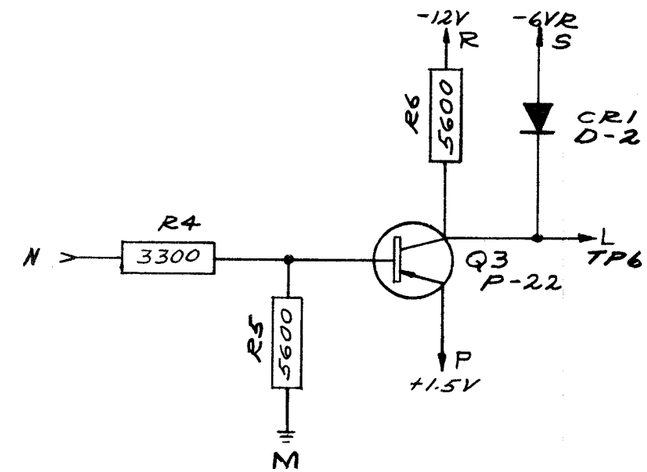
SYMBOLS

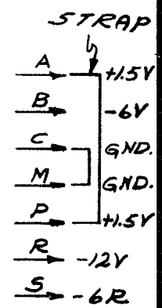


This card consists of one Relay Driver Circuit and one Receiving Input Amplifier. The Relay Driver consists of Q1 and Q2 with Q2 not to be loaded greater than 30 volts or 100 ma. The circuit will operate with inputs of +8 and Gnd. With +8 volts applied at input (F) Q1 is biased "OFF" and -6 volts appears 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.







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

ISSUE	DATE	AUTH. NO.
2	1-2[illegible]	[illegible]

APPROVALS

D AND R	E OF M

E-NUMBER

PROD. NO. 146521

DATE 10-OCT-61

P.D. FILE NO. 1-11.134AA

DRAWN SV | CHKD

ENGD CJR | APPD

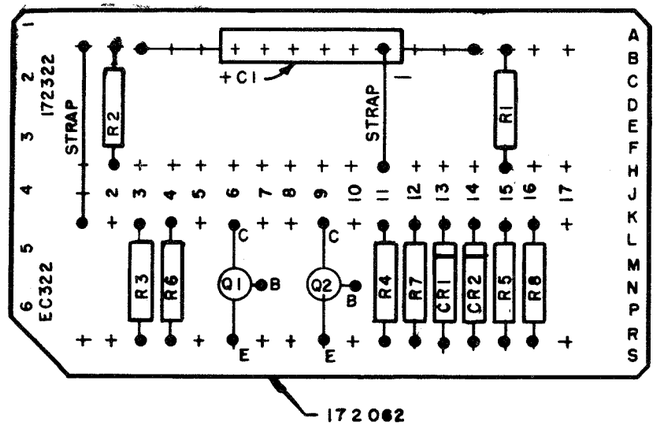
TELETYPE CORPORATION

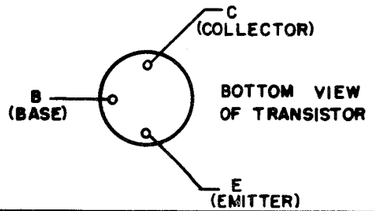
146521

FT-11451

EC 322

172322





NOTE

REFER TO 5016 WD FOR MARKING INFORMATION

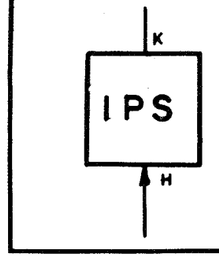
REF. DESIGN.	TELETYPE PART NO.	TOTAL QTY.	NAME AND DESCRIPTION	LOCATING FUNCTION
C1	171586	1	CAPACITOR, TANTALUM – 100 MF	INTEGRATION CAP.
CR1	177108	2	DIODE, D-2	CLAMP
CR2			SAME AS CR1	CLAMP
R1 *	137442	1	RESISTOR, FIXED 1500 OHMS	BASE BIAS
R2	118144	3	RESISTOR, FIXED 2700 OHMS	BASE BIAS
R3			SAME 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.	

ET108147
TC255(6-54)

INTEGRATOR PULSE SHAPER

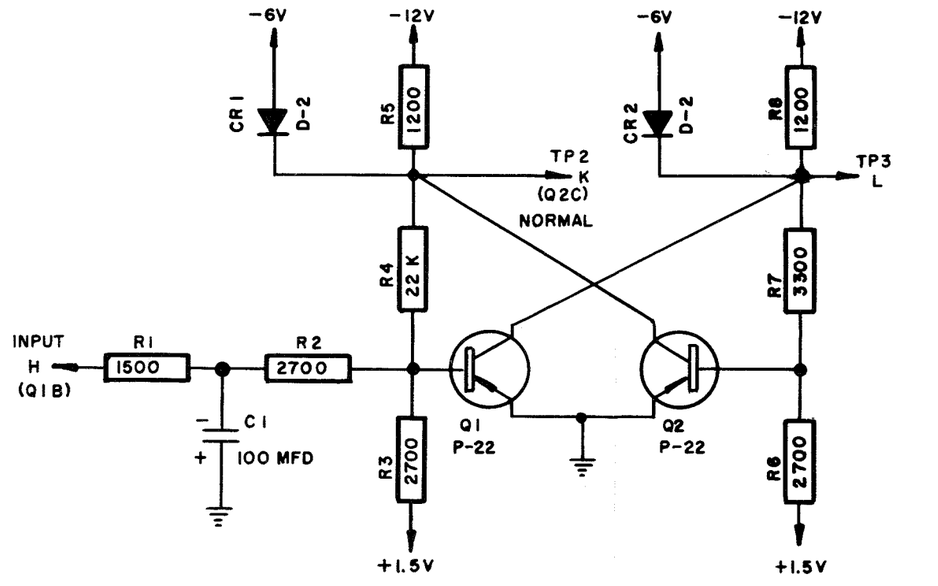
CIRCUIT BOARD EC 322

172322



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



NOTE

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

ISSUE	DATE	AUTH. NO.
2	5-26-61	6989Z

APPROVALS

D AND R | E OF M

E-NUMBER

PROD. NO. 172322

DATE: 1-27-61

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

DRAWN. SW RLW | CHKD. R.D.F.

ENGD. EHP | APPD.

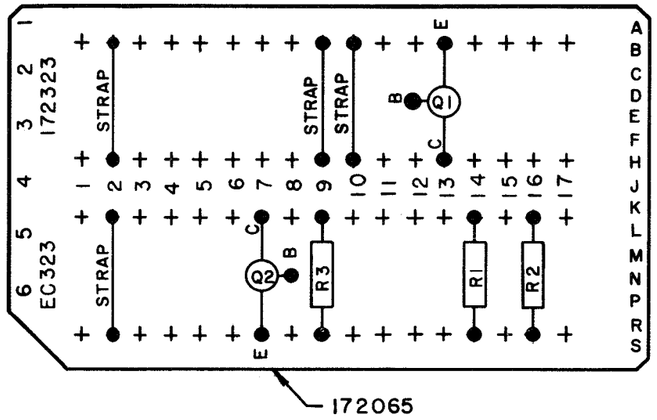
TELETYPE CORPORATION

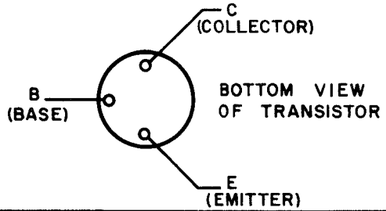
172322

ET-131451

EC 323

172323





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	EMITTER LOAD
Q1	177106	1	TRANSISTOR N-33	AMPLIFIER
Q2	177105	1	TRANSISTOR P-22	AMPLIFIER
EC	172065	1	CIRCUIT CARD, ETCHED	
		4	STRAPS - BARE 24 AWG	
	144495	2	PAD, TRANSISTOR	
R2	137438	2	RESISTOR FIXED 100 OHMS	CURRENT LIMITING
R3			SAME AS R2	

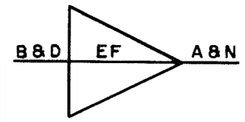
ET-108147
TC255(6-54)

SYMMETRICAL EMITTER FOLLOWER

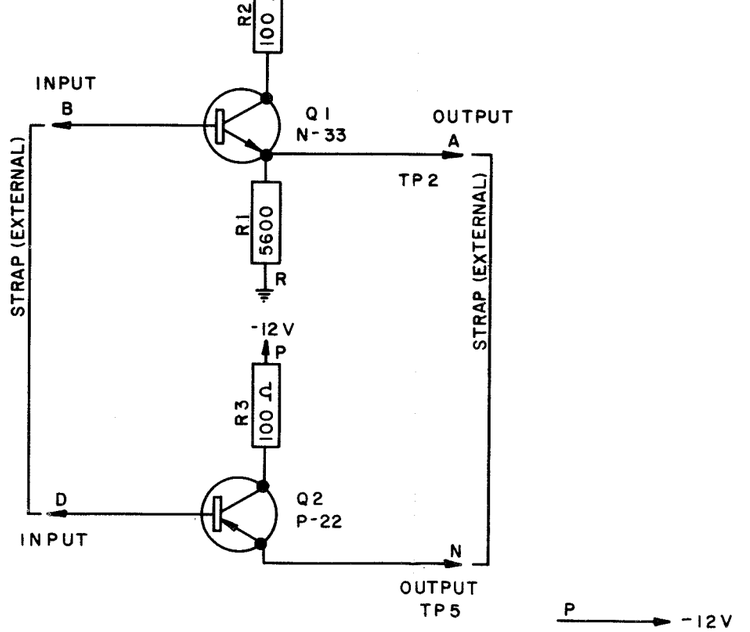
CIRCUIT BOARD EC323

172323

SYMBOLS



THIS CIRCUIT IS USED TO PROVIDE CURRENT GAIN WITH NO INVERSION OR CHANGE IN SIGNAL LEVEL. WITH ZERO VOLTS APPLIED AT BASE OF NPN AND PNP TRANSISTORS ZERO VOLTS APPEAR AT EMITTERS OR OUTPUT. WITH -6 VOLTS APPLIED -6 VOLTS APPEARS AT EMITTERS. THE SYMMETRICAL EMITTER FOLLOWER IS USED TO PROVIDE LOW OUTPUT IMPEDANCE (HIGH CURRENT GAIN) ON BOTH POSITIVE AND NEGATIVE GOING VOLTAGE TRANSISTIONS.



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. 172323

DATE: 12-28-59

P.D. FILE NO. 1-11.134AA

DRAWN. S.W. F.S. CHKD.

ENGD. E.H.P. APPD.

TELETYPE CORPORATION

172323

ET-131481

EC324

172324

INVERTER AND PULSE AMPLIFIER

CIRCUIT BOARD EC324

172324

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

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

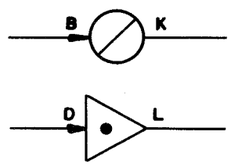
INVERTER

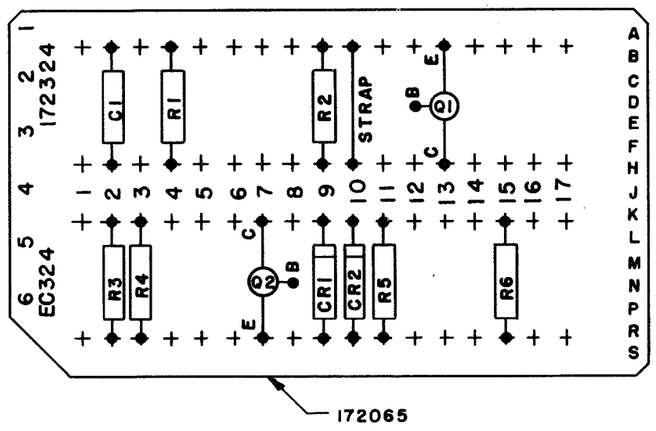
Q1 IS REVERSE BIAS AT APPROXIMATELY 1.5 VOLTS AND THE COLLECTOR IS CLAMPED TO -6V. WITH -6 VOLTS APPLIED AT TERMINAL B, Q1 IS DRIVEN INTO SATURATION CAUSING THE COLLECTOR POTENTIAL TO RISE (-6V TO 0V) FOR DURATION OF THE INPUT SIGNAL.

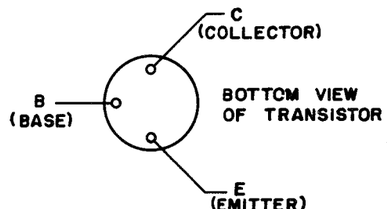
PULSE AMPLIFIER

Q2 IS REVERSED BIAS AT APPROXIMATELY +1.5V WHICH HOLDS Q2 OFF. WITH A NEGATIVE GOING 6V (0V TO -6V) TRANSISTION 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

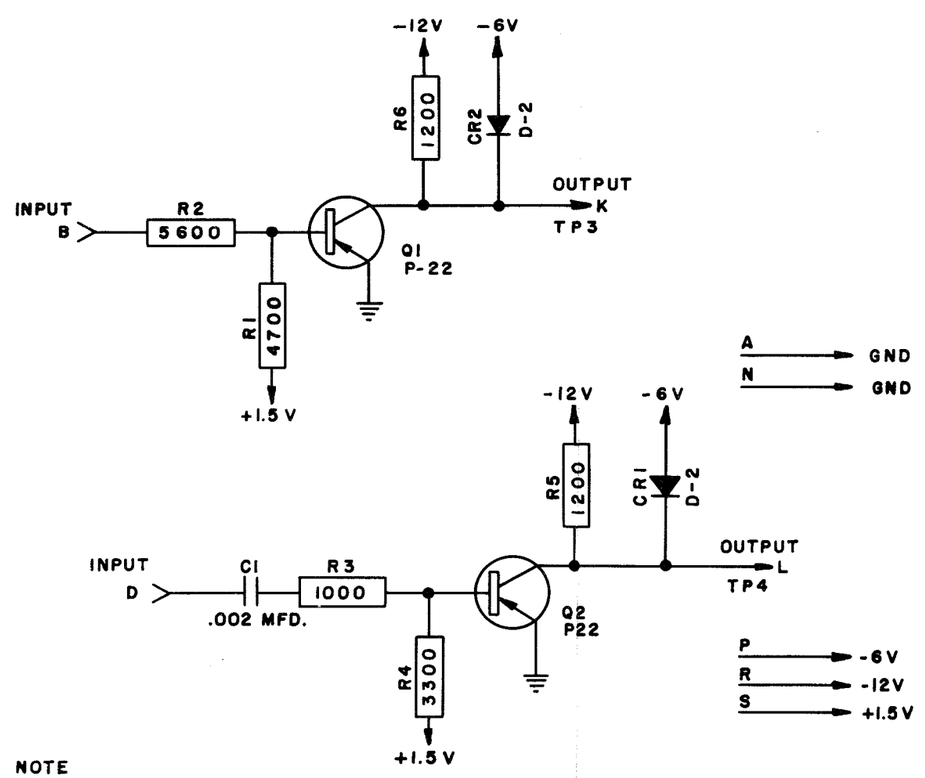






NOTE
REFER TO 5016WD FOR MARKING INFORMATION

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	
	144495	2	PAD, TRANSISTOR	



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

APPROVALS

D AND R	E OF M

E-NUMBER

PROD. NO. 172324

DATE: 2-1-60

P.D. FILE NO. 1-11.134AA

DRAWN. AB CHKD.

ENGD. EHP APPD.

TELETYPE CORPORATION

172324

ET-108147
TC255(6-54)

EC 325

172325

OUTPUT AMPLIFIER AND VOLTAGE BIAS

CIRCUIT BOARD EC325

172325

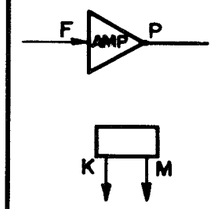
ISSUE	DATE	AUTH. NO.
2	5-26-61	69892

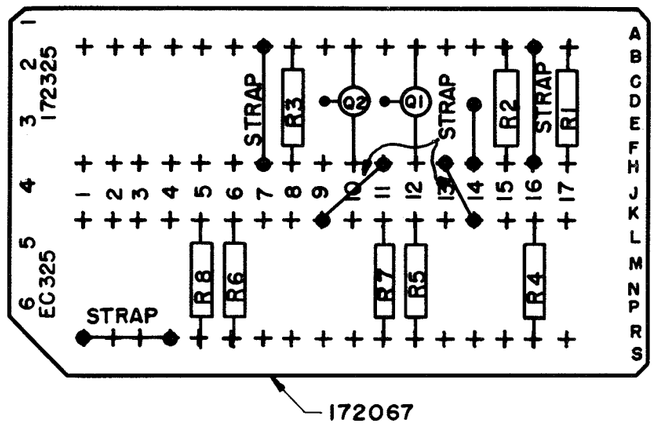
THIS CARD BASICALLY CONSISTS OF TWO COMMON EMITTER AMPLIFIERS AND A VOLTAGE BIASING NETWORK. ONE AMPLIFIER IS A PNP TYPE THE OTHER IS A NPN.

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

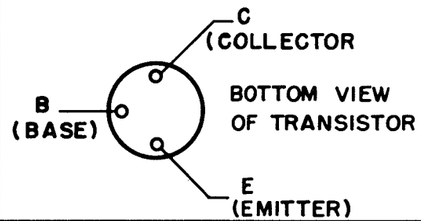
Q1 AND Q2 ARE BOTH CUT-OFF WITH 0 VOLTS APPLIED AT POINT F. R1 AND R2 RETURNED TO +1.5V REVERSE BIAS Q1 APPROXIMATELY +.75V. Q2 IS HELD CUT-OFF BY -12V COLLECTOR POTENTIAL OF Q1. THE OUTPUT AT POINT P IS THEREFORE +6V. WITH -6 VOLTS APPLIED AT POINT F, Q1 CONDUCTS, WHICH IN TURN DRIVES Q2 INTO CONDUCTION.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

SYMBOLS



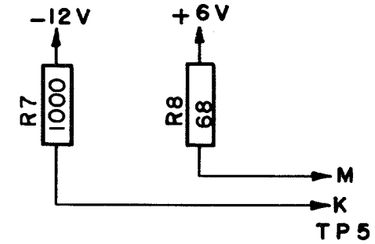


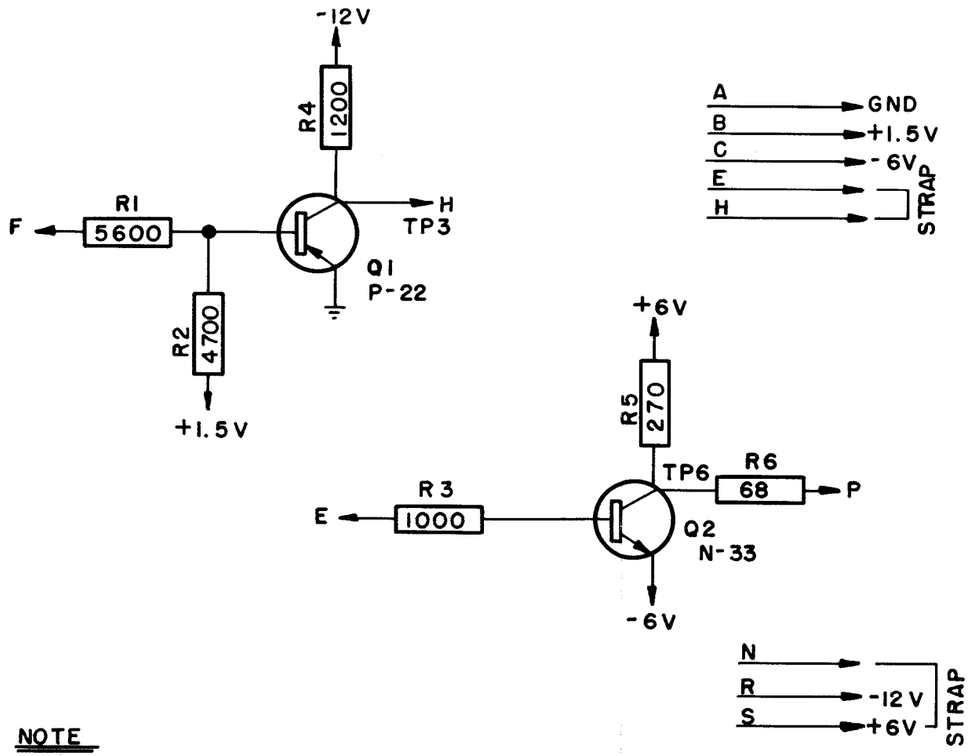
172067



NOTE

REFER TO 5016 WD FOR MARKING INFORMATION





NOTE

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

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, TRANSITOR	

APPROVALS

D AND R	E OF M

E-NUMBER

PROD. NO. 172325

DATE: 1-26-60

P.D. FILE NO. 1-11.134AA

DRAWN. E.R. CHKD.

ENGD. E.H.P. APPD.

TELETYPE CORPORATION

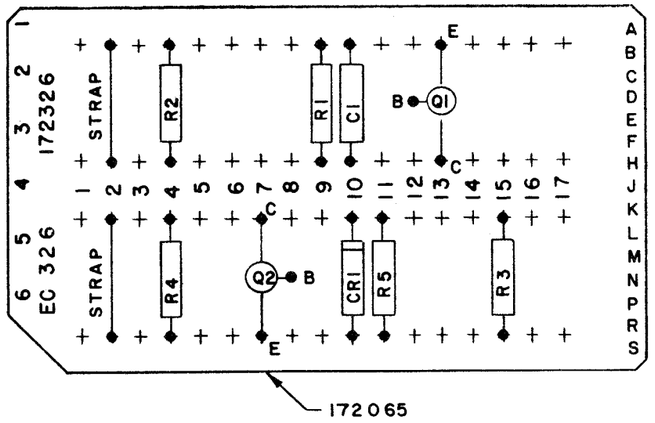
172325

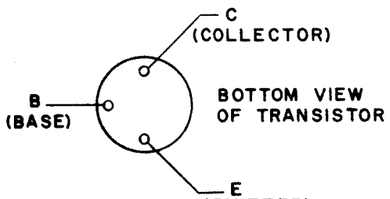
ET108147
TC255(6-54)

ET-131481

EC 326

172326





NOTE

REFER TO 5016 WD FOR MARKING INFORMATION

REF. DESIGN.	TELETYPE PART NO.	TOTAL QTY.	NAME AND DESCRIPTION	LOCATING FUNCTION
C1	179332	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	

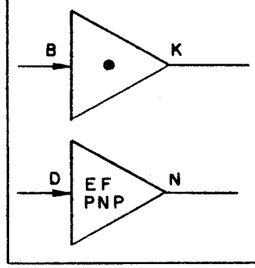
ET:108147
TC255(6-54)

PULSE AMP, AND EMITTER FOLLOWER (PNP)

CIRCUIT BOARD EC326

172326

SYMBOLS

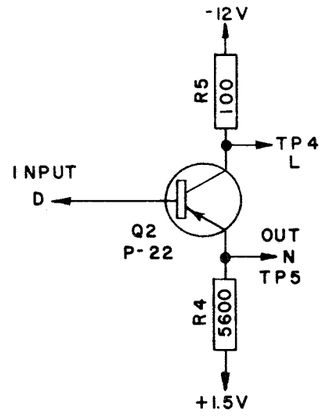


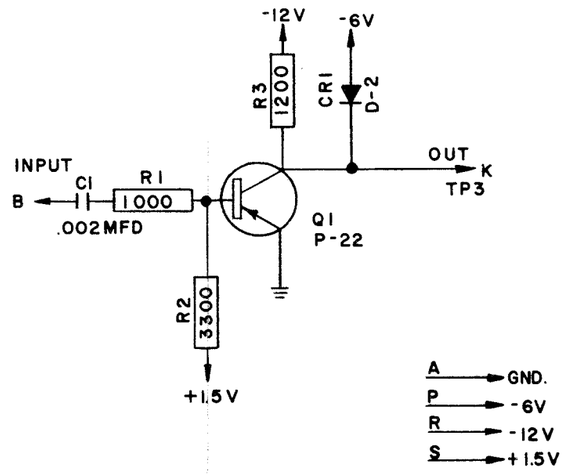
PULSE AMP

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).





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
4	4-5-62	73031

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. S.W. F.S.	CHKD.
ENGD. E.H.P.	APPD.

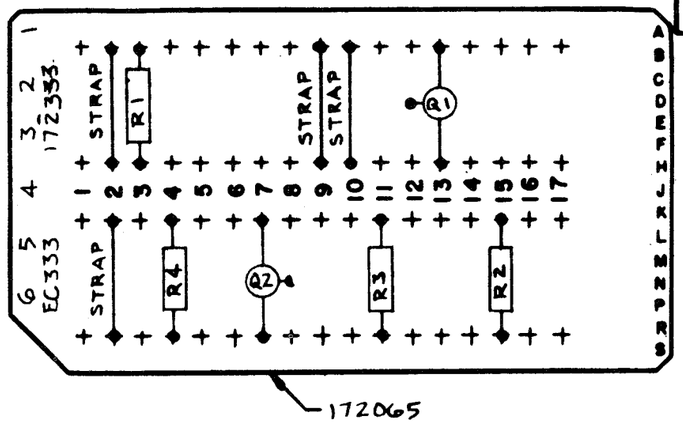
TELETYPE CORPORATION

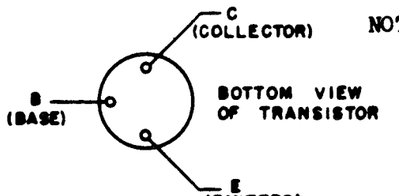
172326

ET-131491

EC 333

172333





NOTE:
REFER TO 5016 WD FOR MARKING INFORMATION

REF. DESIGN.	TELETYPE PART NO.	TOTAL QTY.	NAME AND DESCRIPTION	LOCATING FUNCTION
R1	118146	2	Resistor, Fixed 4700 Ohms	Emitter Load
R2	137438	2	" " 100 Ohms	Collector Dropping
R3			Same as R2	Emitter Load
R4			Same as R1	Collector Dropping
Q1	177106	2	Transistor (NPN) N-33	Amplifier
Q2			Same as Q1	"
EC	172065	1	Circuit Card Etched	
		4	Straps, Bare 25 AWG	
	144495	2	PAD, TRANSISTOR	

ET-109147
TC235(6-54)

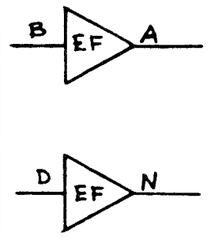
(NPN) EMITTER FOLLOWER (2)

CIRCUIT BOARD EC 333

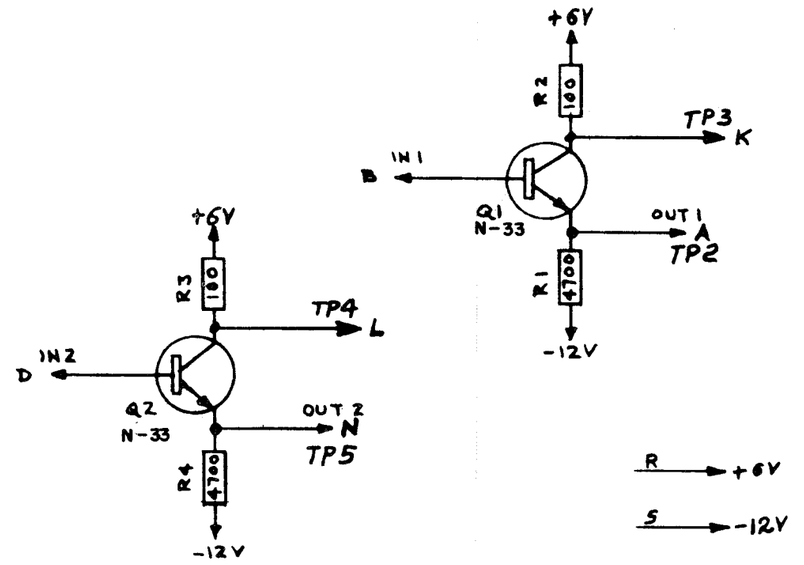
172333

This circuit is a general purpose 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 applied at the base, zero volts appears at the emitter. With -6 V applied, -6 V 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 V).

SYMBOLS



ISSUE	DATE	AUTH. NO.
2	6-30-58	HS-10440
3	9-8-59	HS-11939
4	10-20-59	HS-12378
5	5-26-61	69892



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

APPROVALS

D AND R	E OF M

E-NUMBER

PROD. NO. 172333

DATE:

P.D. FILE NO.

DRAWN. R.S. | CHKD.

ENGD. S.S. | APPD.

TELETYPE CORPORATION

172333

ET-109091

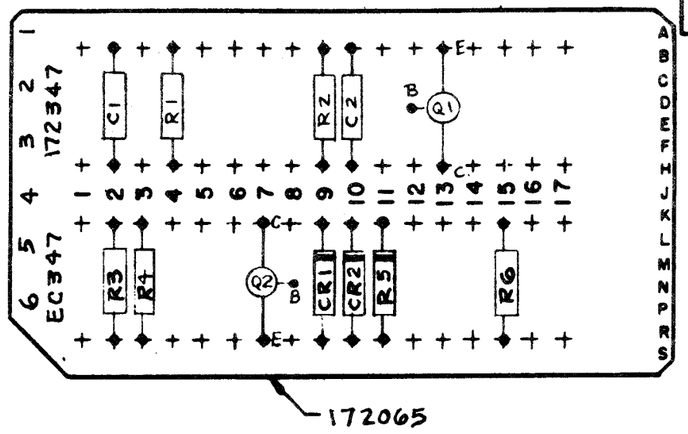
EC 347

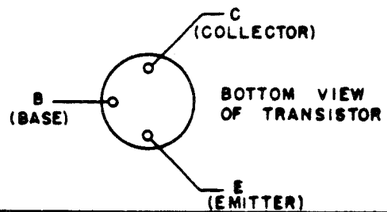
172347

PULSE AMPLIFIER (2)

CIRCUIT BOARD EC 347

172347



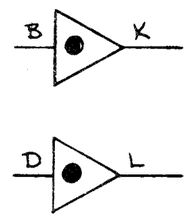


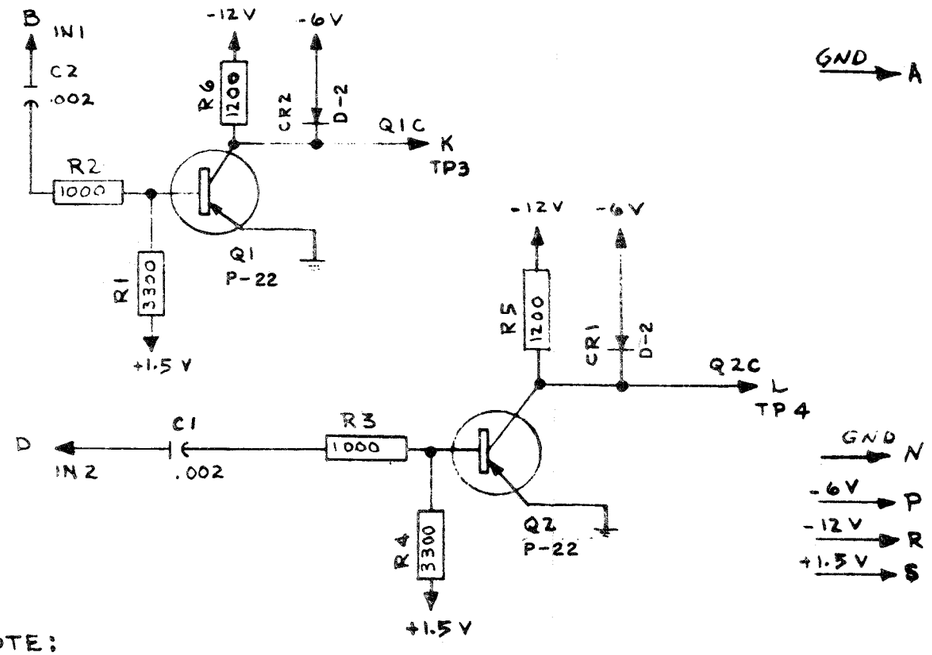
NOTE:
REFER TO 5016 WD FOR MARKING INFORMATION

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	

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.

SYMBOLS





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	7-31-59	H.S.-1072
4	9-8-59	H.S.-1139
5	11-5-59	H.S.-1261
6	3-30-60	H.S.-1700
7	5-26-61	69892
8	11-16-61	71626

APPROVALS

D AND R	E OF M

E-NUMBER

PROD. NO. 172347

DATE:

P.D. FILE NO.

DRAWN. CHKD.

ENGD. S.S. APPD.

TELETYPE CORPORATION

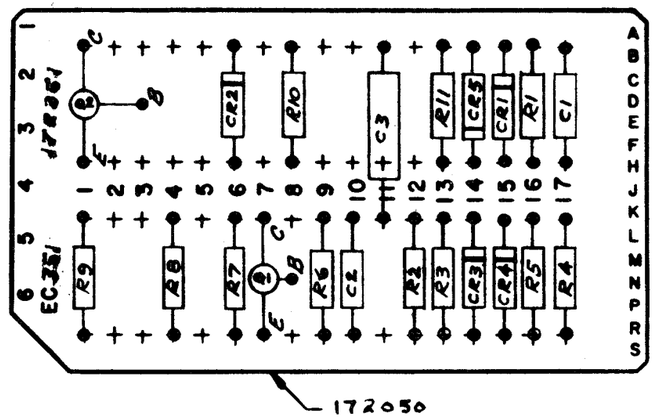
172347

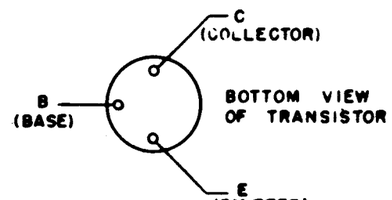
ET-131-001

ET-09-67
T-255-6-541

EC 351

172351





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
C2	177331	1	Capacitor, Ceramic .001MFD	Feedback
C3	171887	1	Capacitor Mylar .25 MFD	Delay
CR1	177108	5	Diode D-2	Gate
CR2			Same as CR-1	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	118147	1	Resistor, Fixed 3900 Ohms	Bias
Q1	177108	2	Transistor, P-22	Amplifier
Q2			Same as Q1	
MC	172050	1	Circuit Card, Etched	
	144495	2	PAD, TRANSISTOR	

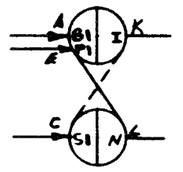
67.30.47
TC25516-541

VARIABLE PULSE DELAY (.41 TO 13MS)

CIRCUIT BOARD EC351

172351

SYMBOLS



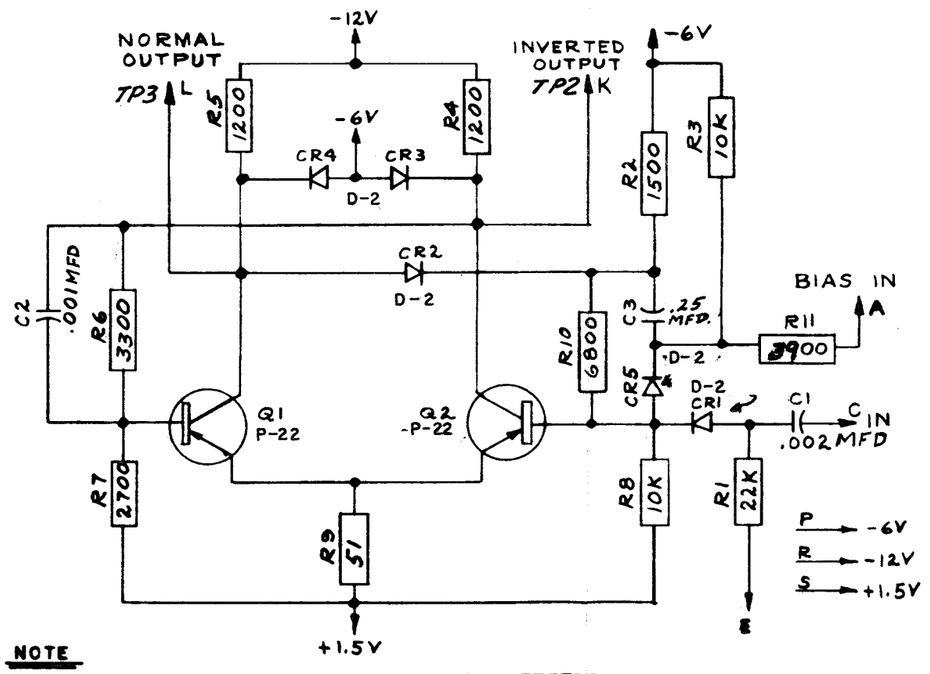
ISSUE	DATE	AUTH NO
5	5-26 61	69892
6	11-16-61	71626
7	2-6-64	80254

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 applied to E and a 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 timing 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.



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

APPROVALS

D AND R	E OF M
O.A.L.	N

E-NUMBER

PROD. NO. 172351

DATE 7-DEC-63

PD. FILE NO. 1-122.134/AA

DRAWN JW | CHKD

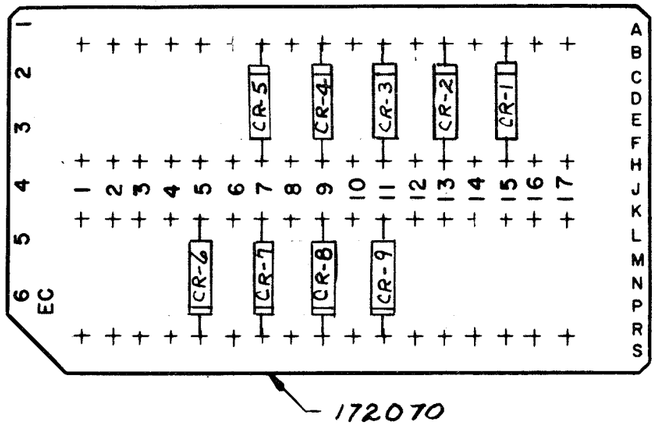
ENGD EHP | APPD

TELETYPE CORPORATION

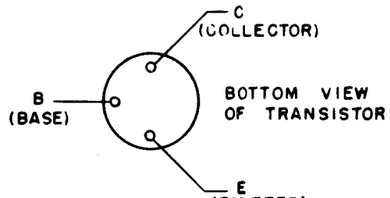
72351

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	

ET-5M-47
TC25516-541

DIODE "FAN-OUT" GATE

CIRCUIT BOARD EC352

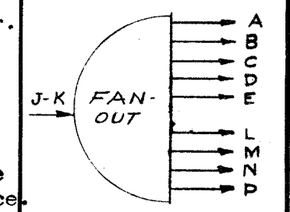
172352

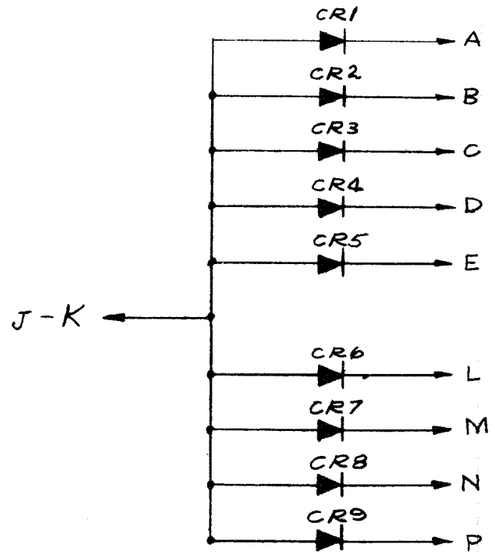
This circuit designated as fan-cut is, in a sense, an "OR" gate without a biasing resistor.

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.

SYMBOLS





ALL DIODES ARE D-2

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

ISSUE	DATE	AUTH NO
2	10-16-61	69392-3
3	11-14-61	71654

APPROVALS

D AND R	E OF M

E-NUMBER

PROD. NO.

DATE: 10-MAR.-60
P.D. FILE NO. 1-122.134AA
DRAWN SW CHKD
ENGD EHP APPD

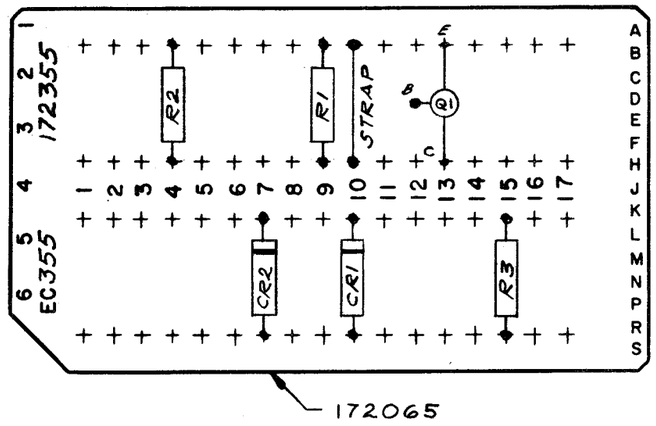
TELETYPE CORPORATION

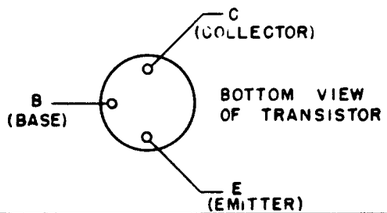
172352

ET-1314B1

EC 355

172355





NOTE
REFER TO 5016WD FOR MARKING INFORMATION

REF. DESIGN.	TELETYPE PART NO.	TOTAL QTY.	NAME AND DESCRIPTION	LOCATING FUNCTION
R1	129851	1	Resistor, Fixed 3300 Ohms	Base Bias
R2	118186	2	Resistor, Fixed 5600 Ohms	Base Bias
R3			Same as R2	Collector Load
CR1	177108	2	Diode D-2	Clamping
CR2			Same as CR1	Gate
Q1	177224	1	Transistor 2N398A	Amplifier
EC	172065	1	Circuit Card, Etched	
		1	Strap Bare 24 AWG	
	144495	1	PAD, TRANSISTOR	

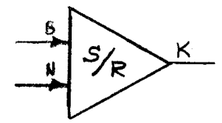
ET 5M147
TC255(6-54)

RECEIVER INPUT AMPLIFIER

CIRCUIT BOARD EC 355

172355

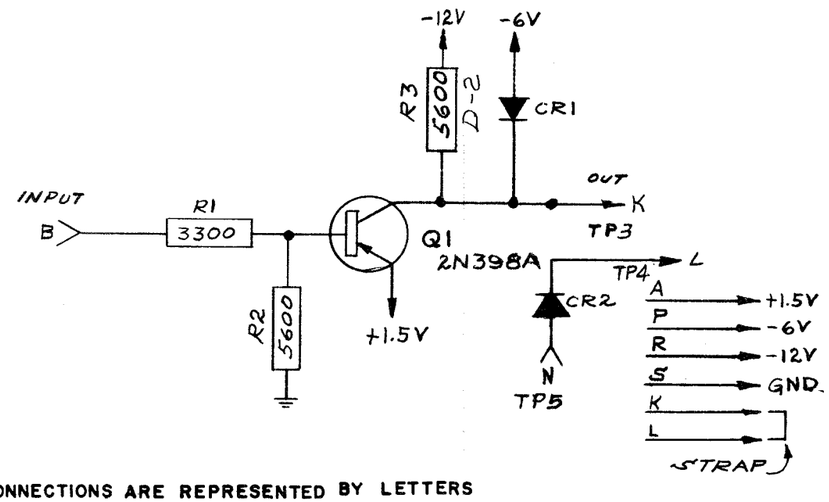
SYMBOLS



This card consist of a common emitter PNP amplifier used to convert a maximum DC signal of +50 to -50 volts and minimum signal of +3 to -3 volts to a -6 to +1.5 volt signal.

With a maximum of +50 volts and minimum of +3 volts on Terminal B, Q1 is cut off and Terminal K is at -6 volts. With a maximum of -50 volts and minimum of -3 volts on Terminal B, Q1 conducts and the output is at approximately +1.5 volts.

Diode CR2 provides an "OR" gate. When Terminal N is at 0 volts, the diode is forward bias and 0 volts appears at K when Q1 is cut off.



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. 172355

DATE: 26-JAN-60

P.D. FILE NO. 1-11.134AA

DRAWN SW CHKD

ENGD EKP APPD

TELETYPE CORPORATION

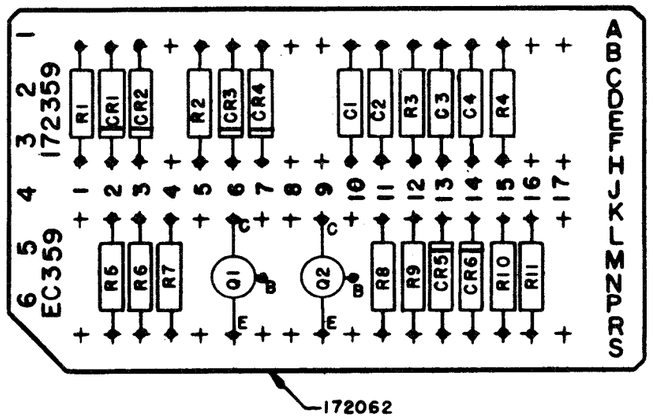
172355

ET 31451

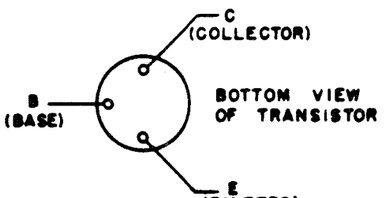
CIRCUIT BOARD EC 359

EC 359

172359



172062



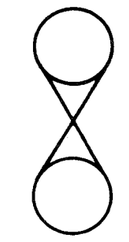
NOTE:
REFER TO 5016WD FOR MARKING INFORMATION

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	143656	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	" " " "
BC	172062	1	Circuit card, etched	---
	144495	2	PAD, TRANSISTOR	

ET 09-67
TC 355(6-54)

FLIP-FLOP

SYMBOLS

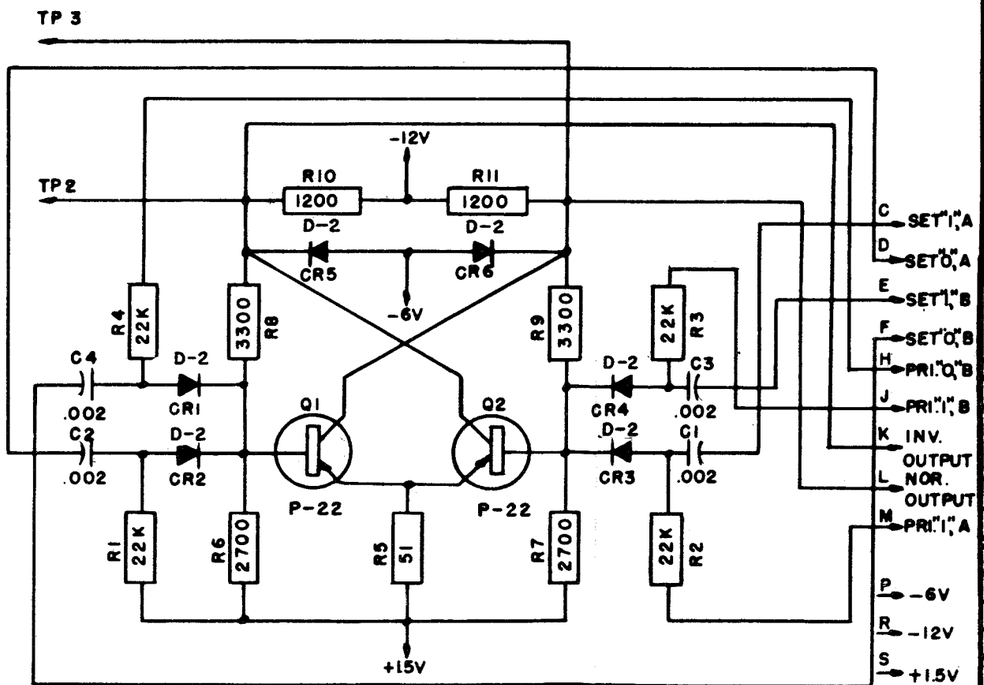


Static Description

The flip-flop employs two PNP junction transistors, so arranged that when one is conducting, the other is held in a cutoff condition. Q_1 and Q_2 are connected in a symetrical 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 C_1 and CR_3, C_2 and CR_2, C_3 and CR_4, or C_4 and CR_1 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 R_2, R_3 and R_4 to -6 volts. This prevents diodes CR1, CR_3 and CR_4 from conducting and coupling the pulse to the base of the corresponding transistor. The resistors R_2, R_3 and R_4 must be returned to ground potential or +1.5V for the drive pulse to be passed by the corresponding diode.



ISSUE	DATE	AUTH. NO.
2	9-8-59	MS-1139
3	10-28-59	MS-1238
4	5-26-61	69892
5	11-16-61	71626

FLIP-FLOP

APPROVALS

D AND R	E OF M

E-NUMBER

PROD. NO. 172359

DATE: 2-18-59

P.D. FILE NO.

DRAWN. G.J.M. CHKD.

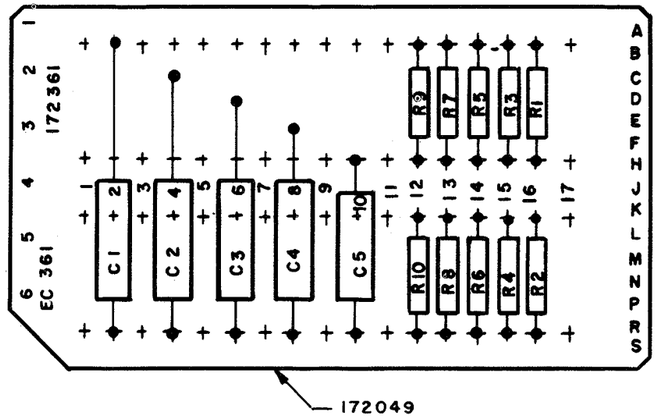
ENGD. R.J.R. APPD.

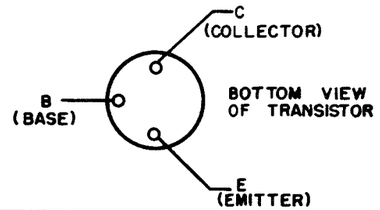
TELETYPE CORPORATION

172359

ET-131481

EC 361





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	

ET108147
TC255(6-54)

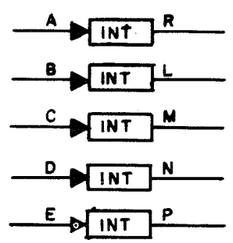
CIRCUIT BOARD EC 361

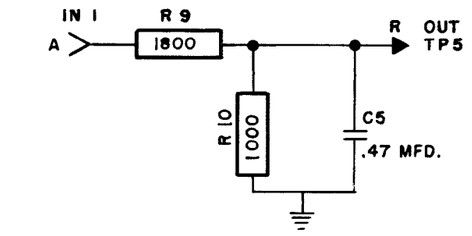
INTEGRATOR

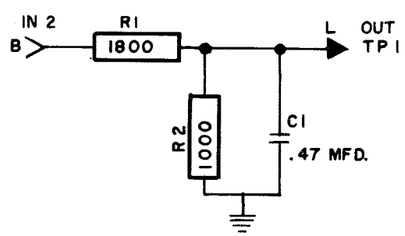
THIS CARD CONSISTS OF FIVE IDENTICAL INTEGRATOR CIRCUITS.

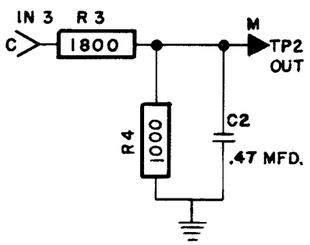
THE INPUT SIGNALS ARE APPLIED THROUGH 1800 OHM DROPPING RESISTOR AT TERMINALS A, B, C, D, AND E. THE LEADING EDGE AND TRAILING EDGE OF THE INPUT SIGNAL WILL BE DELAYED DUE TO RELATIVELY LONG TIME CONSTANT OF THE CAPACITOR AND 1800 OHM RESISTOR. THE CIRCUIT IS DESIGNED FOR INPUT SIGNAL OF 0 TO −28 VOLTS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

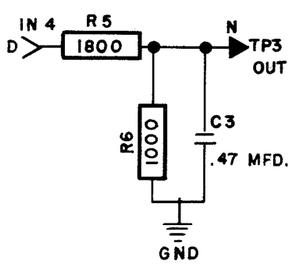
SYMBOLS

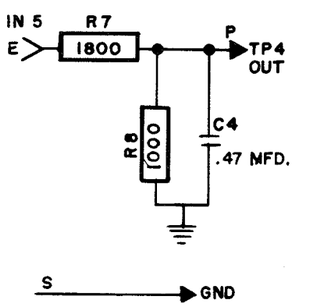












NOTE
CARD CONNECTIONS ARE REPRESENTED BY LETTERS
TEST POINTS ARE REPRESENTED BY NUMBERS.

172361

ISSUE	DATE	AUTH. NO.

APPROVALS

D AND R	E OF M

E-NUMBER

PROD. NO. 172361

DATE: 1-26-60

P.D. FILE NO. 1-11.134 AA

DRAWN SW RLW | CHKD.

ENGD. E H P | APPD.

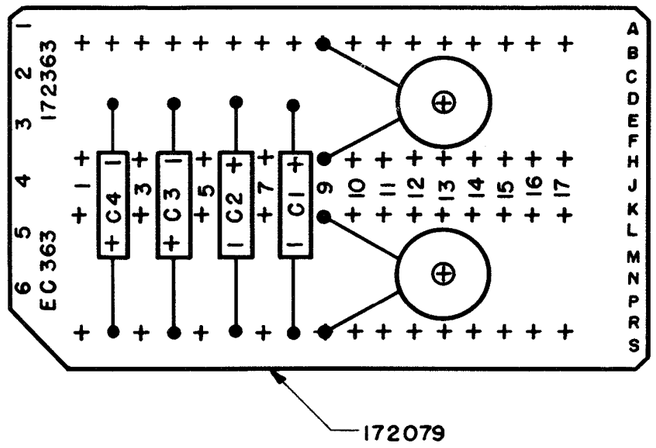
TELETYPE CORPORATION

172361

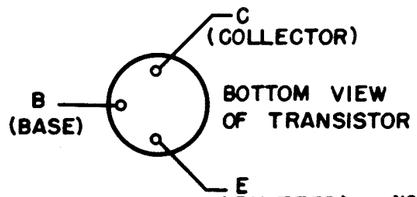
ET-131451

EC 363

172363



172079



NOTE : REFER TO 5016WD FOR MARKING INFORMATION

NOTICE: SPECIAL ARRANGEMENT OF CAPACITOR POLARITIES.

REF. DESIGN	TELETYPE PART NO.	TOTAL QTY.	NAME AND DESCRIPTION	LOCATING FUNCTION
C1	171831	4	CAPACITOR, 10 MFD 150 WVDC	FILTER CAPACITOR
C2			SAME AS C1	FILTER CAPACITOR
C3			SAME AS C1	FILTER CAPACITOR
C4			SAME AS C1	FILTER CAPACITOR
L1	171645	2	COIL	RF FILTER, COIL
L2			SAME AS L1	RF FILTER, COIL
EC	172079	1	CIRCUIT CARD, ETCHED	
	170558	2	SCREW, 16-32 X .438	
			BRASS, BINDING HEAD	

ET-108147
TC255(6-54)

FILTER (2)

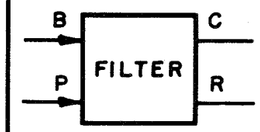
CIRCUIT BOARD EC 363

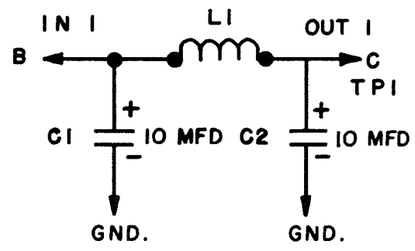
172363

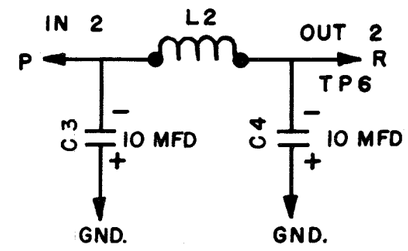
THIS CARD CONSISTS OF TWO PI FILTERS. VARIOUS VOLTAGE INPUTS TO EACH MODULE ARE APPLIED THROUGH THIS FILTER.

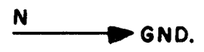
THE FUNCTION OF THIS FILTER IS TO REJECT HIGH FREQUENCY NOISE. INPUTS ARE APPLIED AT POINTS B AND P, OUTPUTS AT C AND R.

SYMBOLS









NOTE

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

ISSUE	DATE	AUTH. NO.

APPROVALS	
D AND R	E OF M
E-NUMBER	
PROD. NO. 172363	
DATE: 1-28-60	
P.D. FILE NO. 1-11.13ARR	
DRAWN. G.R.	CHKD.
ENGD. E.H.P.	APPD.

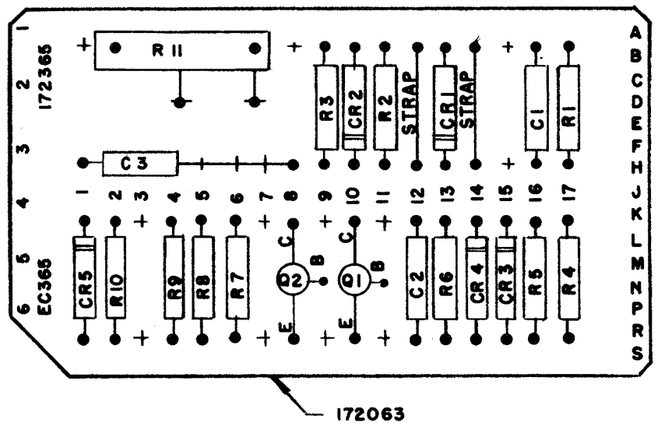
TELETYPE CORPORATION

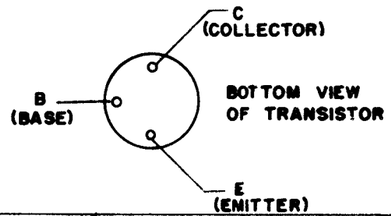
172363

ET-131481

EC 365

172365





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	

ET:108147
TC255(6-54)

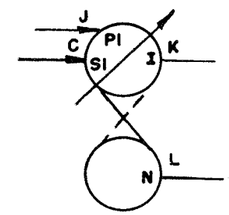
VARIABLE ONE SHOT

CIRCUIT BOARD EC365

.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.

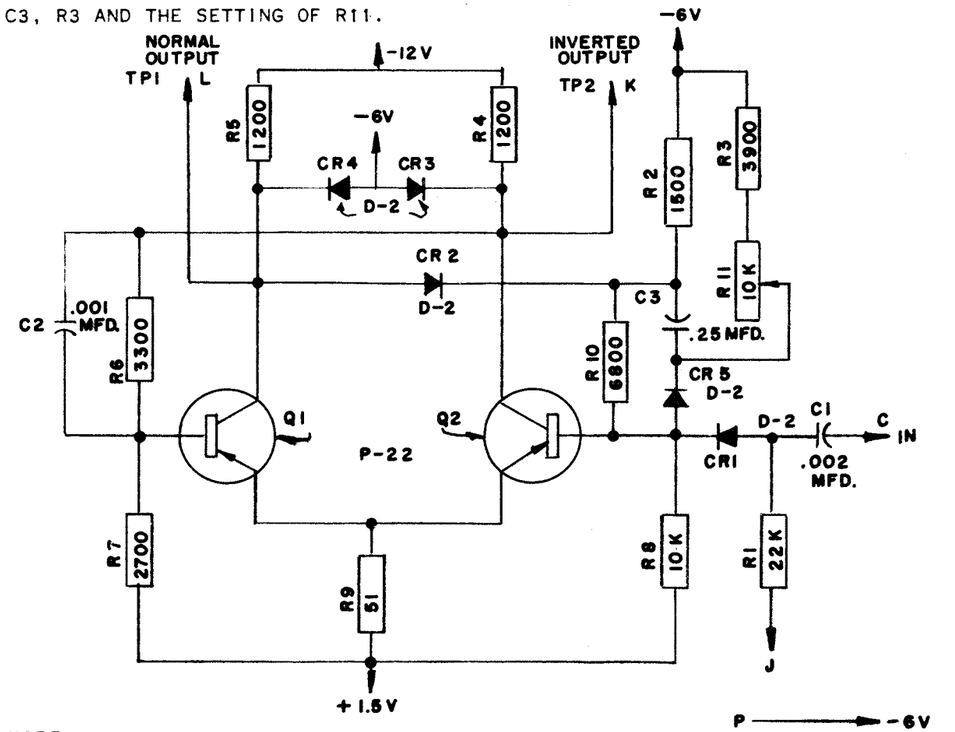
SYMBOLS



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 OV 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 OV, 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

172365

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. G.S.

ENGD. EMP | APPD.

TELETYPE CORPORATION

172365

ET-131481

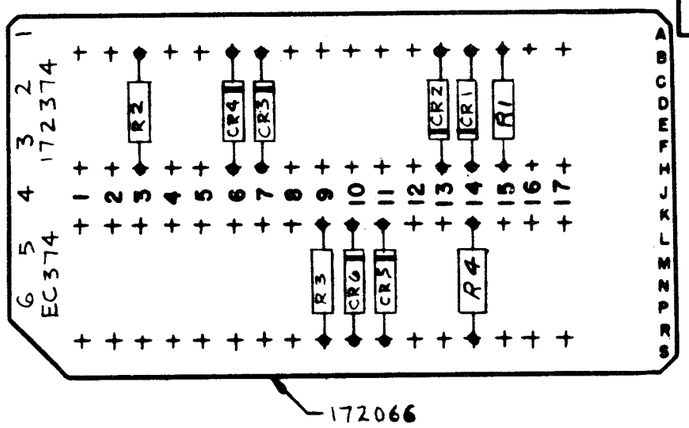
EC 374

172374

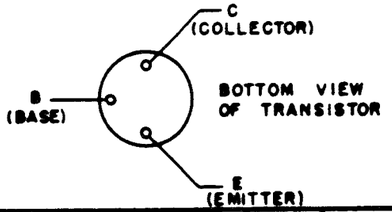
DIODE GATES (3)

CIRCUIT BOARD EC 374

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	118144	2	Resistor, Fixed 2700 "	" "
R3			Same as R2	" "
R4	137441	1	RESISTOR, FIXED 1200 OHMS	" "
EC	172066	1	Circuit Card, Etched	

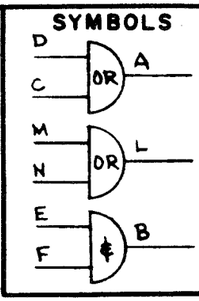
ET 08147
TC255/8-541

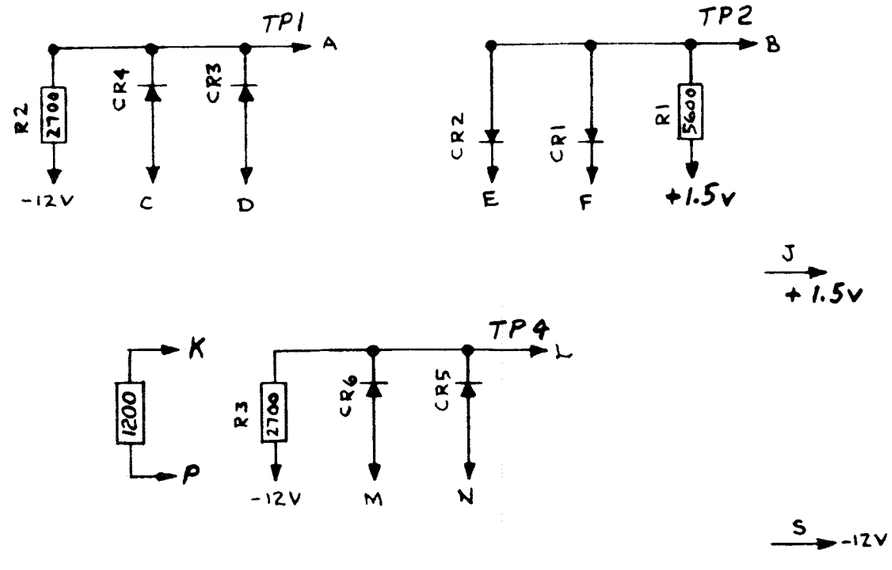
This card consists of two "OR" gates and one "AND" gate. Diode CR3 and CR4 together with R2 comprise one "OR" gate, while diodes CR5 and CR6 together with R3 comprise the second "OR" gate. CR1 and CR2 together with R1 comprise the "AND" gate.

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.

SYMBOLS





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	HS-1139
4	10-28-59	HS-1238
5	12-29-59	HS-1242
6	9-10-60	HS-1957
7	5-26-61	69892
8	4-5-62	73031

APPROVALS

D AND E

E OF M

E-NUMBER

PROD. NO. 172374

DATE:

P.D. FILE NO.

DRAWN. R.A. CHK'D.

ENGD. S.S. APPD.

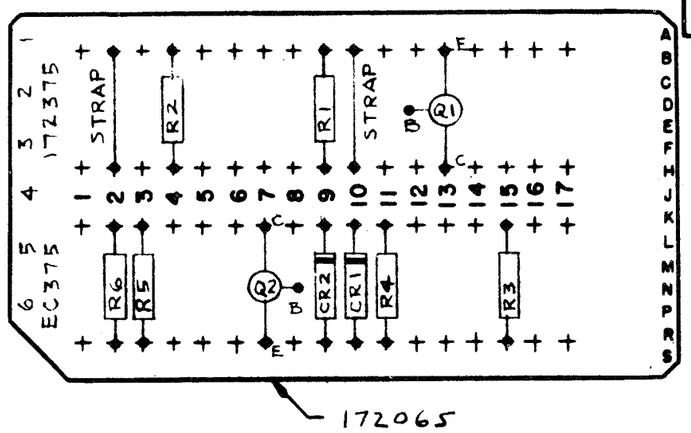
TELETYPE CORPORATION

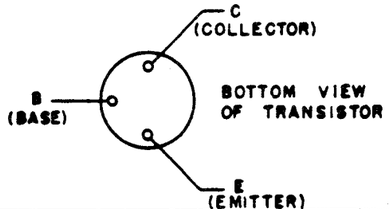
172374

ET-131401

EC 375

172375





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	118186	4	Resistor, Fixed 5600 Ohms	Base Bias
R2	118180	2	" " 10K "	" "
R3			Same as R1	Collector Load
R4			Same as R1	" "
R5			Same as R2	Base Bias
R6			Same as R1	" "
Q1	177105	2	Transistor, P-22	Gate
Q2			Same as Q1	"
EC	172065	1	Circuit Card, Etched	
		2	Straps Bare 24 Awg.	
	144495	2	PAD, TRANSISTOR	

ET 09-67
TC255(6-54)

INHIBIT GATE (2)

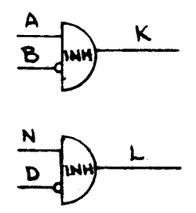
CIRCUIT BOARD EC 375

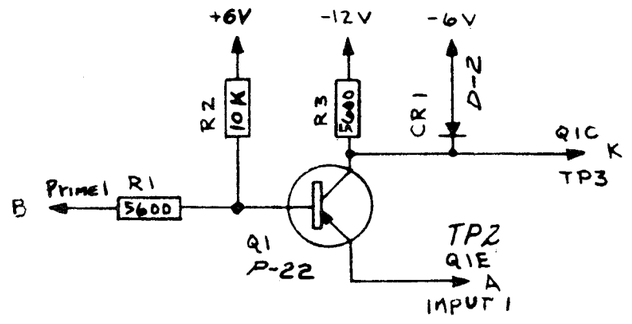
172375

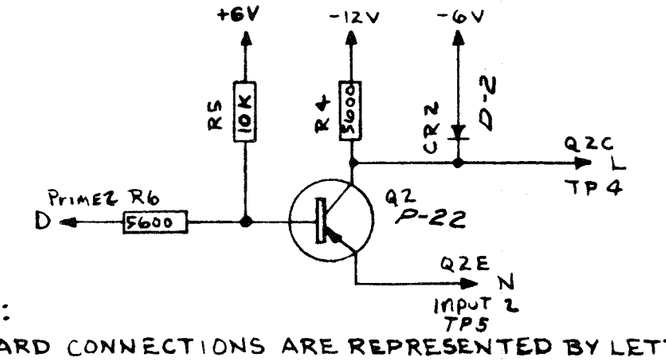
This card consists of two identical circuits. They are basically common emitter amplifiers which may be connected to function as inhibit ("and") gates.

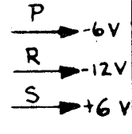
The base and emitter potentials vary from -6 to 0 volts independently. In order for Q1 and Q2 to conduct, there must be a coincidence of -6 volts applied at points B and D and 0 volts applied at points A and N. When this condition is met, Q1 and Q2 conduct and the collector output is 0 volts (K and L).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

SYMBOLS









NOTE:

CARD CONNECTIONS ARE REPRESENTED BY LETTERS

TEST POINTS ARE REPRESENTED BY NUMBERS

ISSUE	DATE	AUTH. NO.
2	8-13-59	MS-10866
3	9-8-59	MS-11239
4	10-28-59	MS-11338
5	5-26-61	69892

APPROVALS

D AND R	E AND M

E-NUMBER

PROD. NO. 172375

DATE:

P.D. FILE NO.

DRAWN. RW | CHKD.

ENGD. | APPD.

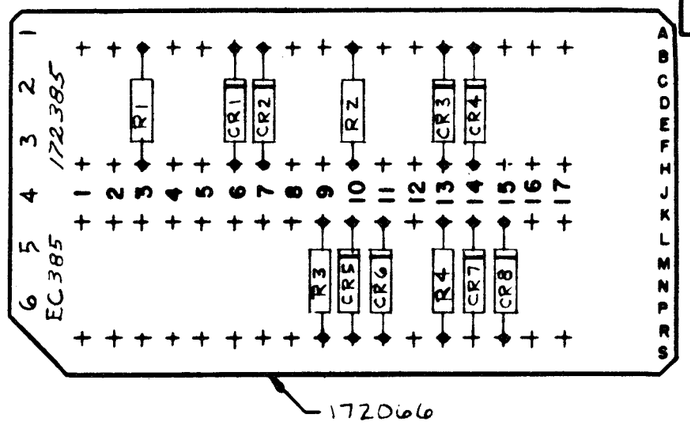
TELETYPE CORPORATION

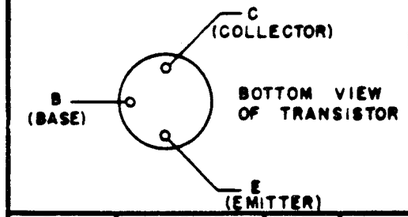
172375

ET-1314(8)

EC 385

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	

ET-06147
TC255/6-541

DIODE GATES (4)

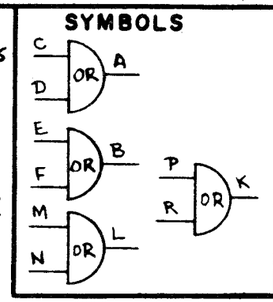
CIRCUIT BOARD EC 385

172385

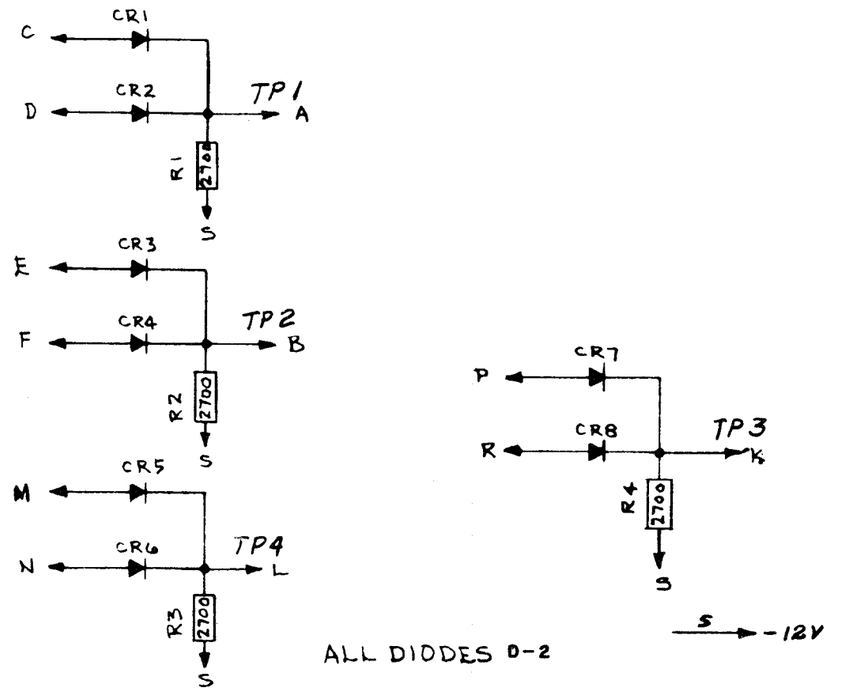
THIS CARD CONSISTS OF FOUR "OR" GATES

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.

SYMBOLS



ISSUE	DATE	AUTH. NO.
2	6-30-59	HS-1040
3	9-8-59	HS-1139
4	10-6-59	HS-1187
5	9-15-60	HS-1406
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 P

E OF M

E-NUMBER

PROD. NO. 172385

DATE:

P.D. FILE NO.

DRAWN. CHKD.

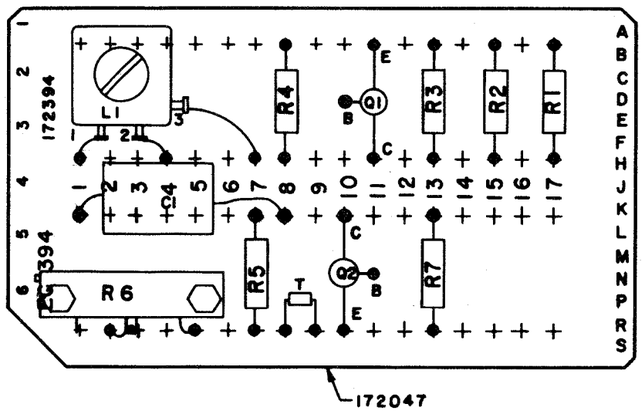
ENGD. APPD.

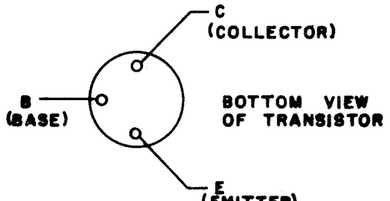
TELETYPE CORPORATION

172385

ET-121481

EC 394
172394





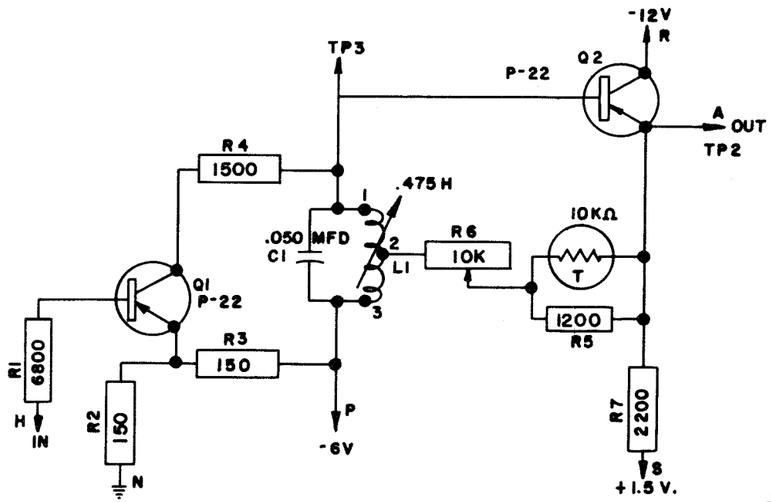
NOTE
REFER TO 5016WD FOR MARKING INFORMATION

REF. DESIGN	TELETYPE PART NO.	TOTAL QTY.	NAME AND DESCRIPTION	LOCATING FUNCTION
R1	178147	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	THERMISTER 10K OHMS	FEED BACK
C1	171834	1	CAPACITOR, .050 MFD ±1%	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	

ET108147
TC255(6-54)

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 -5.5 V. 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.



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

SYMBOLS

CIRCUIT BOARD EC 394 — 172394

ISSUE	DATE	AUTH. NO.
2	5-26-61	69892
3	10-11-61	71306
4	12-6-61	71867
5	2-10-64	80306

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

APPROVALS

D AND R	E OF M

E-NUMBER

PROD. NO. 172394

DATE: 3-1-60

P.D. FILE NO. 1-11.134A

DRAWN. S.W. | CHKD.

ENGD. E.H.P. | APPD.

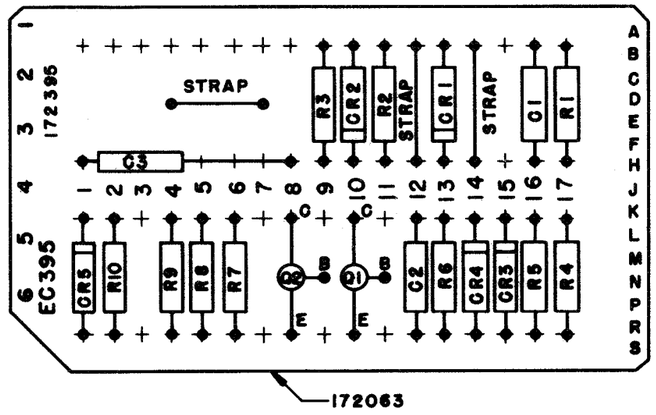
TELETYPE CORPORATION

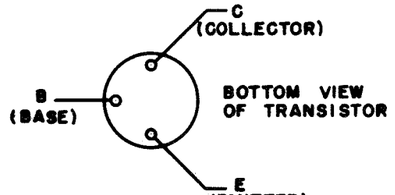
172394

ET-121401

EC 395

172395





NOTE
REFER TO 5016WD FOR MARKING INFORMATION

REF. DESIGN.	TELETYPE PART NO.	TOTAL QTY.	NAME AND DESCRIPTION	LOCATING FUNCTION
C1	177332	1	CAPACITOR, CARAMIC .002MF	COUPLING
C2	177331	1	CAPACITOR, CARAMIC .001 MF	FEED BACK
C3	171680	1	CAPACITOR, CARAMIC .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 8200 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 24 AWG BARE	
	144495	2	PAD, TRANSISTOR	

ET108147
TC255(6-54)

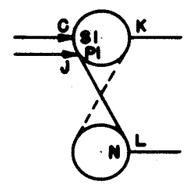
FIXED ONE-SHOT 200 μS

CIRCUIT BOARD EC 395

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.

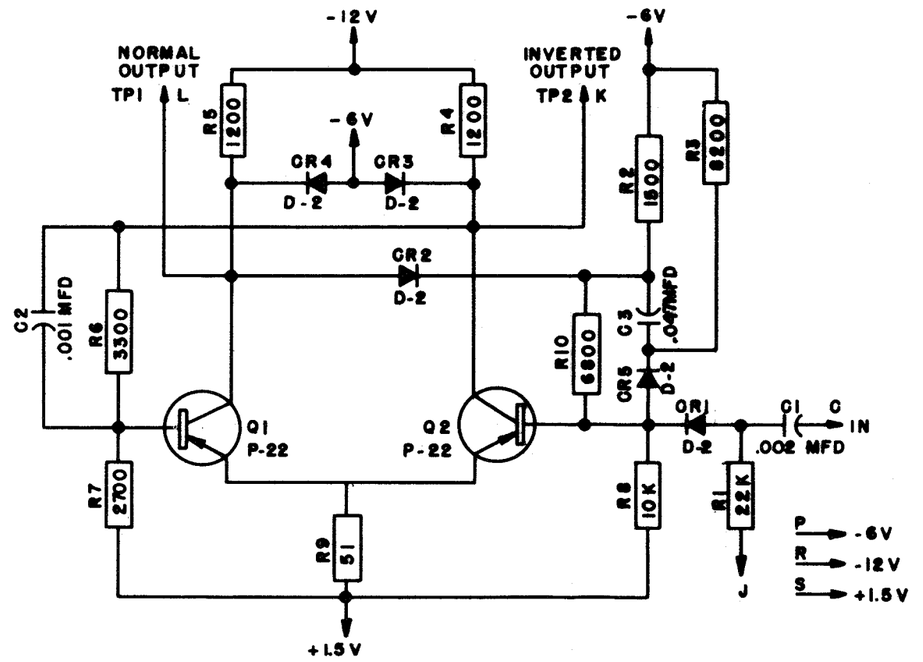
THE QUIESCENT STATE OF THIS CIRCUIT IS THAT Q2 IS SATURATED, RECEIVING ITS BIAS CURRENT PRIMARILY THROUGH R2 AND R10 CONNECTED IN PARALLEL WITH CR5, R3 TO -6V. THE COLLECTOR OF Q2 IS APPROXIMATELY 0 V AND THE COLLECTOR OF Q1 IS -6V. Q1 IS MAINTAINED CUT-OFF BY CROSS COUPLING OF R6 AND R7 RETURNED TO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

SYMBOLS



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 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

172395

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

APPROVALS

D AND R	E OF M

E-NUMBER

PROD. NO. 172396

DATE: 3-1-60

P.D. FILE NO. 1-11.134AA

DRAWN. AB	CHKD.
ENGD. E.H.P.	APPD.

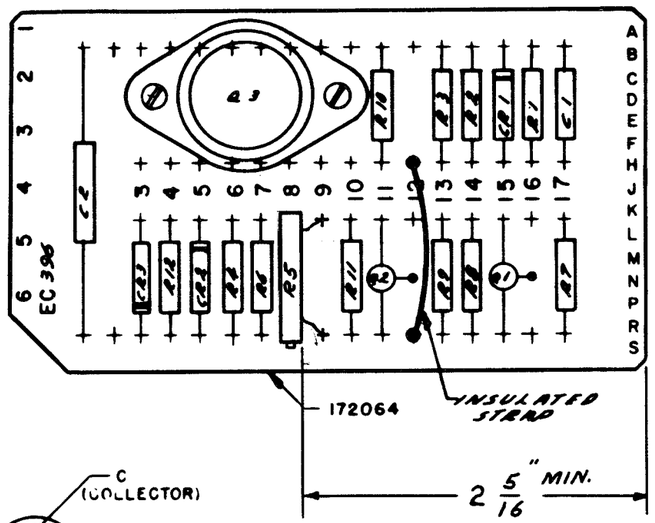
TELETYPE CORPORATION

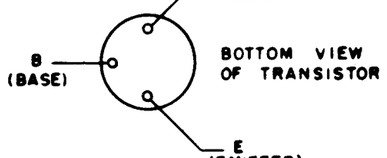
172395

ET-131481

EC 396

172396





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 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 Fil.	
	92260	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	

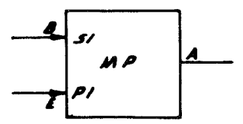
MAGNET PULSER

CIRCUIT BOARD EC 396

172396

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.

SYMBOLS

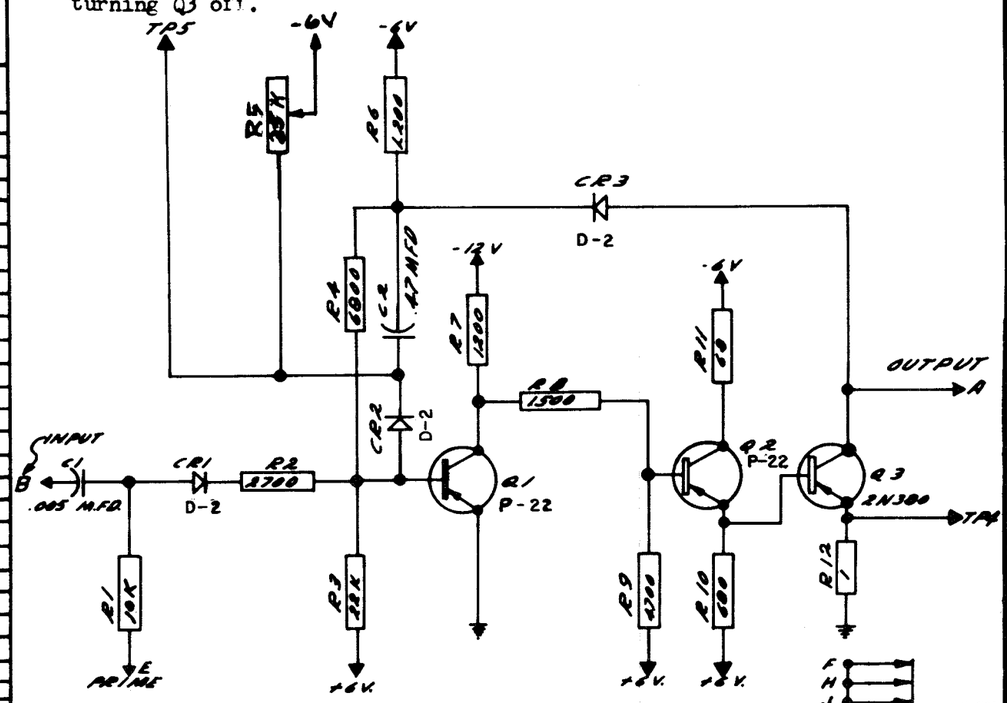


STATIC CONDITION

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.



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

ISSUE	DATE	AUTH NO
2	8-22-60	HS1941
3	8-29-60	HS1936
4	9-1-60	HS1936
5	5-26-61	69892
6	3-28-68	72927

APPROVALS

D AND R	E OF M
JDB	

E-NUMBER

PROD. NO. 172396

DATE 7-6-60

P.D. FILE NO 19-A25AA

DRAWN R.F.L. | CHKD

ENGD E.M.P. | APPD

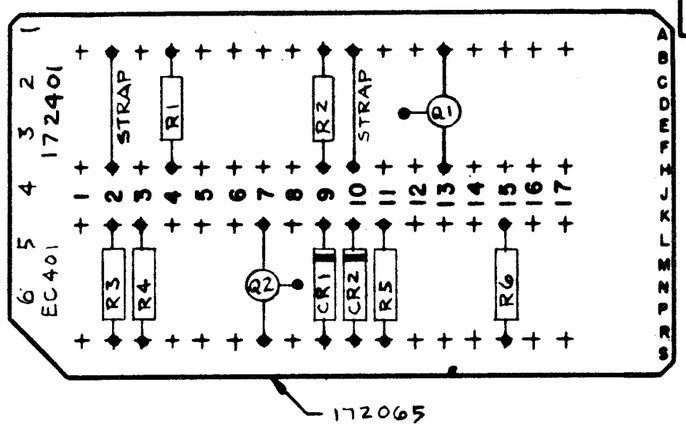
TELETYPE CORPORATION

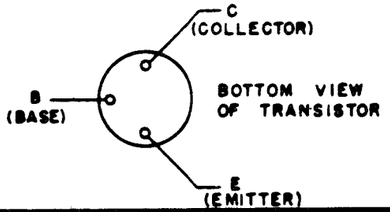
172396

FT 131491

EC 401

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	118146	2	Resistor, Fixed 4700 Ohms	Base Bias
R2	118186	2	" " 5600 "	" "
R3			Same as R2	" "
R4			Same as R1	" "
R5	137441	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 Bare 24 AWG.	
	144495	2	PAD, TRANSISTOR	

ET-DS-67
T-2255 6-54

(PNP) INVERTER (2)

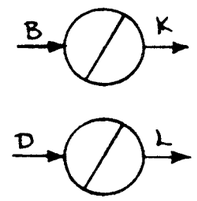
CIRCUIT BOARD EC 401

172401

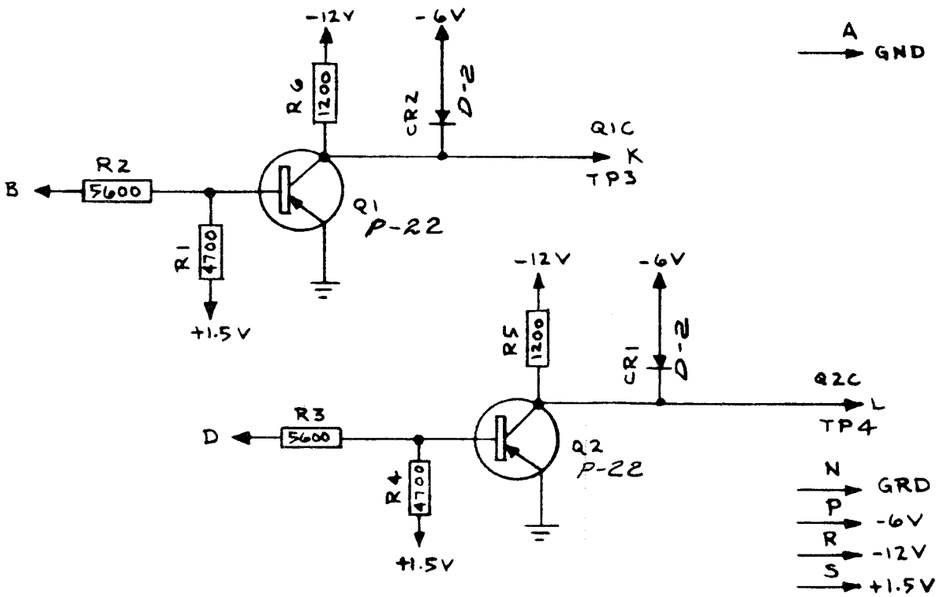
This card consists of two identical PNP common emitter amplifiers which provides an inverted output signal.

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.

SYMBOLS



ISSUE	DATE	AUTH. NO.
2	9-8-59	HS-1139
3	10-28-59	HS-1238
4	5-25-61	69892



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

APPROVALS

D AND R	E OF M

E-NUMBER

PROD. NO. 172401

DATE:

P.D. FILE NO.

DRAWN. A.J.S. | CHKD.

ENGD. S.S. | APPD.

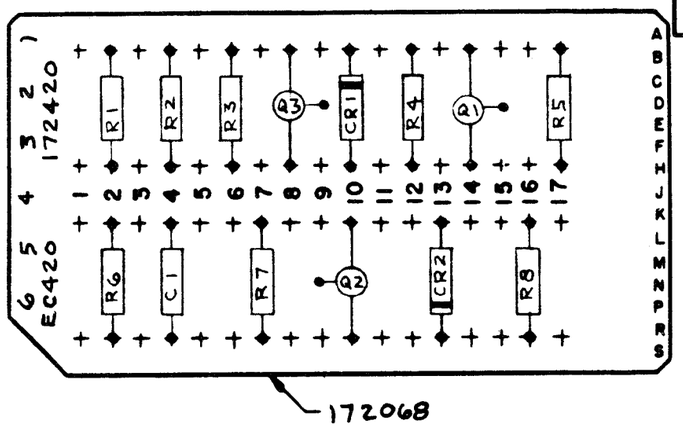
TELETYPE CORPORATION

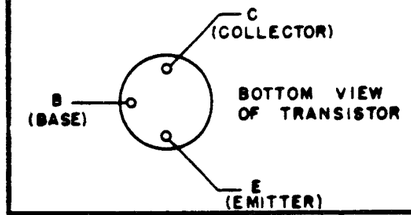
172401

ET-1314-01

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 Mf	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	"
Q3			Same as Q2	Amplifier
EC	172068	1	Circuit Card, Etched	
	144495	3	PAD, TRANSISTOR	

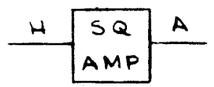
ET-09-47
(255-6-54)

SQUARING AMPLIFIER

CIRCUIT BOARD EC 420

172420

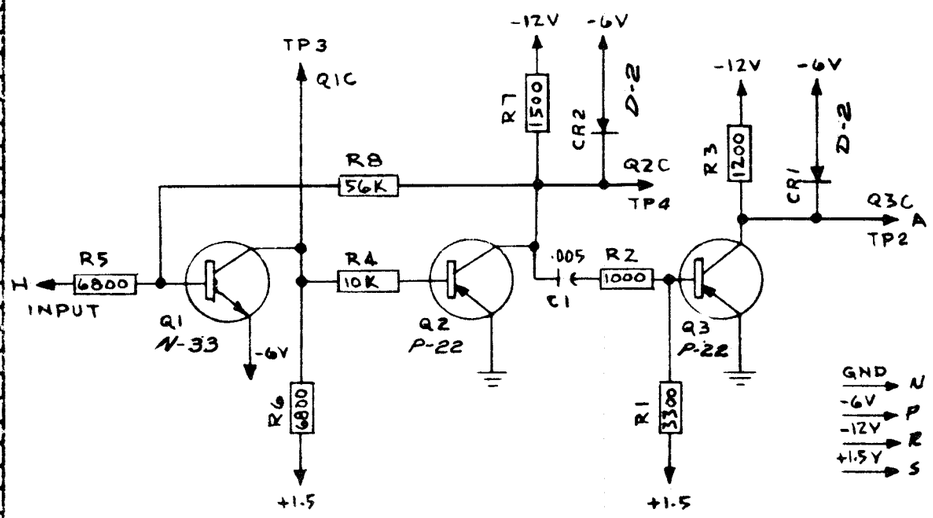
SYMBOLS



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

ISSUE	DATE	AUTH. NO.
2	9-19-60	45-1905
3	5-26-61	69892
4	4-5-62	73031

APPROVALS

D AND E

E OF M

E-NUMBER

PROD. NO. 172420

DATE:

P.D. FILE NO.

DRAWN. R.S. CHKD.

ENGD. AS APPD.

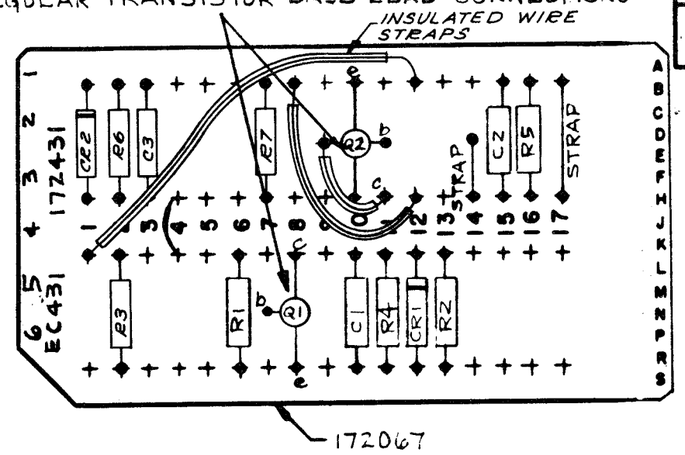
TELETYPE CORPORATION

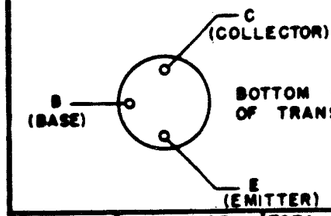
172420

ET-131461

EC431

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	" " .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	

ET-08-67
T-225/8-541

PICKUP AMPLIFIER

CIRCUIT BOARD EC 431

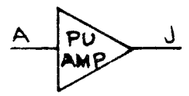
172431

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



ISSUE	DATE	AUTH. NO.
2	9-8-59	HS-1139
3	10-28-59	HS-1239
4	12-3-59	HS-1357
5	12-16-59	HS-1386
6	1-15-60	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

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

APPROVALS

D AND P	E OF M

E-NUMBER

PROD. NO. 172431

DATE: 10-23-59

P.D. FILE NO.

DRAWN. | CHKD.

ENGD. | APPD.

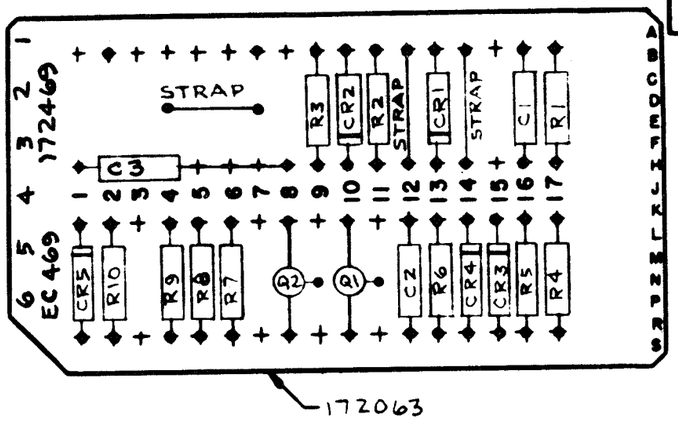
TELETYPE CORPORATION

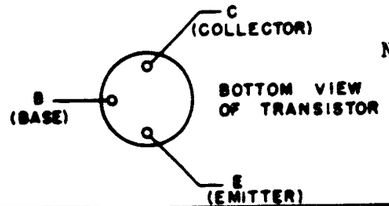
172431

ET-131486

EC 469

172469





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	" TUBULAR .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	137442	1	" " 1500 "	Bias
R3	137444	1	" " 8200 "	Timing
R4	137441	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	143656	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	

ET 09147
C295(6-54)

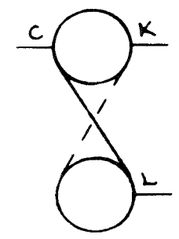
CIRCUIT BOARD EC469

172469

FIXED ONE-SHOT

100 μs

SYMBOLS

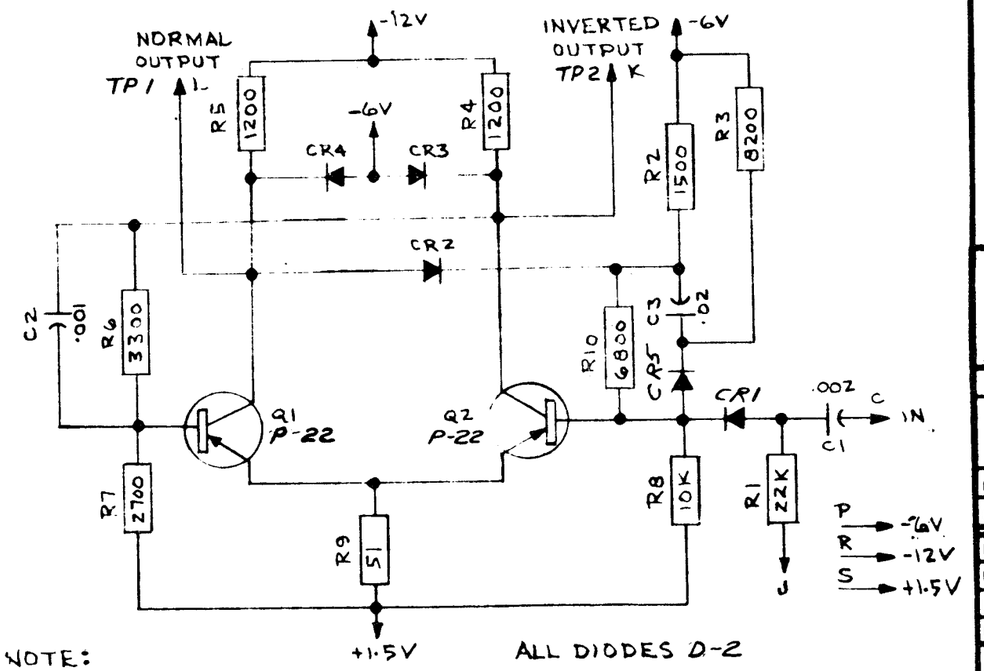


The purpose of this circuit is to generate a pulse of 100 micro seconds in width in response to an input. Normal (positive going) and inverted outputs are provided.

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.



NOTE:
ALL DIODES D-2

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

ISSUE	DATE	AUTH. NO.
2	6-30-58	HS-1040
3	9-8-59	HS-1139
4	10-28-59	HS-1238
5	11-17-59	HS-1276
6	11-25-59	HS-1274
7	5-26-61	69892
8	11-16-61	71626

APPROVALS

D AND E	E OF M

E-NUMBER

PROD. NO. 172469

DATE:

P.D. FILE NO.

DRAWN R.S. CHK'D. JJB

ENG'D. J.J.D. APP'D.

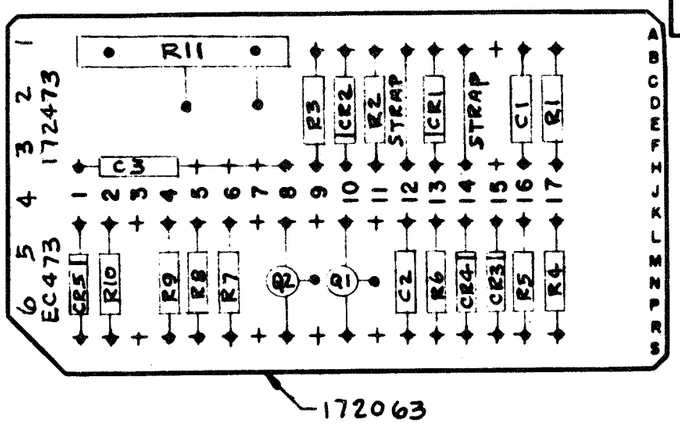
TELETYPE CORPORATION

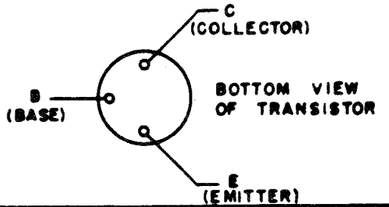
172469

ET-101404

EC473

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	137308	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	137441	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.	
	110446	2	NUT 2X56 HEX.	
		2	STRAP 24AWG BARE	
	144495	2	PAD, TRANSISTOR	

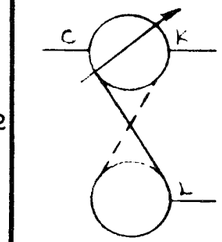
ET 09147
TC255(6-54)

VARIABLE ONE-SHOT
.9 - 1.5 MS

CIRCUIT BOARD EC473

172473

SYMBOLS

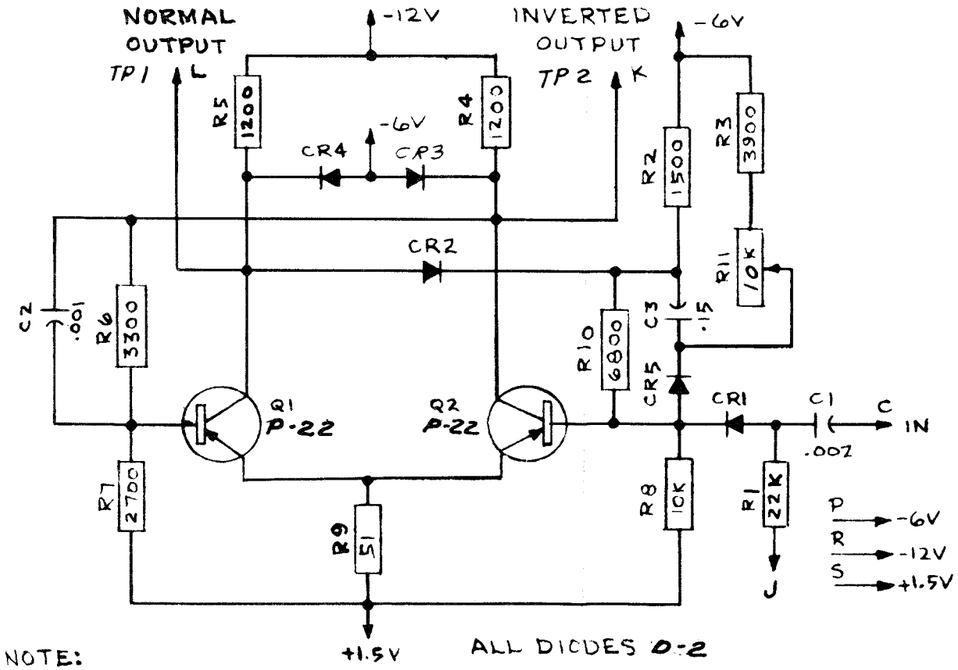


The purpose of this circuit is to generate a pulse of known width in the range of .9 to 1.5 milliseconds in response to an input. Normal (positive going) and inverted outputs are provided.

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

ISSUE	DATE	AUTH. NO.
2	6-30-59	HS-1040
3	9-8-59	HS-1139
4	10-28-59	HS-1234A
5	11-17-59	HS-1296
6	11-25-59	HS-1314
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

APPROVALS

D AND R	E OF M

E-NUMBER

PROD. NO. 172473

DATE:

P.D. FILE NO.

DRAWN. R.S. CHKD.

ENGD. APPD.

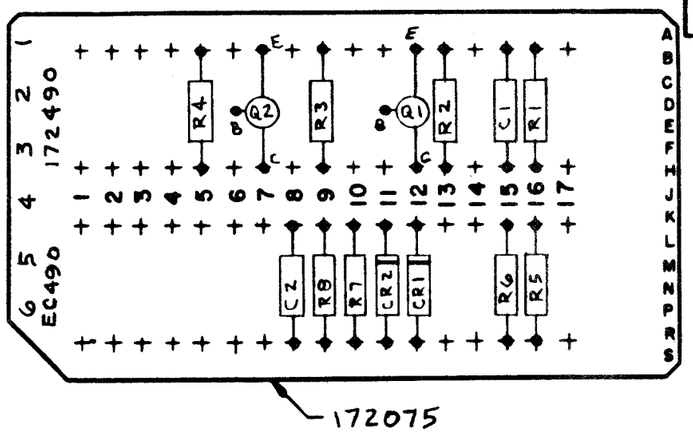
TELETYPE CORPORATION

172473

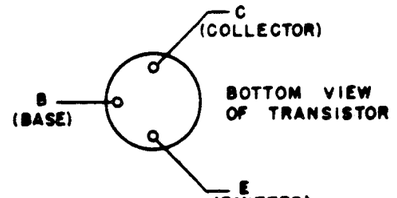
ET-101459

EC 490

172490



172075



NOTE:
REFER TO 5016 WD FOR MARKING INFORMATION

REF. DESIGN.	TELETYPE PART NO.	TOTAL QTY.	NAME AND DESCRIPTION	LOCATING FUNCTION
C1	137306	1	Capacitor, Ceramic .05 MF	Integration Cap.
C2	177331	1	" " .001 MF	Feed Back Cap.
CR1	177108	2	Diode, D-2	Clamping Diode
CR2			Same as CR1	" "
R1	129851	3	Resistor, Fixed 3300 Ohms	Base Bias
R2	137440	1	" " 1000 "	" "
R3	118186	1	" " 5600 "	" "
R4	118146	1	" " 4700 "	" "
R5			Same as R1	Collector Load
R6	137441	1	Resistor, Fixed 1200 Ohms	"
R7	118180	1	" " 10 K "	Feed Back Resistor
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	PAD, TRANSISTOR	

ET 28147
TC255(6-54)

SIGNAL DELAY (50 μs)

CIRCUIT BOARD EC 490

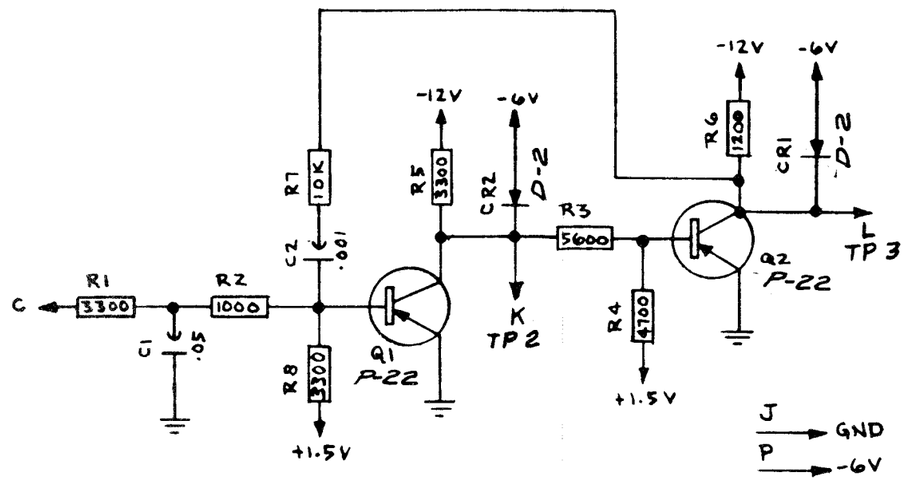
172490

SYMBOLS

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 6 V 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 -6 V by CR1 and CR2.

With a positive 6 V transition applied Q1 will cut-off after a time delay of 50 microseconds driving Q2 into conduction, causing Q2 collector potential to rise from -6 V to 0 V. C2 and R7 provide regenerative feedback.



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

ISSUE	DATE	AUTH. NO.
2	6-30-59	HS-1040
3	9-8-59	HS-1139
4	10-28-59	HS-1230
5	5-26-61	69892
6	11-16-61	71626

APPROVALS

D AND A	E OF M

E-NUMBER

PROD. NO. 172490

DATE:

P.D. FILE NO.

DRAWN. | CHKD.

ENGD. | APPD.

TELETYPE CORPORATION

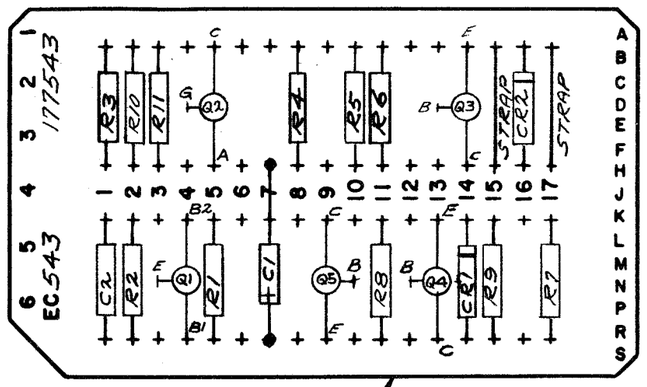
172490

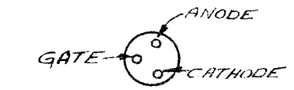
ET-121481

EC

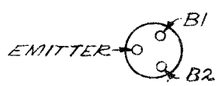
CIRCUIT BOARD EC

177543

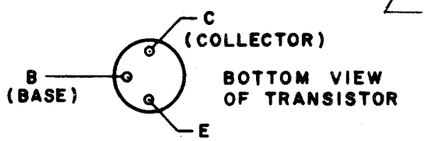




BOTTOM VIEW OF SILICON CONTROLLED RECTIFIER



BOTTOM VIEW OF UNIJUNCTION 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	177107	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	

ET-10H147
TC255(6-54)

TIME DELAY RELAY DRIVER

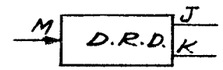
This circuit consists basically of two relay drivers, one of which is operated by a time delay circuit.

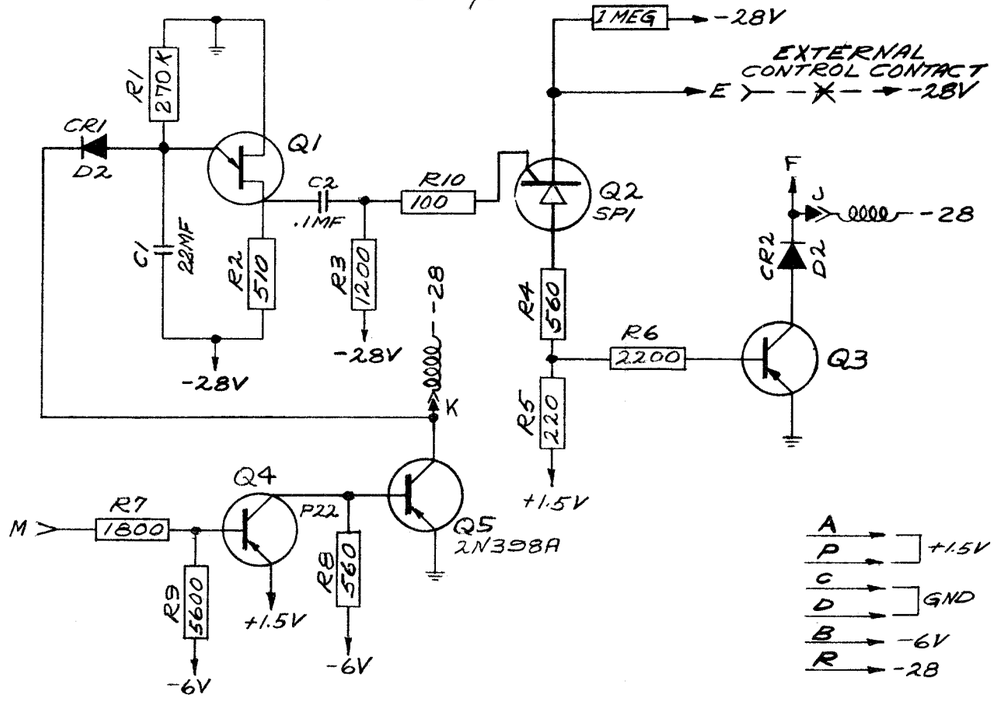
In the static or "off" condition, M is at 0 volts or more negative and Q4 is conducting holding Q5 off. Transistor Q5 collector output (K) is connected to a relay biased to -28 volts. Diode CR1 is forward biased and a small amount of current flows from ground via R1, CR1 and relay to -28 volts. Unijunction 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





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

ISSUE	DATE	AUTH NO
2	11-2-62	175016
3	12-10-62	175337

APPROVALS

D AND R	E OF M

E-NUMBER

PROD. NO. 177543

DATE: 8-24-62

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DRAWN SW CHKD

ENGD. EHP APPD

TELETYPE CORPORATION

177543

ET-131481