

SHEET INDEX

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| DWG ISSUE | CD ISSUE | DATE ISSUED | DRAWN | APPRO |
|-----------|----------|-------------|------------|-----------|
| 1 | 1 | 1-5-70 | RJB HBM | AL GES |

SHEET INDEX NOTES

1. WHEN CHANGES ARE MADE IN THIS DRAWING, ONLY THOSE SHEETS AFFECTED WILL BE REISSUED.
2. THIS SHEET INDEX WILL BE REISSUED AND BROUGHT UP TO DATE EACH TIME ANY SHEET OF THE DRAWING IS REISSUED, OR A NEW SHEET IS ADDED.
3. THE ISSUE NUMBER ASSIGNED TO A CHANGED OR NEW SHEET WILL BE THE SAME ISSUE NUMBER AS THAT OF THE SHEET INDEX.
4. SHEETS THAT ARE NOT CHANGED WILL RETAIN THEIR EXISTING ISSUE NUMBER.
5. THE LAST ISSUE NUMBER OF THE SHEET INDEX IS RECOGNIZED AS THE LATEST ISSUE NUMBER OF THE DRAWING AS A WHOLE.

OPTION INDEX

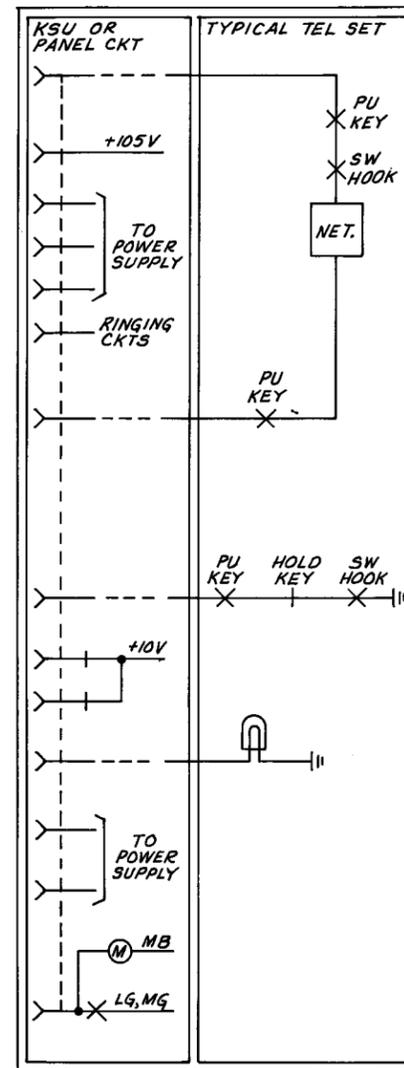
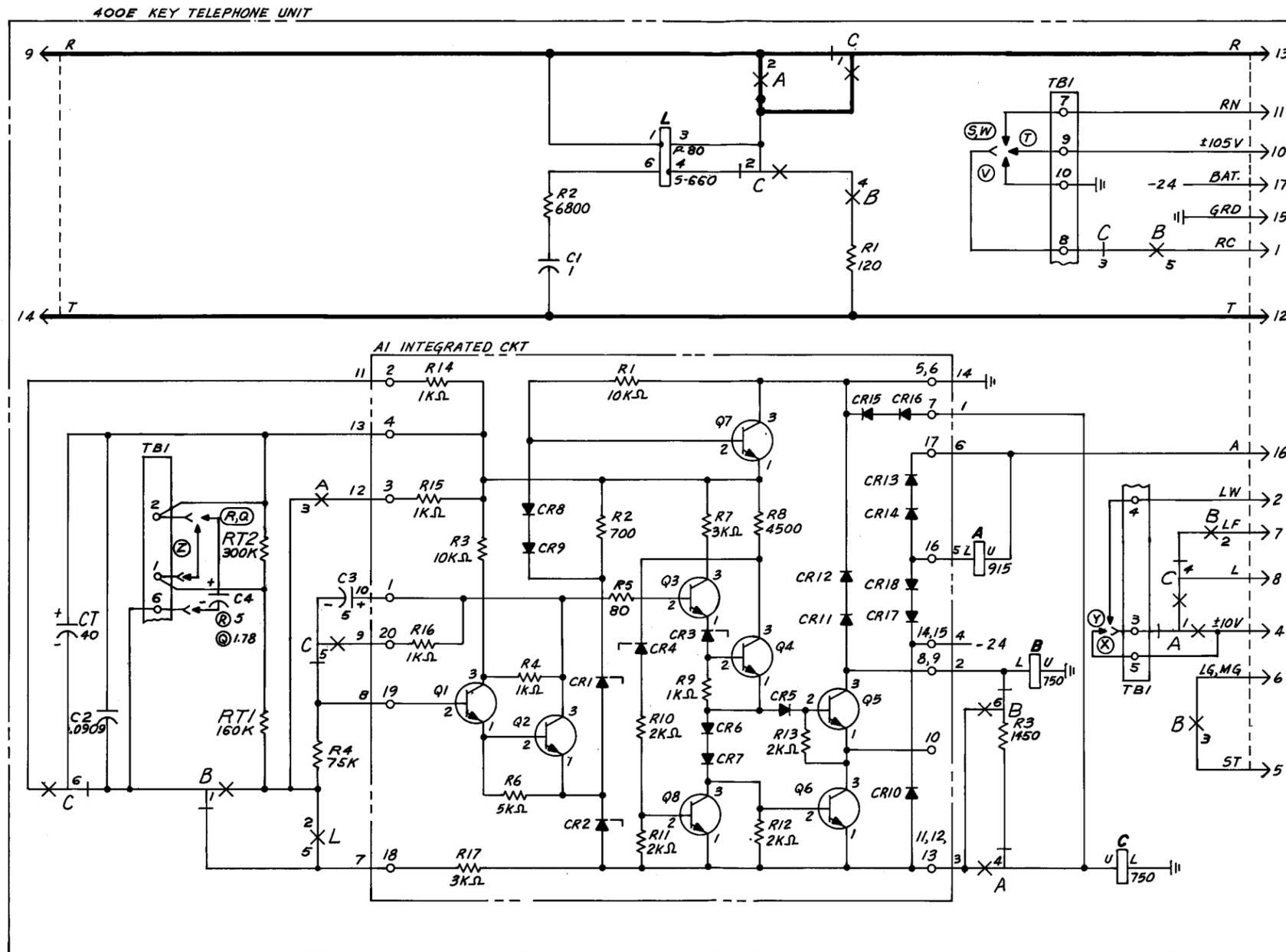
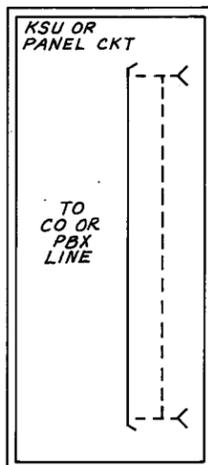
| APP OR WRG | LOCATION |
|------------|----------|
| | |

SUPPORTING INFORMATION

| CATEGORY | NO. |
|----------|-----|
| | |

| | | |
|--|------|--|
| SD-69617-01 | 1K02 | AT&T CO STANDARD |
| STATION SYSTEMS 1A2 KEY TELEPHONE SYSTEM CO OR PBX LINE CIRCUIT INTEGRATED CIRCUIT TYPE | | SD-69617-01-A1 5 SHEETS |
| BELL TELEPHONE LABORATORIES INCORPORATED | | DWG SIZE 3S PRINTED IN U.S.A. |

FS1
CO OR PBX LINE CKT



0

1

2

3

4

APP FIG. 1

400E KEY TELEPHONE UNIT

DRAWING

ISSUE

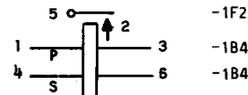
RELAY

| DESIG CODE | A | | B | | | | C | | | | | |
|---------------|-------------|-----|-------------|-----|-------------|-----|-------------|-----|-------------|-----|-------------|-----|
| | MA19 | | MB16 | | | | MB23 | | | | | |
| OPTION | CONT ARR | LOC |
| 6 | | | | | EBM | 1E5 | | | EMB | 1F1 | | |
| 5 | | | | | M | 1C6 | | | EBM | 1E2 | | |
| 4 | EMB | 1F5 | | | M | 1B5 | | | EBM | 1D6 | | |
| 3 | M | 1D2 | | | M | 1E6 | | | EB | 1C6 | | |
| 2 | M | 1A4 | | | M | 1D6 | | | EBM | 1B4 | | |
| 1 | EBM | 1E6 | | | EBM | 1F1 | | | EMB | 1A5 | | |
| COIL | | 1B5 | | | | 1E6 | | | | 1F6 | | |

RELAY

L

327F



RELAYS NOT ADJUSTABLE. REPLACE WHEN THERE IS A MALFUNCTION.

CAPACITOR

| DESIG | LOC | CODE |
|-------|-----|------------|
| CT | 1E1 | 602A |
| C1 | 1C3 | 575C |
| C2 | 1E1 | 594G .0909 |
| C3 | 1E2 | 601A |
| C4 | 1E2 | 596G 1.78 |
| | | 601A |

TERMINAL BOARD

| DESIG | TB1 |
|--------|----------|
| CODE | P-15C931 |
| OPTION | |
| | LOC |
| 10 | 1B6 |
| 9 | 1B6 |
| 8 | 1C6 |
| 7 | 1B6 |
| 6 | 1E1 |
| 5 | 1E6 |
| 4 | 1D6 |
| 3 | 1E6 |
| 2 | 1D1 |
| 1 | 1E1 |

INTEGRATED CKT

| DESIG | LOC | CODE |
|-------|-----|------|
| A1 | 1C3 | 36A |

RESISTOR

| DESIG | LOC | CODE |
|-------|-----|--------------------|
| R1 | 1C5 | KS-20289, L4, 120 |
| R2 | 1B3 | KS-13490, L2, 6800 |
| R3 | 1E6 | 221A, 1450 |
| R4 | 1F2 | KS-13490, L1, 75K |
| RT1 | 1E2 | KS-13490, L1, 160K |
| RT2 | 1D2 | KS-13490, L1, 300K |

CO OR PBX LINE CIRCUIT.

SD-69617-01-C1

BELL TELEPHONE LABORATORIES
INCORPORATEDDWS SIZE
3S

PRINTED IN U.S.A.

CIRCUIT NOTES:

| | | | | |
|----------------|-------|----------|---------------|---|
| 101. | DESIG | FUSE AMP | POTENTIAL | ONE PER |
| | | | -24 SIG | FUSE PROVIDED ON ASSOC KSU OR PANEL CKT |
| BATTERY SYMBOL | | | VOLTAGE RANGE | |
| -24 | | | 20-26V | |

CIRCUIT NOTES (CONT.):

104. WHEN Z OPTION IS TO BE PROVIDED IN COMBINATION WITH OPTION R, THE STRAP BETWEEN TERMINALS 1 AND 2 IS TO BE REPLACED WITH THE CAPACITOR LEAD.

105. TOTAL LOOP RESISTANCE OF THE A LEAD TO THE B GROUND THROUGH THE A1 LEAD SHALL NOT EXCEED 50Ω.

106. STATION LAMP LOOP SHALL NOT EXCEED 50Ω.

DRAWING ISSUE

A
B
C
D
E
F
G
H

| | | | | |
|--|-------------------------------------|---------|------------|------------|
| 102. | FEATURE OR OPTION | PROVIDE | | |
| | | FIG. | APP OR WRG | QUANTITY |
| AUDIBLE SIGNAL | INTERRUPTED RING | 1 | W | 1 PER LINE |
| | STEADY RING | | T | |
| | COM WITH RELAY CONTROL | | V | |
| | COM WITH DIODE MATRIX CONTROL | | S | |
| VISUAL HOLD. CKT | LAMP WINK | 1 | Y | 1 PER LINE |
| | LAMP STEADY | | X | |
| TIMEOUT CONTROL | LONG TIME DELAY | 1 | * | 1 PER LINE |
| | SHORT TIME DELAY | | Z | |
| | SEE NOTES 104 & 302 | | | |
| DELAY HOLD CKT RELEASE FOR MIN. 400 MS | LONG TIMEOUT PROVIDED | 1 | Q | 1 PER LINE |
| | SHORT TIMEOUT PROVIDED SEE NOTE 104 | | R | |

* LONG TIME DELAY IS A FUNCTION OF THE PRINTED WIRING AND IS EFFECTIVE ONLY WHEN Z OPTION STRAP IS REMOVED.

INFORMATION NOTES:

301. UNLESS OTHERWISE SPECIFIED: RESISTANCE VALUES IN OHMS, CAPACITANCE VALUES IN MICROFARADS, VALUES PRECEDED BY SYMBOL + (PLUS) OR - (MINUS) ARE IN VOLTS.

302. THE SHORT TIMEOUT CAN BE REDUCED BY SHUNTING A RESISTOR ACROSS RT1 AT THE OPTION BLOCK. REPLACE THE OPTION STRAP CONNECTING TERMINALS 1 AND 2 WITH ONE LEAD OF SHUNTING RESISTOR R AND CONNECT OTHER LEAD TO TERMINAL 6. THE TABLE BELOW GIVES THE RESISTANCE OF R REQUIRED TO REDUCE TIMEOUT t_0 TO SOME LOWER VALUE DESIRED TIME.

| DESIRED TIME | R * (MEG Ω) |
|--------------|-------------|
| .8 t_0 | .68 |
| .7 t_0 | .39 |
| .6 t_0 | .27 |
| .5 t_0 | .16 |
| .4 t_0 | .12 |

*KS-13490, LI OR EQUIV

NOTE:
SHUNTING RESISTOR RT1 WITH RESISTOR R ALSO REDUCES DELAYED HOLD RELEASE TIME. WHEN THE DELAYED HOLD RELEASE FEATURE IS REQUIRED, RESISTOR R SHOULD NOT BE USED TO SHUNT RT1.

| 103. RECORD OF FIGURES, WIRING, AND APPARATUS CHANGES | | | | | | |
|---|-------------------------------|----------------------|----------|----------------|-------|----|
| CHANGED ON ISS | IF JOB RECORDS DO NOT SPECIFY | THIS OPTION WAS FURN | SEE NOTE | USE IN CIRCUIT | | |
| | | | | STD | A & M | MD |
| | | | | | | |

WORKING LIMITS

| MINIMUM RINGING VOLTAGE | MINIMUM LEAKAGE RESISTANCE (KΩ) | MAXIMUM NO. OF RINGERS | | | |
|-------------------------|---------------------------------|------------------------------|------|------|------|
| | | 0 | 1 | 2 | 3 |
| | | MAXIMUM RINGING RANGE (OHMS) | | | |
| 65 | 10 | 2250 | 1625 | 1150 | 850 |
| 72 | 10 | 3375 | 2250 | 1600 | 1250 |
| 80 | 10 | 4350 | 2750 | 2250 | 1625 |
| 84 | 10 | 5000 | 2875 | 2375 | 1850 |
| 84 | 20 | 6600 | 3750 | 2500 | 2100 |

CO OR PBX LINE CIRCUIT

SD-69617-01-DI

BELL TELEPHONE LABORATORIES INCORPORATED

DWG DES 3S

PRINTED IN U.S.A.

CIRCUIT REQUIREMENTS
CO OR PBX LINE CIRCUIT

| APPARATUS | | | | MECH REQ | | | CIRCUIT PREPARATION | | | | TEST SET PREP | SEE TEST NOTE | DIRECT CURRENT FLOW REQ | | | | | REMARKS |
|-----------|------|-----|------|----------|-------------|-----------|---------------------|----------------|----------|----------|---------------|---------------|-------------------------|----------------|----------|-----------|--|---------|
| DESIG | CODE | OPT | FIG. | BSP FIG. | CONT PRESS. | ARM. TRVL | BLOCK OR INSULATE | TEST CLIP DATA | | TEST WDG | | | TEST FOR | AFTER SOAK MA. | TEST MA. | READJ MA. | | |
| | | | | | | | | CONN BAT. | CONN GRD | | | | | | | | | |
| MISC | 400E | KTU | | | | | | | | | | | | | | | | |
| A | MA19 | | 1 | | | | | U | GRD | | 3 | | 0 | | 17.0 | | | |
| B | MB16 | | 1 | | | | | L | U | B/G | 1,2 | | 0 | | 20.0 | | | |
| | | | | | | | | L | U | B/G | 1,2 | | R | | 1.2 | | | |
| C | MB23 | | 1 | | | | | U | L | B/G | 1,2 | | 0 | | 21.0 | | | |
| | | | | | | | | U | L | B/G | 1,2 | | H | | 7.5 | | | |
| | | | | | | | | U | L | B/G | 1 | | NO | | 11.8 | | | |
| L | 327F | | 1 | | | | | 3 | 1 | B/G | 1 | P | 0 | | 13.5 | | | |
| | | | | | | | | 3 | 1 | B/G | 1 | P | NO | | 7.4 | | | |
| | | | | | | | | 3 | 1 | B/G | 1 | P | R | | 1.4 | | | |
| | | | | | | | | 1 | 6 | B/G | 1 | P/S | 0 | | 3.3 | | | |

TEST NOTES:

1. THE CURRENT FLOW INFORMATION LISTED APPLIES ONLY WHEN THE RELAY TO BE TESTED IS REMOVED FROM THE PRINTED WIRING BOARD.
2. TO TEST RELAY ON AN IN-CIRCUIT BASIS CONTROL THE LOCAL DC CIRCUIT VOLTAGE -20V AND TEST RELAY OPERATION ON BUSY AND HOLD CONDITION. PROPER RELAY PERFORMANCE UNDER THIS CONDITION INDICATES SATISFACTORY RELAY ADJUSTMENT.
3. OPEN LEAD A TO TELEPHONE SETS.

| | | |
|---|----|-------------------|
| CO OR PBX LINE CIRCUIT | | SD-69617-01-F1 |
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