

BELL SYSTEM PRACTICES
Teletypewriter Stations

SECTION P30.412
Issue 8, May, 1957
AT&TCo Standard

NO. 15 TELETYPEWRITER

INTERNAL WIRING VARIATIONS

1. GENERAL

- 1.01 This section gives the internal wiring variations for the No. 15 teletypewriter in the form of M Plans.
- 1.02 This section is reissued to provide Plans M2.52, M2.53← and M3.11 and in addition to bring other plans up to date.
- 1.03 The following plans are included:

<u>Plan No.</u>	<u>Title</u>
M2.01	Operation Without Line Relay (15A & B Bases)
M2.02	Polar Operation of 215A Line Relay (15A Base)
M2.03A	Connections for 240 OPM — 100V to 124V (15B Motor Unit)
M2.03B	Connections for 240 OPM — 125V to 130V (15B Motor Unit)
M2.04A	Connections for 368 & 460 OPM — 100V to 111V (15B Motor Unit)
M2.04B	Connections for 368 & 460 OPM — 125V to 130V (15B Motor Unit)
M2.05	Operation in .060 Amp. Circuit (15 Type Base)
M2.06	Operation in .060 Amp. Circuit (15 Type Keyboard and 15 Type Perforator Transmitter)
M2.07	Extension of Biasing Circuit (15 Type Base)
M2.08	Disabling Break Contacts (15A & B Bases)
M2.09	Modification for Remote Motor Control — Used With External Relay on A-C Power (15B Base)
M2.10	Connection of TTY Permanently in Line Condition (15 Type Keyboards and 15 Type Perforator Transmitters)
M2.11	Connection for Use of Power Switch (15B Base)

<u>Plan No.</u>	<u>Title</u>
M2.12	Connection for Remote Motor Control (15A & B Bases)
M2.13	Disabling Power Switch (15A Base)
M2.14	Station Line Resistance (15A & B Bases)
M2.15	Connection of Fuse for Use With External Power Relay (15B TTY Base)
M2.16	Operation With Line Relay (15C Base) ←
M2.17	Polar Operation of Line Relay (15C Base per M2.16 ← & 15D Base)
M2.18	Operation of Line Relay in .060 Amp. Circuit (15C Base per M2.16 & 15D Base)
M2.19	Extension of Biasing Circuit (15C Base per M2.16 & 15D Base)
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M2.21	Modification for Remote Motor Control—Used With External Relay on A-C Power (15C & D Bases)
M2.22	Connection for Remote Motor Control (15C & D Bases)
M2.23	Connection for Use of Power Switch (15C & D Bases)
M2.24	Sending Contact Spark—Killer Connection for Duplex Operation (15C & D Bases)
M2.25	Adding Station Line Resistance (15C & D Bases)
M2.26A	Connections for 240 OPM — 100V to 124V (15K Motor Unit)
M2.26B	Connections for 240 OPM — 125V to 130V (15K Motor Unit)
M2.27A	Connections for 368 & 460 OPM — 100V to 111V (15K Motor Unit)
M2.27B	Connections for 368 & 460 OPM — 125V to 130V (15K Motor Unit)
M2.28	Operation in .005-.025 Amp. Circuit (15B Base)
M2.29A	Connections for Plunger Type Line-Test Key (15 Type Keyboards)
M2.29B	Connections for Cam Type Line-Test Key (15 Type Keyboards and 15 Type Perforator-Transmitters)
M2.30	Connection of Fuse for Use With External Power Relay (15C & D Bases)
M2.31	Operation in .005-.025 Amp. Circuit (15C & D Bases)
M2.32	Operation With 15J & K Motor Units (15A & B Bases)

- M2.33 Adding Motor Control Relay (15A Base)
- M2.34 Adding Motor Control Relay (15C & D Bases)
- M2.35 Operation with .005 Amp. Break Current (15B Base)
- M2.36 Operation with .005 Amp. Break Current (15C & D Bases)
- M2.37 Operation in .020 Amp. Circuit (15A Base)
- M2.38 Polar Operation of 255A Line Relay (15A Base)
- M2.39 Polar Operation of 255A Line Relay (15C Base per M2.16 & 15D Base)
- M2.40 Adding .060 Amp. Motor Control Unit in Line Ckt. (15A Base)
- M2.41 Adding .060 Amp. Motor Control Unit in Line Ckt. (15C & D Bases)
- M2.42 Adding Station Line Resistance (15A Base)
- M2.43 Adding Stop Contacts for Use With External Relay (15Y & AA Typing Units)
- M2.44 Adding Stop Contacts for Use With Motor Control Unit (15U, W, Y & AA Typing Units)
- M2.45 Adding Sending Contact Spark—Killer (15 A & B Bases)
- M2.46 Sending Contact Spark—Killer Connection for Duplex Operation (15A & B Bases)
- M2.47 Addition of Switching Control Contact Cable (15C← Base)
- M2.48 Adding .060 Amp. Motor Control in Selector Magnet Ckt., with Line Relay (15A Base)
- M2.49 Adding .060 Amp. Motor Control in Selector Magnet Ckt., with Line Relay (15C & D Bases)
- M2.50 Adding Local Test Resistors to 15C & D Bases
- M2.51 Operation with 15A & 15B Motor Units — Adding 300 ohm Resistors to (15C & 15D Bases)
- M2.52 Sending Contact Spark Killer — Connection Change↗ when TTY Line-Test Key Is Used (15C and 15B Bases)
- M2.53 Operation with 15AK Typing Unit — Adding Resistor and Connection Springs to 15 Type Base for Two Color Printing ↘
- M3.01 Single or Duplex Operation—External Switching Key (15A Base)
- M3.02 Operation Without Line Relay (15B Base)
- M3.03 Type "A" Polarential Operation (15A Base)

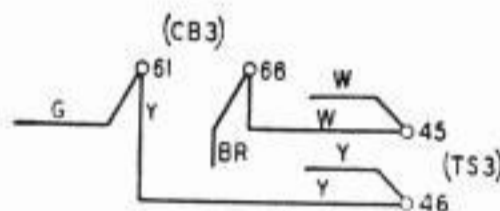
<u>Plan No.</u>	<u>Title</u>
M3.04	Single or Duplex Operation With External Switching Key (15C & D Bases)
M3.05	Separation of Sending and Receiving Circuits (15C & D Bases)
M3.06	Operation in .005-.025 Amp. Circuit (15B Base)
M3.07	Operation in .005-.025 Amp. Circuit (15C & D Bases)
M3.08	Type "A" Polarential Operation (15C & D Bases)
M3.09	Cam-Type Line-Test Key—Sending Contacts excluded from Line—15-Type Perforator Transmitter
M3.10	Line Relay Contacts Sending to Line (15D Base)
M3.11	Connections to extend Line Magnet Circuit through External Jacks (15D TTY Base).

Note 1: The designation CB, TS, FM, etc., with the accompanying associated numbering, refer to correspondingly numbered connecting block, terminal strip, fuse mounting, etc., on the wiring diagram.

Note 2: With reference to M2.04 and M2.27 the motors as furnished are connected for operation at 112V to 124V. (See wiring diagrams in another section.)

Note 3: Plans under the M3 designation apply only to the No. 19 TTY set.

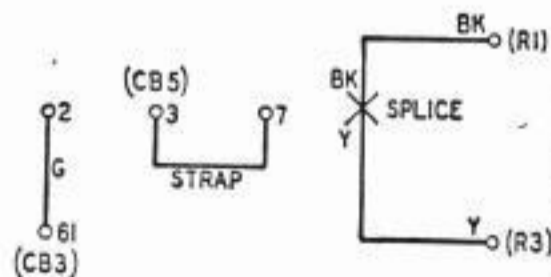
Note 4: The 15C Base may be converted to a 15D Base by adding M2.16.



LEADS TO BE REMOVED			
COLOR	FROM	TO	REMARKS
Y	46	62	REMOVE FROM 62
W	45	65	REMOVE FROM 65

LEADS TO BE CONNECTED			
COLOR	FROM	TO	REMARKS
Y	46	62	CONN. TO 61
W	45	65	CONN. TO 66

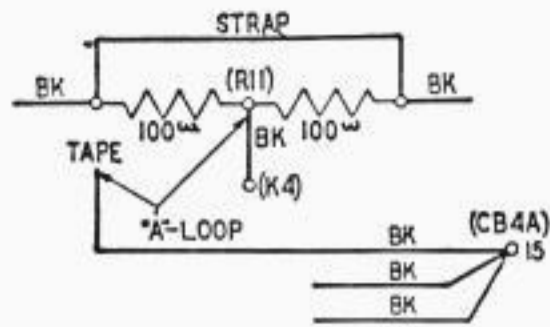
M2.01 Operation Without Line Relay (15A & B TTY Bases)



LEADS TO BE REMOVED			
COLOR	FROM	TO	REMARKS
BK	(R1)	7	REMOVE FROM 2 & 7 (CB5)
Y	(R3)	2	SPLICE & TAPE
G	61	3	REMOVE FROM 3 (CB5)

LEADS TO BE CONNECTED			
COLOR	FROM	TO	REMARKS
G	61	3	CONN. TO 2 (CB5)
—	—	—	STRAP 3-7 (CB5)

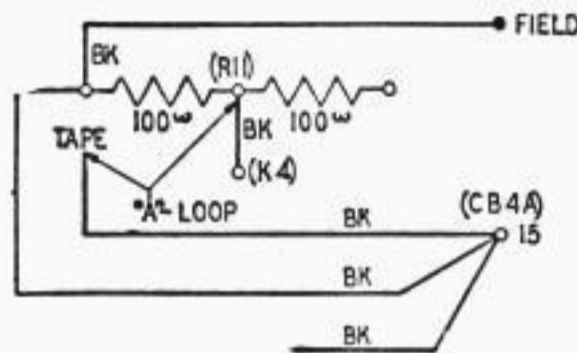
M2.02 Polar Operation of 215A Line Relay (15A TTY Base)



LEADS TO BE REMOVED			
COLOR	FROM	TO	REMARKS
BK	15	(K4)	CUT *A*-LOOP AT (R1) & TAPE END OF LEAD FROM 15 AT *A*

LEADS TO BE CONNECTED			
COLOR	FROM	TO	REMARKS
BK	(K4)	*A*	CONN. TO MIDDLE TERM. OF (R1)

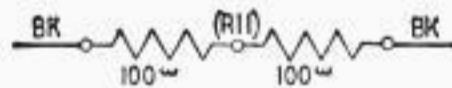
**M2.03A Connections for 240 O.P.M.—For 100V. to 124V.
(15B Motor Unit)**



LEADS TO BE REMOVED			
COLOR	FROM	TO	REMARKS
			REMOVE STRAP (R1)
BK	FIELD	(R1)	REMOVED FROM (R1)
BK	15	(K4)	CUT *A*-LOOP AT (R1) & TAPE END OF LEAD FROM 15 AT *A*

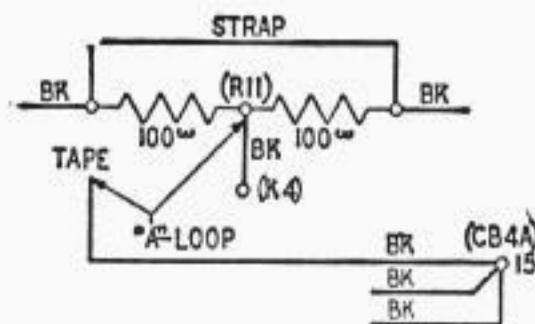
LEADS TO BE CONNECTED			
COLOR	FROM	TO	REMARKS
BK	FIELD	(R1)	CONN. TO TERM. OF (R1) TO WHICH IS CONN. LEAD FROM 15
BK	(K4)	*A*	CONN. TO MIDDLE TERM. OF (R1)

**M2.03B Connections for 240 O.P.M.—For 125V. to 130V.
(15B Motor Unit)**



LEADS TO BE REMOVED			
COLOR	FROM	TO	REMARKS
			REMOVE STRAP FROM (R1)

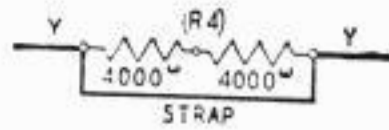
M2.04A Connections for 368 & 460 O.P.M.—For 100V. to 111V. (15B Motor Unit)



LEADS TO BE REMOVED			
COLOR	FROM	TO	REMARKS
BK	15	(K4)	CUT *A*-LOOP AT (R1) & TAPE END OF LEAD FROM 15 AT *A*

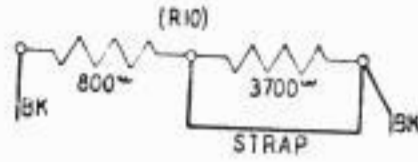
LEADS TO BE CONNECTED			
COLOR	FROM	TO	REMARKS
BK	(K4)	*A*	CONN. TO MIDDLE TERM. OF (R1)

M2.04B Connections for 368 & 460 O.P.M.—For 125V. to 130V. (15B Motor Unit)



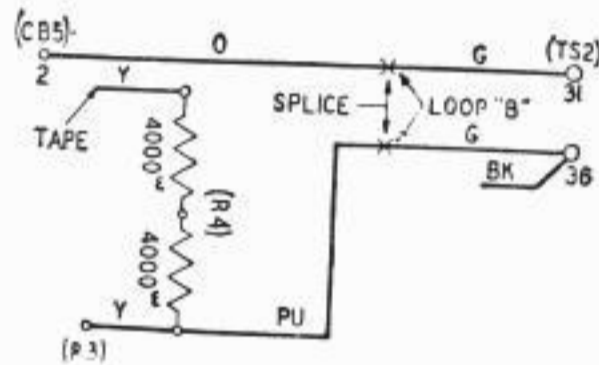
LEADS TO BE CONNECTED			
COLOR	FROM	TO	REMARKS
			STRAP OUT (R4) RESISTANCE

M2.05 Operation in .060 Amp. Circuit (15 Type Base)



LEADS TO BE CONNECTED			
COLOR	FROM	TO	REMARKS
			STRAP OUT 3700-ohm SECTION (R10)

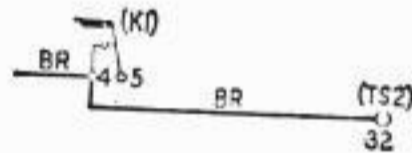
M2.06 Operation in .060 Amp. Circuit (15 Type Keyboard & 15 Type Perforator Transmitters)



LEADS TO BE REMOVED			
COLOR	FROM	TO	REMARKS
Y	(R4)	2(CB5)	REMOVE FROM 2 OF (CB5) & TAPE

LEADS TO BE CONNECTED			
COLOR	FROM	TO	REMARKS
G	31	36	CUT AT "B" & SPLICE "L" LEADS 0 TO G(31) & PU TO G(36)
0	"L"	"M"	CONN. TO 2(CB5)
PU	"L"	"M"	CONN. TO (R4) TERM. THAT IS CONN. TO (R3)

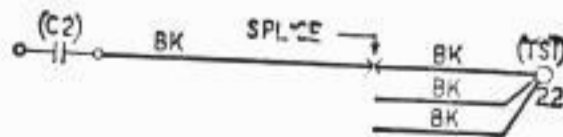
M2.07 Extension of Biasing Circuit (15 Type Base)



LEADS TO BE REMOVED			
COLOR	FROM	TO	REMARKS
BR.	32	5(K1)	REMOVE FROM 5 OF (K1)

LEADS TO BE CONNECTED			
COLOR	FROM	TO	REMARKS
BR.	32	5(K1)	CONN. TO 4 OF (K1)

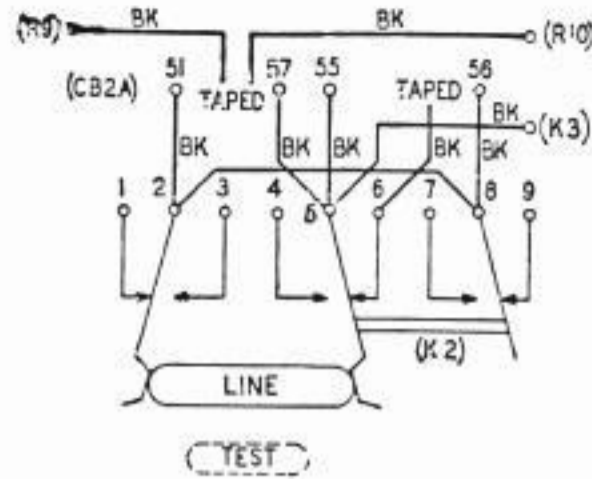
M2.08 Disabling Break Contacts (15A and 15B TTY Bases)



LEADS TO BE REMOVED			
COLOR	FROM	TO	REMARKS
BK	(C2)	(D1)	REMOVE FROM (D1)

LEADS TO BE CONNECTED			
COLOR	FROM	TO	REMARKS
BK	(C2)	(D1)	EXTEND & CONN. TO 22

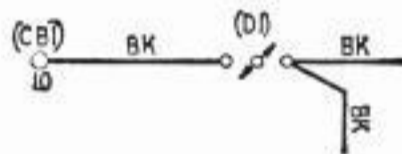
M2.09 Modification for Remote Motor Control—Used With External Relay on A.C. Power (15B TTY Base)



LEADS TO BE REMOVED			
COLOR	FROM	TO	REMARKS
BK	(R9)	3 (K2)	REMOVE FROM 3 & 4 AND TAPE SEPARATELY
BK	(R10)	4 (K2)	REMOVE FROM 7 & TAPE
BK	6 (K2)	7 (K2)	REMOVE FROM 1
BK	8 (K2)	7 (K2)	REMOVE FROM 7

LEADS TO BE CONNECTED			
COLOR	FROM	TO	REMARKS
BK	55	7 (K2)	CONN. TO 5
BK	8 (K2)	1 (K2)	CONN. TO 2

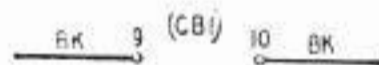
M2.10 Connection of TTY Permanently in Line Condition (15 Type Keyboards & 15 Type Perforator-Transmitters)



LEADS TO BE REMOVED			
COLOR	FROM	TO	REMARKS
BK	10	(D1)	REMOVE FROM (D1)

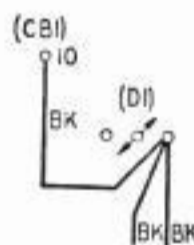
LEADS TO BE CONNECTED			
COLOR	FROM	TO	REMARKS
BK	10	(D1)	CONN. TO VACANT TERM. OF (D1)

M2.11 Connection for Use of Power Switch (15B TTY Base)



COLOR	FROM	TO	CHANGE
STRAP	9	10	REMOVE STRAP

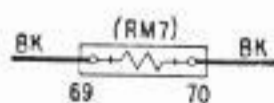
M2.12 Connection for Remote Motor Control (15A & 15B TTY Bases)



LEADS TO BE REMOVED			
COLOR	FROM	TO	REMARKS
BK	10	(D1)	REMOVE FROM LEFT (D1)

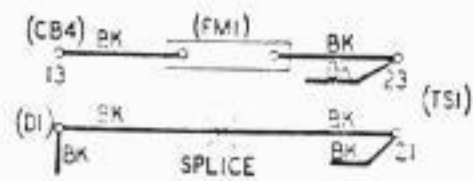
LEADS TO BE CONNECTED			
COLOR	FROM	TO	REMARKS
BK	10	(D1)	CONN. TO RIGHT (D1)

M2.13 Disabling Power Switch (15A TTY Base)



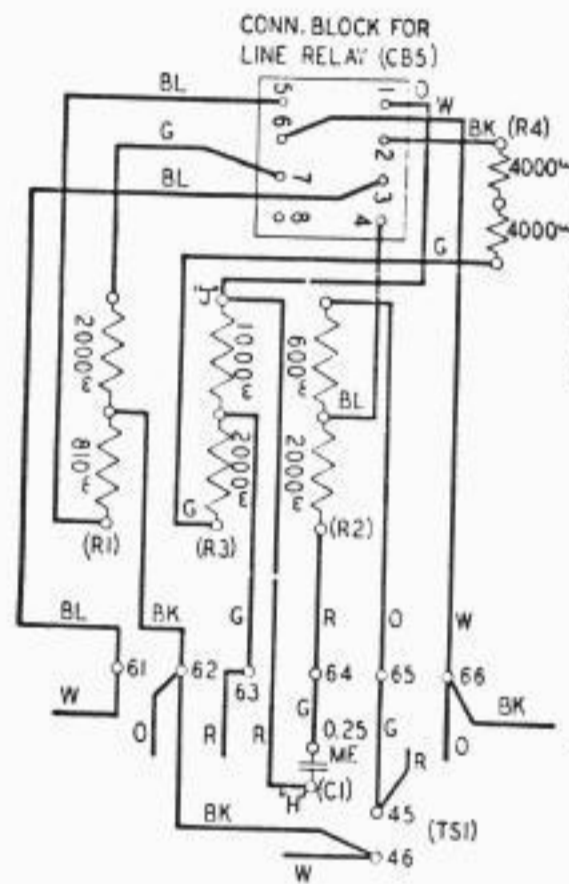
RESISTANCE TO BE CONNECTED			
COLOR	FROM	TO	REMARKS
—	—	—	INSERT PROPER NO.18 OR NO.19 TYPE RESISTANCE IN (RM7) AS REQUIRED

M2.14 Station Line Resistance (15A & B TTY Bases)



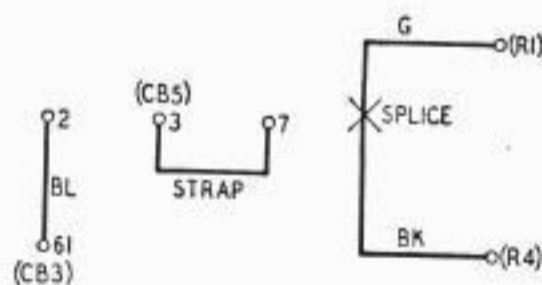
COLOR	FROM	TO	CHANGE
BK	21	(FMI)	REMOVE FROM (FMI) SPLICE & TAPE.
BK	(C1)	(FMI)	
BK	23	13	MOVE FROM 13 TO (FMI).
BK	—	—	CONN. NEW LEAD FROM (FMI) TO 13.

M2.15 Conn. of Fuse for Use With External Power Relay (15B TTY Base)



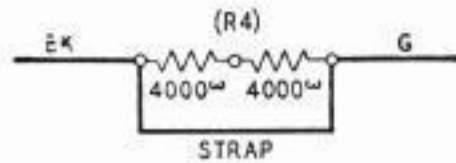
COLOR	FROM	TO	CHANGE
BL	3(CB5)	—	CONN. TO 61
BK	(R1)	—	CONN. TO 62
G	(R3)	—	CONN. TO 63
R	"J"	"H"	CONN. AT "H" TO (C1) & AT "J" TO (R3)
G	64	"H"	CONN. AT "H" TO OTHER SIDE OF (C1)
R	(R2)	—	CONN. TO 64
O	(R2)	—	CONN. TO 65
W	6(CB5)	—	CONN. TO 66
BK	46	61	MOVE FROM 61 TO 62
G	45	66	MOVE FROM 66 TO 65

M2.16 Operation With Line Relay (15C TTY Base)



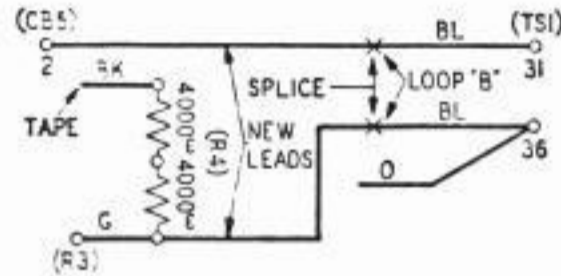
COLOR	FROM	TO	CHANGE
G	(R1)	7	REMOVE FROM 7 & 2 (CB5),
BK	(R4)	2	SPLICE & TAPE
BL	61	3	MOVE FROM 3 TO 2 (CB5)
—	—	—	STRAP 3-7 (CB5)

M2.17 Polar Operation of Line Relay (15C TTY Base per M2.16 & 15D TTY Base)



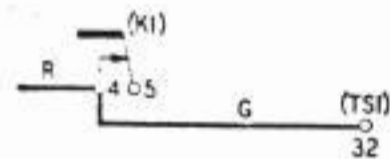
COLOR	FROM	TO	CHANGE
—	—	—	STRAP OUT (R4) RESISTANCE

M2.18 Operation of Line Relay in .060 Amp. Circuit (15C TTY Base per M2.16 & 15D TTY Base)



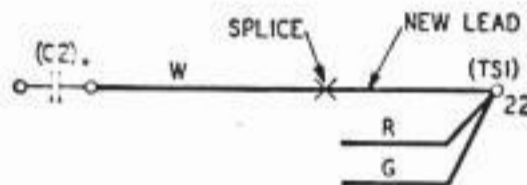
COLOR	FROM	TO	CHANGE
BK	(R4)	2(CB5)	REMOVE FROM 2 & TAPE
BL	31	"B"	CUT AT "B" & EXTEND LEADS 31
BL	36	"B"	TO 2(CB5) & 36 TO (R4)

M2.19 Extension of Biasing Circuit (15C TTY Base per M2.16 & 15D TTY Base)



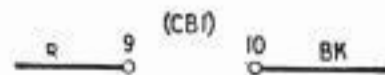
COLOR	FROM	TO	CHANGE
G	32	5(KI)	MOVE FROM 5 TO 4(KI)

M2.20 Disabling Break Contacts (15C & 15D TTY Bases)



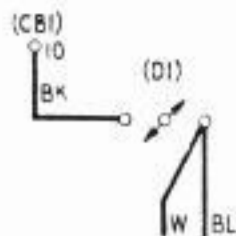
COLOR	FROM	TO	CHANGE
W	(C2)	(D1)	REMOVE FROM (D1) & EXTEND TO 22

M2.21 Modification for Remote Motor Control—Used With External Relay on A.C. Power (15C & 15D TTY Bases)



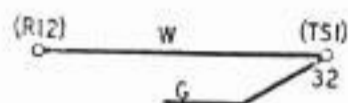
COLOR	FROM	TO	CHANGE
STRAP	9	10	REMOVE STRAP

M2.22 Connection for Remote Motor Control (15C & 15D TTY Bases)



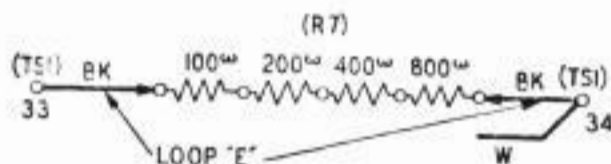
COLOR	FROM	TO	CHANGE
BK	10	(D1)	MOVE FROM RT. TO LEFT (D1)

M2.23 Conn. for Use of Power Switch (15C & 15D TTY Bases)



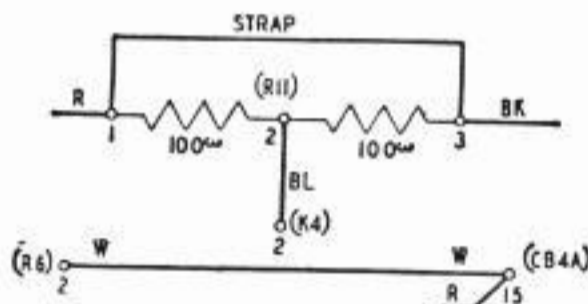
COLOR	FROM	TO	CHANGE
W	(R12)	42	MOVE FROM 42 TO 32

M2.24 Sending Contact Spark—Killer Connection for Duplex Operation (15C & 15D TTY Bases)



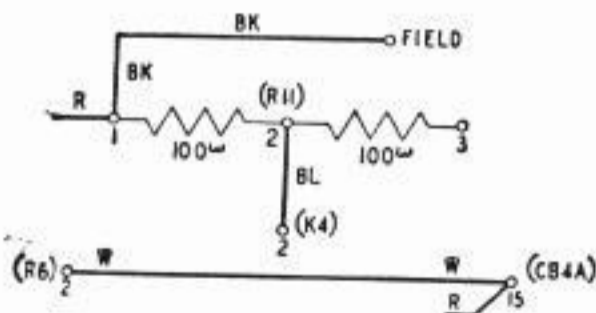
COLOR	FROM	TO	CHANGE
BK	33	"E"	CUT LOOP AT "E" & CONNECT RESISTANCE AS REQUIRED
BK	34	"E"	

M2.25 Adding Station Line Resistance (15C & 15D TTY Bases)



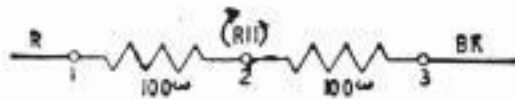
COLOR	FROM	TO	CHANGE
BL	2(K4)	2(R6)	MOVE FROM (R6) TO 2 (R11)
W	15	2(K4)	MOVE FROM (K4) TO 2 (R6)
STRAPS	—	—	REMOVE STRAPS 1-2, 2-3, (R11) & CONN. STRAP 1-3 (R11)

M2.26A Connections for 240 O.P.M.—For 100V. to 124V. (15K Motor Unit)



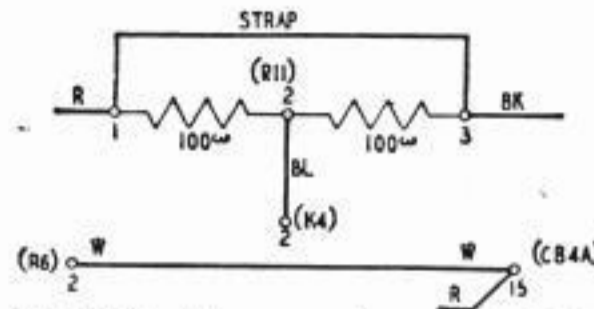
COLOR	FROM	TO	CHANGE
BL	2(K4)	2(R6)	MOVE FROM (R6) TO 2 (R11)
W	15	2(K4)	MOVE FROM (K4) TO 2 (R6)
STRAPS	—	—	REMOVE STRAPS 1-2, 2-3 (R11)
BK	FIELD	3(R11)	MOVE FROM 3(R11) TO 1 (R11)

M2.26B Connections for 240 O.P.M.—For 125V. to 130V. (15K Motor Unit)



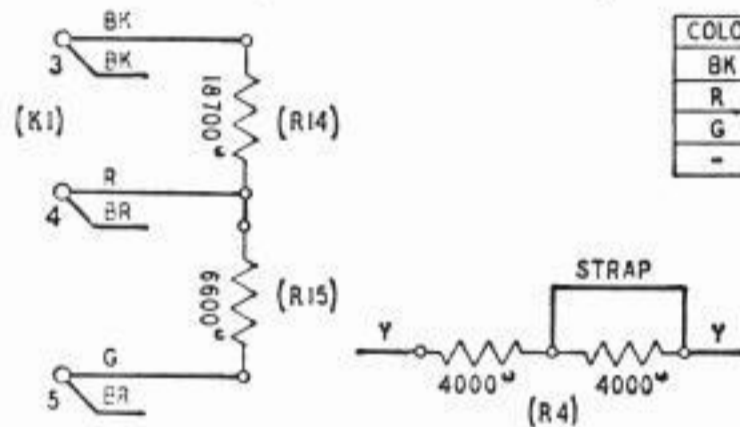
COLOR	FROM	TO	CHANGE
STRAPS	—	—	REMOVE STRAPS 1-2, 2-3 (R11)

**M2.27A Connections for 368 & 460 O.P.M.—For 100V. to 111V.
(15K Motor Unit)**



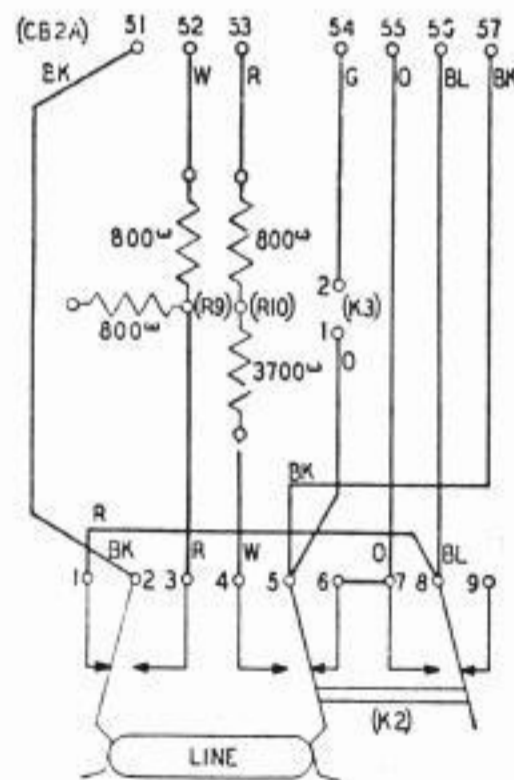
COLOR	FROM	TO	CHANGE
BL	2 (K4)	2 (R6)	MOVE FROM (R6) TO 2 (R11)
W	15	2 (K4)	MOVE FROM (K4) TO 2 (R6)
STRAPS	—	—	REMOVE STRAPS 1-2, 2-3 (R11) & CONN. STRAP 1-3 (R11)

**M2.27B Connections for 368 & 460 O.P.M.—For 125V. to 130V.
(15K Motor Unit)**



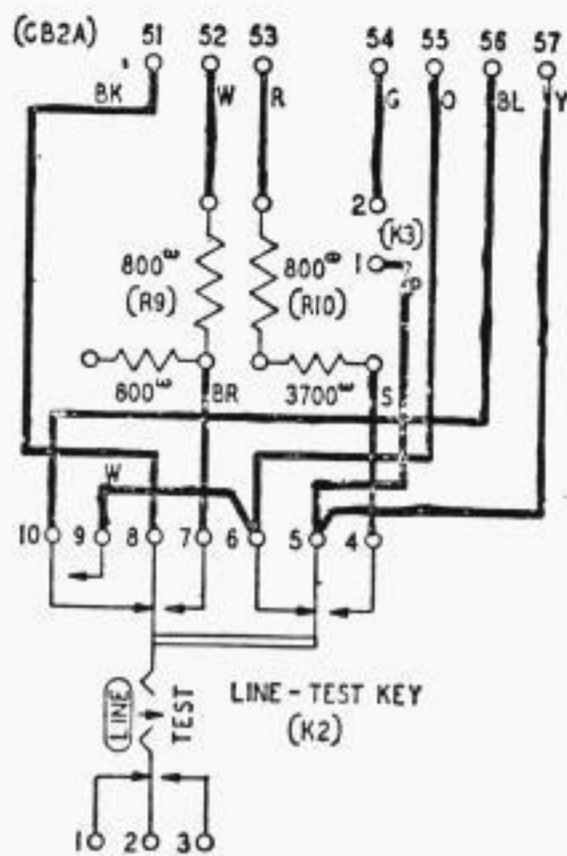
COLOR	FROM	TO	CHANGE
BK	(R14)	—	CONN. TO 3 (K1)
R	(R14)	—	CONN. TO 4 (K1)
G	(R15)	—	CONN. TO 5 (K1)
—	—	—	STRAP 4000Ω OF (R4)

M2.28 Operation in .005-.025 Amp. Circuit (15B TTY Base)



COLOR	FROM	TO	CHANGE
W	51	56	REMOVE ALL LEADS
BK	55	57	
R	55	2 (K3)	
G	54	1 (K3)	
BK	2 (K2)	—	CONN. TO 51
R	3 (K2)	—	CONN. TO (R9)
W	—	—	CONN. (R9) TO 52
W	4 (K2)	—	CONN. TO (R10)
R	—	—	CONN. (R10) TO 53
BK	5 (K2)	—	CONN. TO 57
O	5 (K2)	—	CONN. 1 (K3)
G	—	—	CONN. 2 (K3) TO 54
O	7 (K2)	—	CONN. TO 55
BL	8 (K2)	—	CONN. TO 56

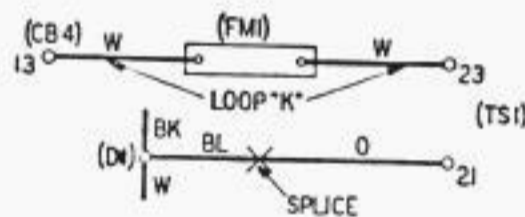
M2.29A Connections for Plunger Type Line-Test Key (15 Type Keyboards)



LEADS TO BE REMOVED					
15A,B & C KEYBOARDS & 15 TYPE PERF. TRANS.			15D,E,F&G KEYBOARDS		
COLOR	FROM	TO	COLOR	FROM	TO
BK	51	2 (K2)	W	51	56
BK	52	(R9)	BK	55	57
BK	53	(R10)	R	55	2 (K3)
BK	54	2 (K3)	G	54	1 (K3)
BK	55	7 (K2)			
BK	56	8 (K2)			
BK	57	5 (K2)			
BK	5 (K2)	1 (K3)			
BK	3 (K2)	(R9)			
BK	4 (K2)	(R10)			

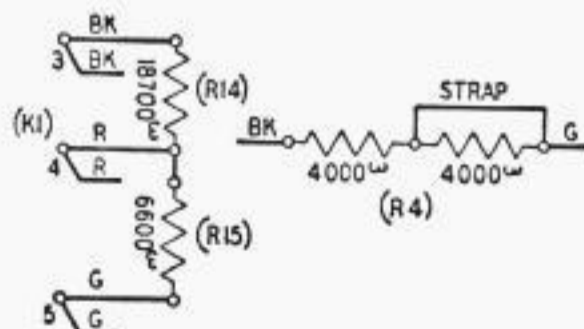
LEADS TO BE CONNECTED			
COLOR	FROM	TO	REMARKS
BK	8 (K2)	-	CONN. TO 51
W	-	-	CONN. (R9) TO 52
R	-	-	CONN (R10) TO 53
G	-	-	CONN 2 (K3) TO 54
O	6 (K2)	-	CONN. TO 55
BL	10 (K2)	-	CONN. TO 56
Y	5 (K2)	-	CONN. TO 57
P	5 (K2)	-	CONN. TO 1 (K3)
BR	7 (K2)	-	CONN. TO (R9)
S	4 (K2)	-	CONN. TO (R10)

M2.29B Connections for Cam Type Line-Test Key (15 Type Keyboards & 15 Type Perforator Transmitters)



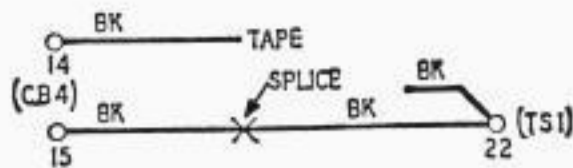
COLOR	FROM	TO	CHANGE
O	21	(FMI)	REMOVE FROM (FMI), SPLICE & TAPE
BL	(D1)	(FMI)	
W	23	*K*	CUT AT *K* & CONN TO (FMI)
W	13	*K*	

M2.30 Conn. of Fuse for Use With External Power Relay (15C & 15D TTY Bases)



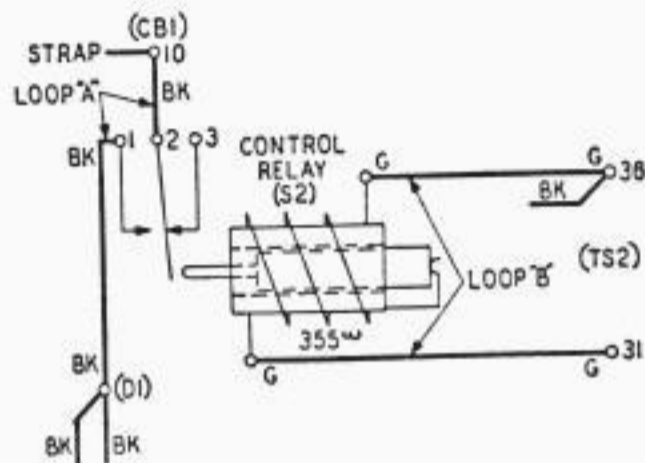
COLOR	FROM	TO	CHANGE
BK	(R14)	-	CONN TO 3 (K1)
R	(R14)	-	CONN TO 4 (K1)
G	(R15)	-	CONN TO 5 (K1)
-	-	-	STRAP 4000Ω OF (R4)

M2.31 Operation in .005-.025 Amp. Circuit (15C & 15D TTY Bases)



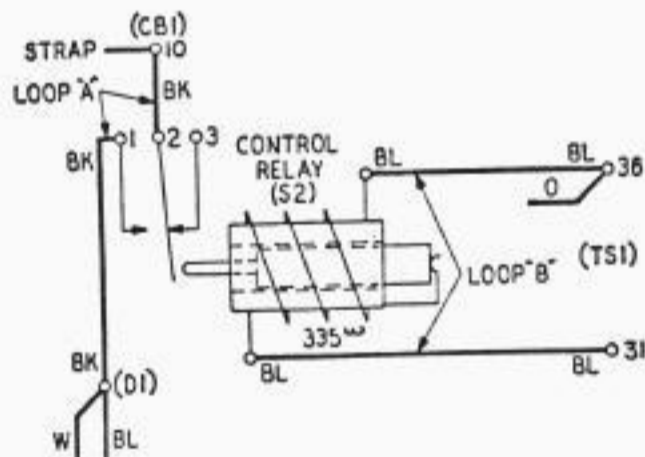
COLOR	FROM	TO	CHANGE
BK	14	(R6)	REMOVE FROM (R6) & TAPE
BK	15	(R5)	REMOVE FROM (R5), SPLICE
BK	22	(R5)	& TAPE

M2.32 Operation With 15J & K Motor Units (15A & B TTY Bases)



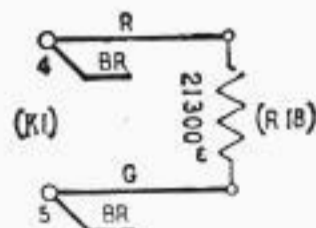
COLOR	FROM	TO	CHANGE
BK	10	LOOP 'A'	CUT LOOP AT 'A' & CONN. TO 1 & 2 OF (S2).
BK	(D1)	LOOP 'A'	
G	38	LOOP 'B'	CUT LOOP AT 'B' & CONN. TO TERMS. OF RELAY COIL.
G	31	LOOP 'B'	

M2.33 Adding Motor Control Relay (15A TTY Base)



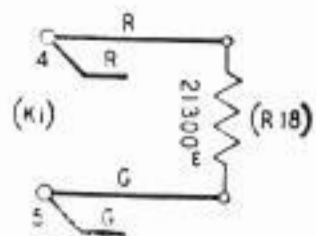
COLOR	FROM	TO	CHANGE
BK	10	LOOP 'A'	CUT LOOP AT 'A' & CONN. TO 1 & 2 OF (S2).
BK	(D1)	LOOP 'A'	
BL	36	LOOP 'B'	CUT LOOP AT 'B' & CONN. TO TERMS. OF RELAY COIL.
BL	31	LOOP 'B'	

M2.34 Adding Motor Control Relay (15C & D TTY Bases)



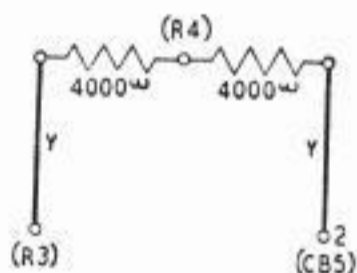
COLOR	FROM	TO	CHANGE
R	(R1B)	-	CONN. TO 4(K1)
G	(R1B)	-	CONN. TO 5(K1)

M2.35 Operation With .005 Amp. Break Current (15B TTY Base)



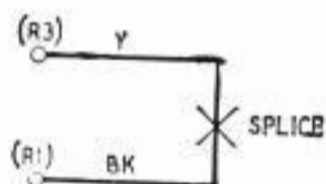
COLOR	FROM	TO	CHANGE
R	(R18)	-	CONN. TO 4 (K1)
G	(R13)	-	CONN. TO 5 (K1)

M2.36 Operation With .005 Amp. Break Current (15C & D TTY Bases)



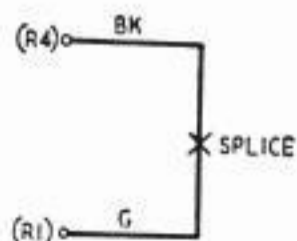
COLOR	FROM	TO	CHANGE
Y	(R3)	2(CB5)	MOVE FROM 2(CB5) TO REAR TERM. (R4).
Y	(R4)	2(CB5)	CONN. FRONT TERM. (R4) TO 2(CB5).

M2.37 Operation in .020 Amp. Circuit (15A TTY Base)



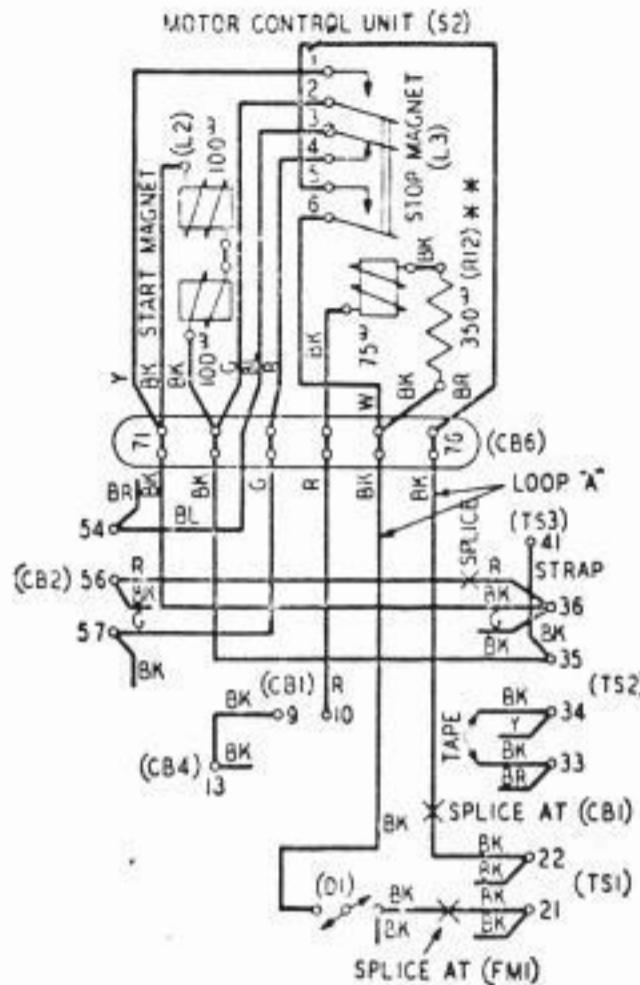
COLOR	FROM	TO	CHANGE
Y	(R3)	2(CB5)	REMOVE FROM 2 &
BK	(R1)	7(CB5)	7(CB5), SPLICE & TAPE

M2.38 Polar Operation of 255A Line Relay (15A TTY Base)



COLOR	FROM	TO	CHANGE
BK	(R4)	2(CB5)	REMOVE FROM 2 & 7 (CB5)
G	(R1)	7(CB5)	AND SPLICE & TAPE

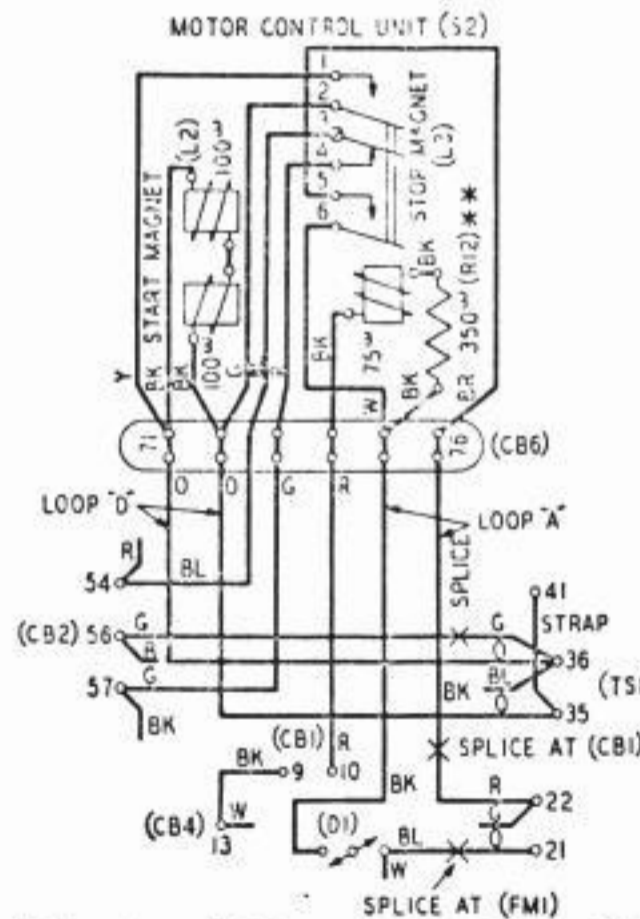
M2.39 Polar Operation of 255A Line Relay (15C TTY Base per M2.16 & 15D TTY Base)



COLOR	FROM	TO	CHANGE
BK	21	(FMI)	REMOVE (FMI). SPLICE LEADS AND TAPE.
BK	(DI)	(FMI)	REMOVE (FMI). SPLICE LEADS AND TAPE.
BK	36	67(RM8)	REMOVE (RM8). CONNECT 36 TO 71 (CB6) AND 35 TO 72 (CB6).
BK	35	68(RM8)	REMOVE (RM8). CONNECT 36 TO 71 (CB6) AND 35 TO 72 (CB6).
BK	34	70	REMOVE (RM7). TAPE LEADS FROM 33 & 34 SEPARATELY.
BK	33	69	REMOVE (RM7). TAPE LEADS FROM 33 & 34 SEPARATELY.
BK	22	9	REMOVE FROM 9 & 10 (CB1) SPLICE AND TAPE. ALSO REMOVE STRAP 9-10.
BK	(DI)	10	REMOVE FROM 9 & 10 (CB1) SPLICE AND TAPE. ALSO REMOVE STRAP 9-10.
* BK	—	—	CONNECT 9 (CB1) TO 13(CB4)
* R	—	—	CONNECT 74(CB6) TO 10(CB1)
* G	—	—	CONNECT 73(CB6) TO 57(CB2)
* BL	—	—	CONNECT 3 (S2) TO 54(CB2)
BK	(DI)	LOOP 'A'	CUT LOOP 'A' AND CONNECT (DI) TO 75 (CB6) AND 22 TO 76 (CB6).
BK	22	LOOP 'A'	CUT LOOP 'A' AND CONNECT (DI) TO 75 (CB6) AND 22 TO 76 (CB6).
R	56	41	REMOVE FROM 41 AND EXTEND TO 36.
—	—	—	STRAP 35 TO 41.

* LEADS FURNISHED WITH (S2)
 ** STRAP OUT FOR A.C. OPERATION

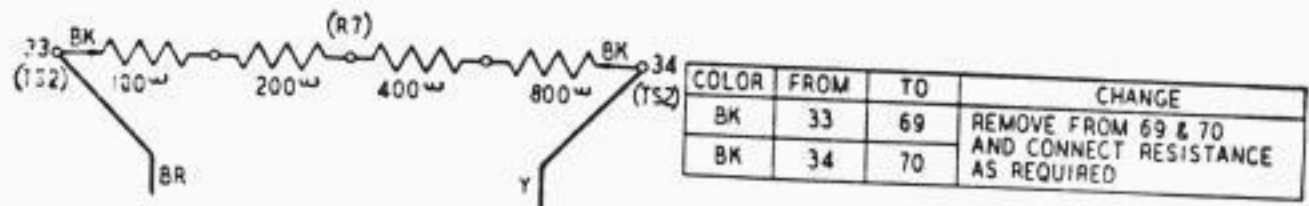
M2.40 Adding .060 Amp. Motor Control Unit in Line Ckt. (15A TTY Base)



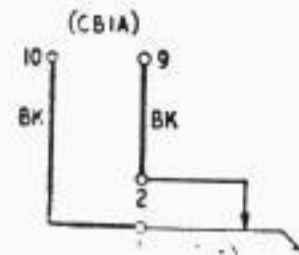
COLOR	FROM	TO	CHANGE
O	21	(FMI)	REMOVE (FMI). SPLICE LEADS AND TAPE.
BL	(DI)	(FMI)	REMOVE (FMI). SPLICE LEADS AND TAPE.
O	36	LOOP 'D'	CUT LOOP 'D' AND CONNECT 36 TO 71 (CB6) AND 35 TO 72 (CB6).
O	35	LOOP 'D'	CUT LOOP 'D' AND CONNECT 36 TO 71 (CB6) AND 35 TO 72 (CB6).
R	22	9	REMOVE FROM 9 & 10 SPLICE AND TAPE. ALSO REMOVE STRAP 9-10.
BK	(DI)	10	REMOVE FROM 9 & 10 SPLICE AND TAPE. ALSO REMOVE STRAP 9-10.
* BK	—	—	CONNECT 9 (CB1) TO 13(CB4)
* R	—	—	CONNECT 74(CB6) TO 10(CB1)
* G	—	—	CONNECT 73(CB6) TO 57(CB2)
* BL	—	—	CONNECT 3 (S2) TO 54(CB2)
BK	(DI)	LOOP 'A'	CUT LOOP 'A' AND CONNECT (DI) TO 75 (CB6) AND 22 TO 76 (CB6).
BK	22	LOOP 'A'	CUT LOOP 'A' AND CONNECT (DI) TO 75 (CB6) AND 22 TO 76 (CB6).
G	56	41	REMOVE FROM 41 AND EXTEND TO 36
—	—	—	STRAP 35 TO 41

* LEADS FURNISHED WITH (S2)
 ** STRAP OUT FOR A.C. OPERATION

M2.41 Adding .060 Amp. Motor Control Unit in Line Ckt. (15C & D TTY Bases)

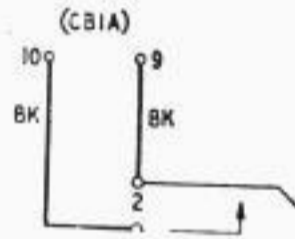


M2.42 Adding Station Line Resistance (15A TTY Base)



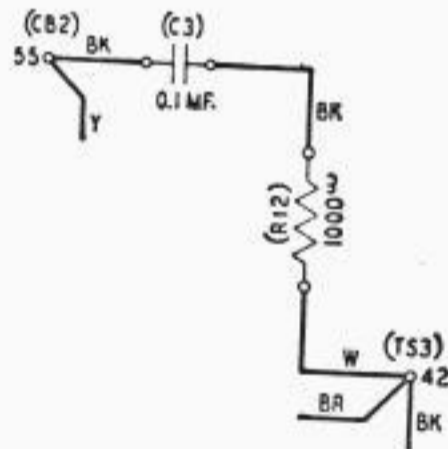
COLOR	FROM	TO	CHANGE
BK	1(K5)	—	CONN. TO 10 (CB1A)
BK	2(K5)	—	CONN. TO 9 (CB1A)

M2.43 Adding Stop Contacts for Use With External Relay (15Y & AA Typing Units)



COLOR	FROM	TO	CHANGE
BK	1(K5)	—	CONN. TO 10 (CB1A)
BK	2(K5)	—	CONN. TO 9 (CB1A)

M2.44 Adding Stop Contacts for Use With Motor Control Unit (15U, W, Y & AA Typing Units)



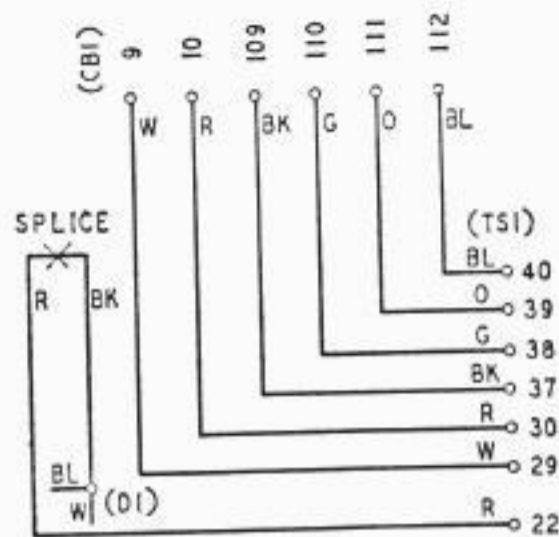
COLOR	FROM	TO	CHANGE
BK	C3	—	CONN TO 55 (CB2)
W	R12	—	CONN. TO 42 (TS3)

M2.45 Adding Sending Contact Spark-Killer (15A & B TTY Bases)



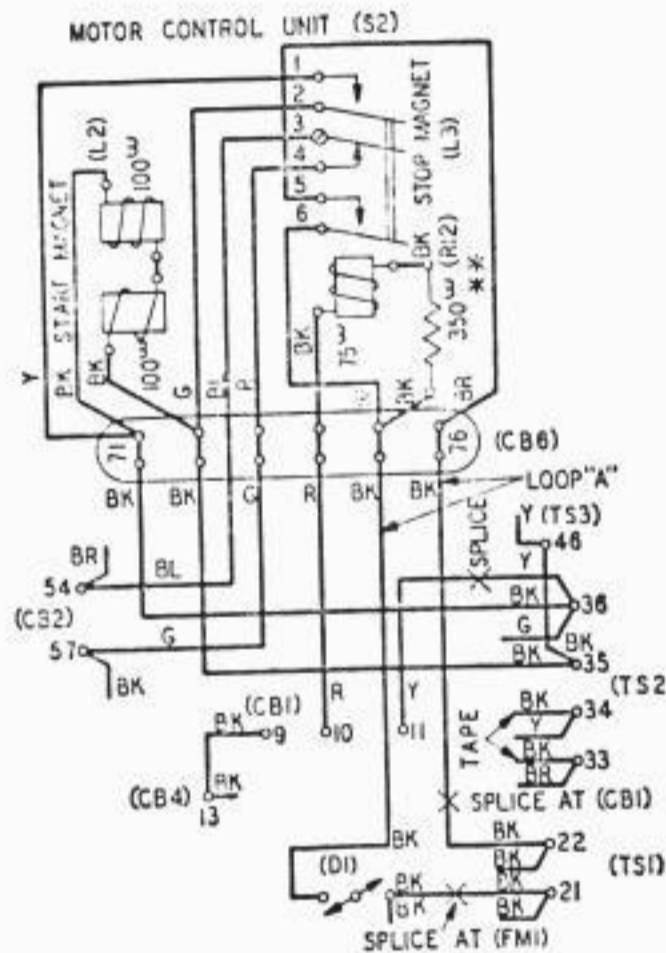
COLOR	FROM	TO	CHANGE
W	R12	42	MOVE FROM 42 (TS3) TO 32 (TS2)

M2.46 Sending Contact Spark-Killer Connection for Duplex Operation (15A & B TTY Bases)



COLOR	FROM	TO	CHANGE
R	22	9	REMOVE FROM 9 & 10, SPLICE & TAPE
BK	(D1)	10	
W	-	-	CONN. 9 TO 29
R	-	-	" 10 " 30
BK	-	-	" 109 " 37
G	-	-	" 110 " 38
O	-	-	" 111 " 39
BL	-	-	" 112 " 40

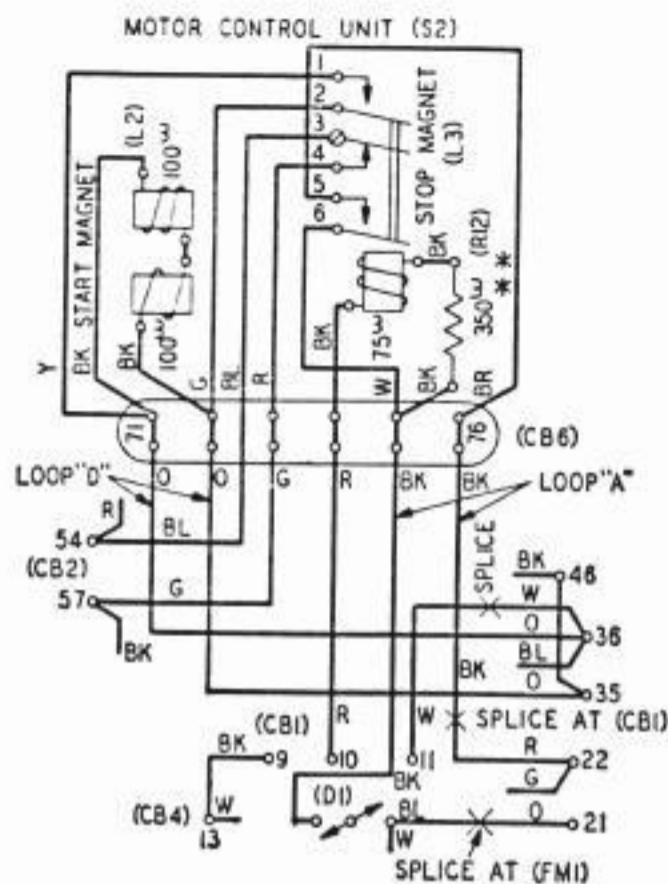
M.247 Addition of Switching Control Contact Cable (15C TTY Base)



COLOR	FROM	TO	CHANGE
BK	21	(FMI)	REMOVE (FMI), SPLICE LEADS AND TAPE.
BK	(D1)	(F1A1)	
BK	38	67(RM8)	REMOVE (RM8), CONNECT 36 TO 71 (CB5) AND 35 TO 72 (CB6).
BK	35	68(RM8)	
BK	34	70	REMOVE (RM7), TAPE LEADS FROM 33 & 34 SEPARATELY.
BK	33	69	
BK	22	9	REMOVE FROM 9 & 10 (CB1) SPLICE AND TAPE. ALSO REMOVE STRAP 9-10.
BK	(D1)	10	
* BK	-	-	CONNECT 9 (CB1) TO 13 (CB4)
* R	-	-	CONNECT 74 (CB6) TO 10 (CB5)
* G	-	-	CONNECT 73 (CB6) TO 57 (CB2)
* BL	-	-	CONNECT 3 (S2) TO 54 (CB2)
BK	(D1)	LOOP "A"	CUT LOOP "A" AND CONNECT (D1) TO 75 (CB6) AND 22 TO 76 (CB6).
BK	22	LOOP "A"	
Y	11	46	REMOVE FROM 46 AND EXTEND TO 36.
-	-	-	STRAP 35 TO 46.

* LEADS FURNISHED WITH (S2)
 ** STRAP OUT FOR A.C. OPERATION

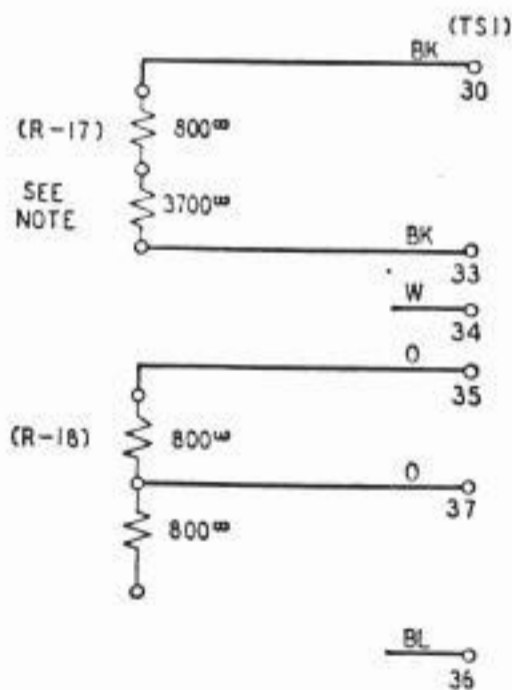
M2.48 Adding .060 Amp. Motor Control in Selector Magnet Ckt., with Line Relay (15A Base)



COLOR	FROM	TO	CHANGE
O	21	(FMI)	REMOVE (FMI). SPLICE LEADS AND TAPE.
BL	(DI)	(FMI)	REMOVE (FMI). SPLICE LEADS AND TAPE.
O	36	LOOP "D"	CUT LOOP "D" AND CONNECT 36 TO 71 (CB6) AND 35 TO 72 (CB6).
O	35	LOOP "D"	CUT LOOP "D" AND CONNECT 36 TO 71 (CB6) AND 35 TO 72 (CB6).
R	22	9	REMOVE FROM 9 & 10 SPLICE AND TAPE. ALSO REMOVE STRAP 9-10.
BK	(DI)	10	REMOVE FROM 9 & 10 SPLICE AND TAPE. ALSO REMOVE STRAP 9-10.
* BK	—	—	CONNECT 9 (CB1) TO 13 (CB4).
* R	—	—	CONNECT 74 (CB6) TO 10 (CB1).
* G	—	—	CONNECT 73 (CB6) TO 57 (CB2).
* BL	—	—	CONNECT 3 (S2) TO 54 (CB2).
BK	(DI)	LOOP "A"	CUT LOOP "A" AND CONNECT (DI) TO 75 (CB6) AND 22 TO 76 (CB6).
BK	22	LOOP "A"	CUT LOOP "A" AND CONNECT (DI) TO 75 (CB6) AND 22 TO 76 (CB6).
W	11	46	REMOVE FROM 46 AND EXTEND TO 36.
—	—	—	STRAP 35 TO 46.

* LEADS FURNISHED WITH (S2)
 ** STRAP OUT FOR A.C. OPERATION
 (15C & D BASES)

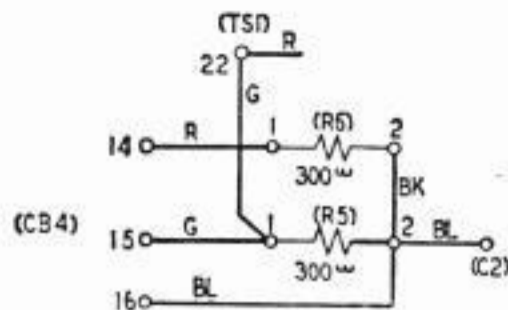
M2.49 Adding .060 Amp. Motor Control in Selector Magnet Ckt., with Line Relay (15C & D Bases)



COLOR	FROM	TO	CHANGE
BK	33	34	CUT LOOP AT "E" AND CONN. 800Ω - 3700Ω RESISTOR
BK	"E"	34	MOVE FROM 34 TO 30.
O	35	36	CUT LOOP AT "D" AND CONN. 800Ω - 800Ω RESISTOR
O	"D"	36	MOVE FROM 36 TO 37

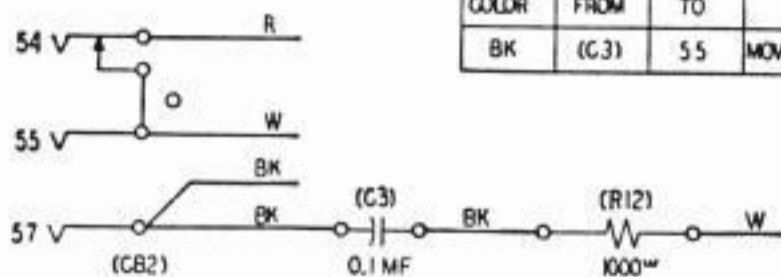
NOTE
 CONNECTIONS SHOWN FOR .020 AMP. OPERATION
 STRAP OUT 3700Ω FOR .060 AMP. OPERATION

M2.50 Adding Local Test Resistors to 15C & D Bases



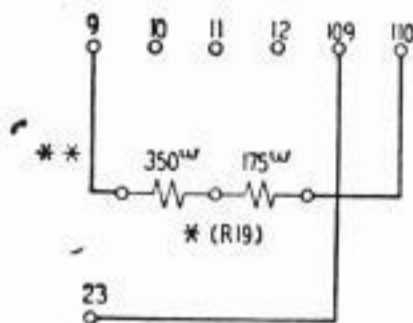
COLOR	FROM	TO	CHANGE
R	14	"L"	CONN. TO 1(R6)
G	15	22	CUT LOOP "F" & CONN. BOTH WIRES TO 1(R5)
BL	16	(C2)	CUT LOOP "G" & CONN. BOTH WIRES TO 2(R5)
BK	-	-	STRAP 2(R5) & 2(R6)

M2.51 Operation with 15A & 15B Motor Units—Adding 300Ω Resistors to (15C & 15D TTY Bases)



COLOR	FROM	TO	CHANGE
BK	(C3)	55	MOVE FROM 55 TO 57

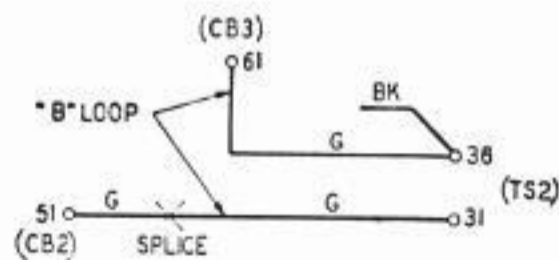
M2.52 Sending Contact Spark Killer—Connection Change when TTY Line-Test Key Is Used (15C & 15D TTY Bases)



COLOR	FROM	TO	CHANGE
* BK			CONN. 23 TO 109
* BR			CONN. 110 TO RIGHT END OF (R19)
* R		**	CONN. 9 TO LEFT END OF (R19)

* LEADS, (R19) AND TERMINALS 109 AND 110 FURNISHED WITH 15AK TYPING UNIT.
 ** CONNECTIONS SHOWN FOR DC OPERATION. CONNECTION 9 TO MIDPOINT OF (R19) FOR AC OPERATION.

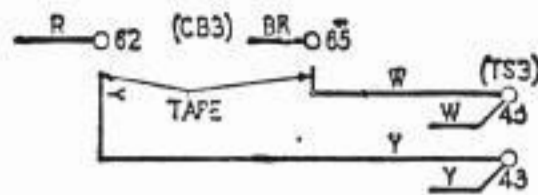
M2.53 Operation with 15AK Typing Unit—Adding Resistor and Connection Springs to 15 Type TTY Base for Two Color Printing



LEADS TO BE REMOVED			
COLOR	FROM	TO	REMARKS
G	51	61	REMOVE FROM 61
G	31	36	CUT LOOP AT "B"

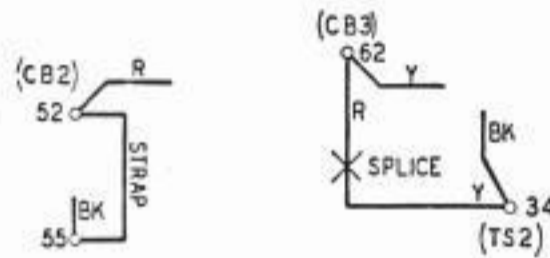
LEADS TO BE CONNECTED			
COLOR	FROM	TO	REMARKS
G	51	61	SPLICE AT "B" TO LEAD FROM 31
G	36	"B"	CONN. TO 61

M3.01 Single or Duplex Operation—External Switching Key (15A TTY Base)



COLOR	FROM	TO	CHANGE
Y	46	62	REMOVE FROM 62 & TAPE
W	45	65	REMOVE FROM 65 & TAPE

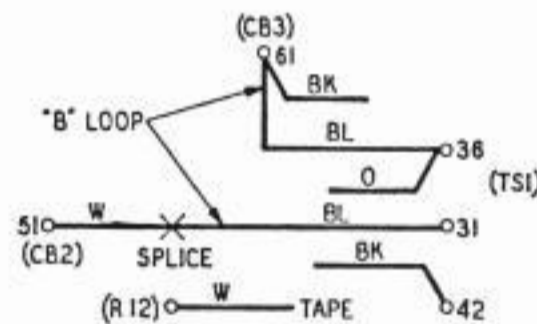
M3.02 Operation Without Line Relay (15B TTY Base)



LEADS TO BE REMOVED			
COLOR	FROM	TO	REMARKS
R	62	52	REMOVE FROM 52
Y	34	55	REMOVE FROM 55

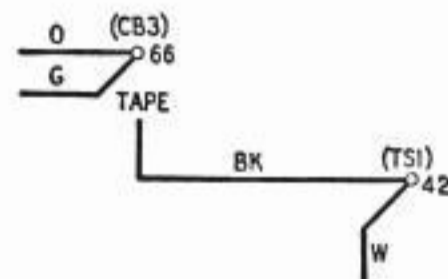
LEADS TO BE CONNECTED			
COLOR	FROM	TO	REMARKS
—	—	—	STRAP 52-55
R	62	52	SPLICE & TAPE
Y	34	55	

M3.03 Type "A" Polarential Operation (15A TTY Base)



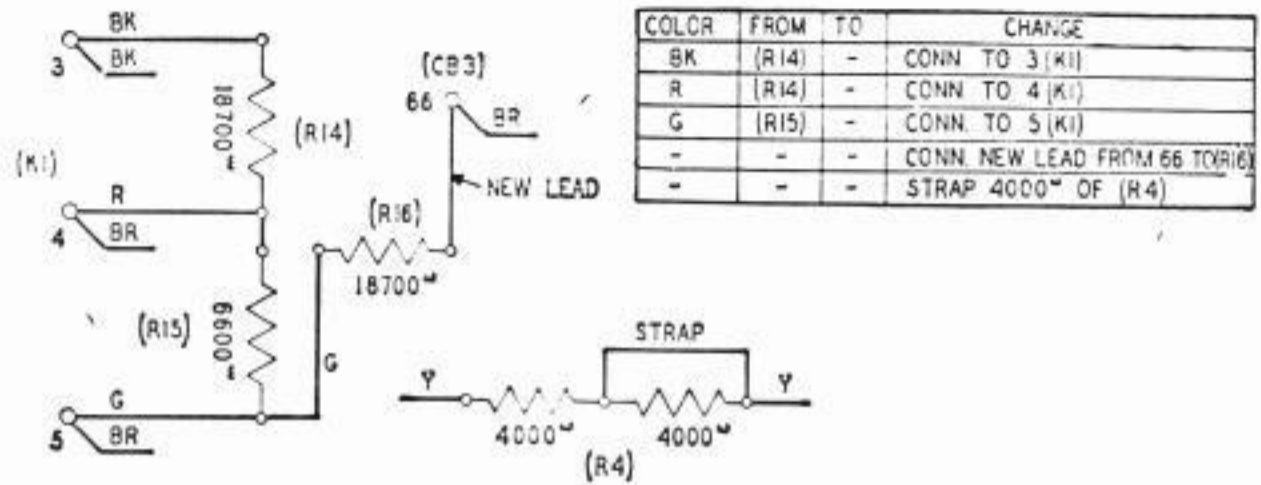
COLOR	FROM	TO	CHANGE
BL	36	"B"	CUT AT "B" & CONNECT LEAD FROM 36 TO 61
W	51	61	REMOVE FROM 61 & SPLICE AT
BL	31	"B"	"B" TO LEAD FROM 31
W	R12	42	REMOVE FROM 42 & TAPE

M3.04 Single or Duplex Operation With External Switching Key (15C & 15D TTY Bases)

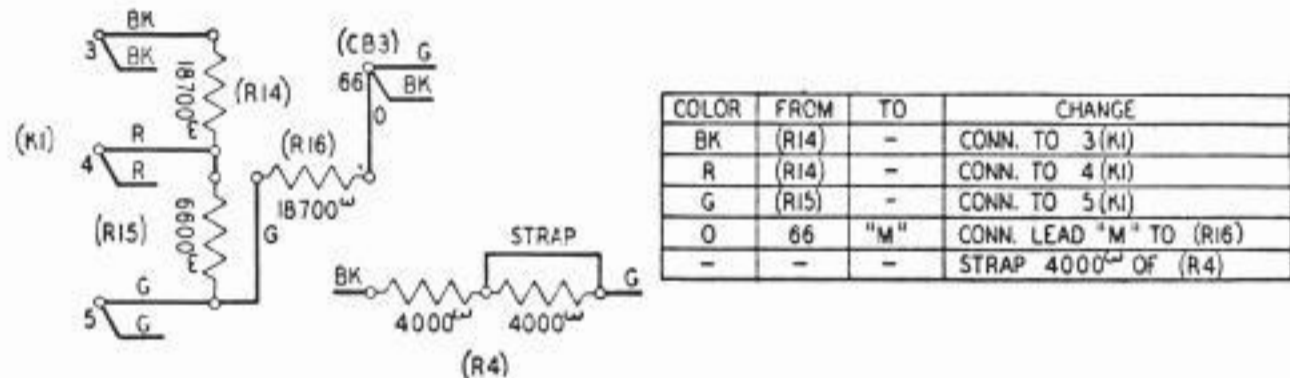


COLOR	FROM	TO	CHANGE
BK	42	66	REMOVE FROM 66 & TAPE

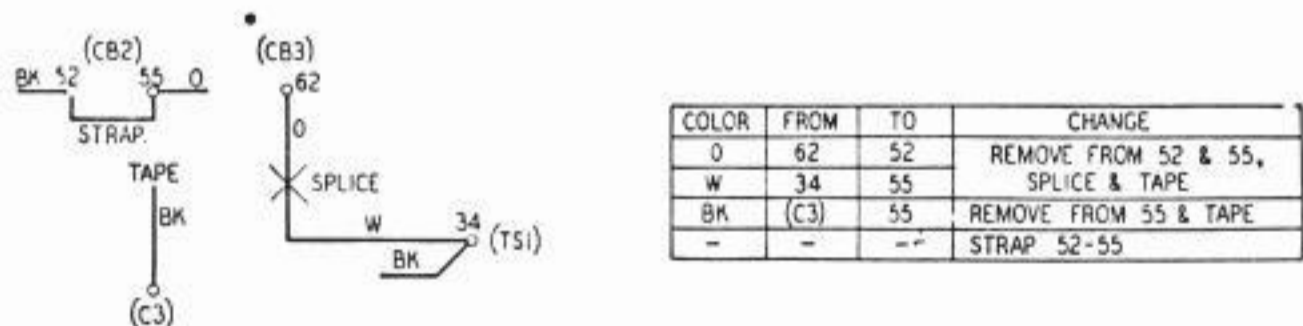
M3.05 Separation of Sending & Receiving Circuits (15C & 15D TTY Bases)



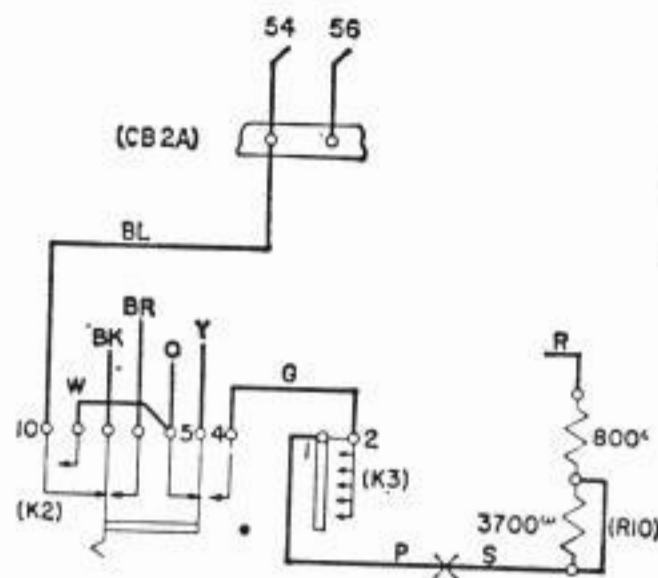
M3.06 Operation in .005-.025 Amp. Circuit (15B TTY Base)



M3.07 Operation in .005-.025 Amp. Circuit (15C & 15D TTY Bases)

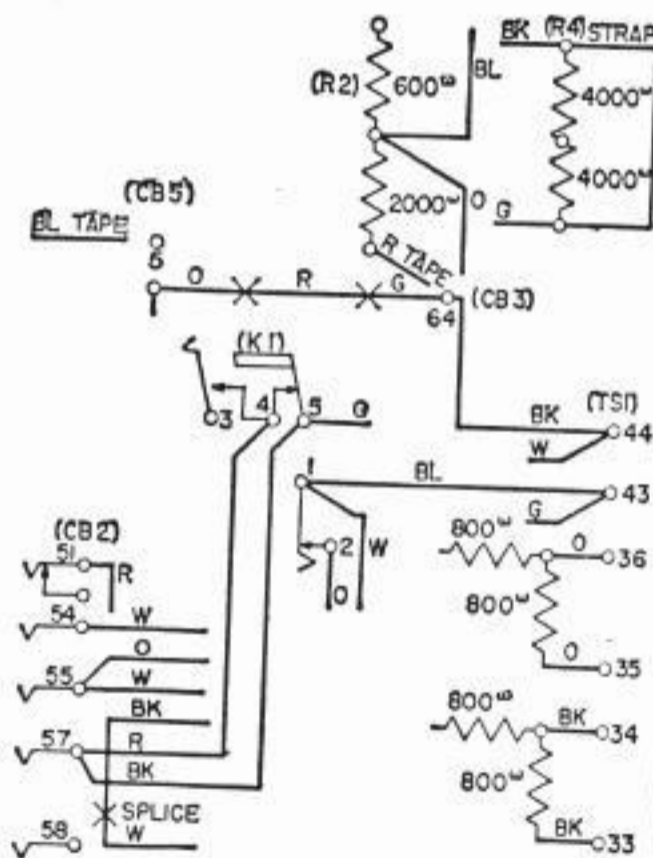


M3.08 Type "A" Polarential Operation (15C & 15D TTY Bases)



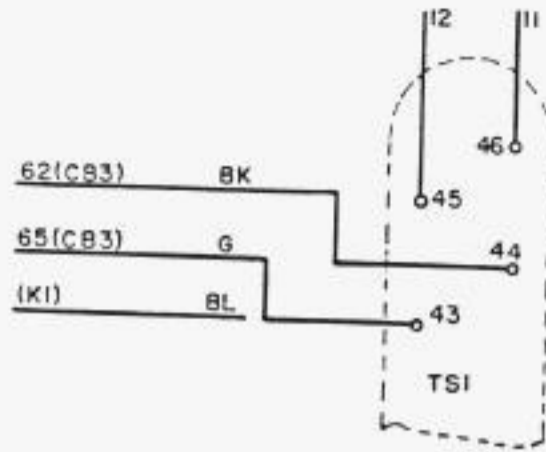
COLOR	FROM	TO	CHANGE
S	(R10)	4(K2)	REMOVE FROM (K2), SPLICE & TAPE
P	1(K3)	5(K2)	STRAP 3700Ω OF (R10)
-	-	-	STRAP 3700Ω OF (R10)
G	2(K3)	54	REMOVE FROM 54 & EXTEND TO 4(K2)
BL	10(K2)	56	MOVE FROM 56 TO 54

M3.09 Cam-Type Line-Test Key — Sending Contacts Excluded from Line 15 Type Perf. Trans.



COLOR	FROM	TO	CHANGE
BL	(R1)	5	REMOVE FROM 5 & TAPE
-	-	-	STRAP (R4)
O	(CB5)	(R3)	REMOVE FROM (R3), SPLICE & TAPE
R	(C1)	(R3)	REMOVE FROM (C1), SPLICE & TAPE
R	(R3)	(C1)	REMOVE FROM (C1), SPLICE & TAPE
G	64	(C1)	REMOVE FROM (C1), SPLICE & TAPE
O	65	(R2)	MOVE FROM END OF (R2) TO CENTER
R	(R2)	64	REMOVE FROM 64 & TAPE
BK	46	62	REMOVE FROM 62 AND EXTEND TO 64
BK	62	46	REMOVE FROM 46 AND EXTEND TO 44
W	(R12)	42	REMOVE FROM 42 AND EXTEND TO 44
G	65	45	REMOVE FROM 45 AND EXTEND TO 43
BK	57	3(K1)	MOVE FROM 3(K1) TO 5(K1)
W	58	2(K1)	MOVE FROM 2(K1) TO 1(K1)
W	2(K1)	58	REMOVE FROM 55 AND 58, SPLICE & TAPE
BK	(C3)	55	REMOVE FROM 55 AND 58, SPLICE & TAPE
R	4(K1)	54	REMOVE FROM 54 AND EXTEND TO 57
W	61	51	REMOVE FROM 51 AND EXTEND TO 54
R	56	LOWER 51	MOVE FROM LOWER 51 TO UPPER 51
O	36	LOOP'D	CUT LOOP 'D' AND ADD 800Ω RESISTANCE
O	35	LOOP'D	CUT LOOP 'D' AND ADD 800Ω RESISTANCE
BK	34	LOOP'E	CUT LOOP 'E' AND ADD 800Ω RESISTANCE
BK	33	LOOP'E	CUT LOOP 'E' AND ADD 800Ω RESISTANCE

M3.10 Line Relay Contacts Sending to Line (15D Base)



COLOR	FROM	TO	CHANGE
BK	62(CB3)	46(TSI)	REMOVE FROM 46 (TSI) CONNECT TO 44 (TSI)
BL	(KI)	43(TSI)	REMOVE FROM 43(TSI) & TAPE
G	65(CB3)	45(TSI)	REMOVE FROM 45 (TSI) CONNECT TO 43 (TSI)

M3.11 Connections to Extend Line Magnet Circuit Through External Jacks (15D TTY Base)