

R E S T R I C T E D

ELECTRICAL AND MECHANICAL  
ENGINEERING REGULATIONS  
(By Command of the Army Council)

TELECOMMUNICATIONS  
F 382  
Part 2

WIRELESS SET, NO 31, MK 2

TECHNICAL HANDBOOK - FAULT FINDING AND REPAIR DATA

Table 2001 - Components

| Circuit reference | Value | Tolerance and rating | Type             | Location         |                 |
|-------------------|-------|----------------------|------------------|------------------|-----------------|
|                   |       |                      |                  | Circuit Fig 2003 | Layout Fig 2005 |
| RESISTORS - FIXED |       |                      |                  |                  |                 |
| R1                | 220Ω  | 10% 1/4W             | comp grade 2 ins | B1               | L4              |
| R2                | 1MΩ   | 10% 1/4W             | comp grade 2 ins | B3               | J3              |
| R3                | 220kΩ | 10% 1/4W             | comp grade 2 ins | B3               | JK4             |
| R4                | 220Ω  | 10% 1/4W             | comp grade 2 ins | BC1              | J3              |
| R5                | 220Ω  | 10% 1/4W             | comp grade 2 ins | C12              | JK34            |
| R6                | 1MΩ   | 10% 1/4W             | comp grade 2 ins | C3               | G3              |
| R7                | 220kΩ | 10% 1/4W             | comp grade 2 ins | C3               | G34             |
| R8                | 2.2kΩ | 10% 1/4W             | comp grade 2 ins | D1               | FG3             |
| R9                | 10kΩ  | 10% 1/4W             | comp grade 2 ins | E1               | J6              |
| R10               | 68kΩ  | 10% 1/4W             | comp grade 2 ins | E3               | H56             |
| R11               | 5.6kΩ | 10% 1/4W             | comp grade 2 ins | E1               | J6              |
| R12               | 2.7kΩ | 10% 1/4W             | comp grade 2 ins | EF1              | FG6             |
| R13               | 5.6kΩ | 10% 1/4W             | comp grade 2 ins | FG1              | G6              |
| R14               | 22kΩ  | 10% 1/4W             | comp grade 2 ins | G3               | G6              |
| R15               | 15kΩ  | 10% 1/4W             | comp grade 2 ins | G3               | F6              |
| R16               | 1MΩ   | 10% 1/4W             | comp grade 2 ins | G3               | H6              |
| R17               | 2.2kΩ | 10% 1/4W             | comp grade 2 ins | H1               | F6              |
| R18               | 100kΩ | 10% 1/4W             | comp grade 2 ins | H2               | E6              |
| R19               | 470kΩ | 10% 1/4W             | comp grade 2 ins | H3               |                 |
| R20               | 56kΩ  | 10% 1/4W             | comp grade 2 ins | J3               | E5              |
| R21               | 330Ω  | 10% 1/4W             | comp grade 2 ins | JK3              | GH3             |
| R22               | 1MΩ   | 10% 1/4W             | comp grade 2 ins | A7               | M67             |
| R23               | 1MΩ   | 10% 1/4W             | comp grade 2 ins | A6               | M3              |
| R24               | 680kΩ | 10% 1/4W             | comp grade 2 ins | A67              | L3              |
| R25               | 10kΩ  | 10% 1/4W             | comp grade 2 ins | B5               | L45             |
| R26               | 100kΩ | 10% 1/4W             | comp grade 2 ins | BC5              | LM4             |
| R27               | 3.3MΩ | 10% 1/4W             | comp grade 2 ins | C67              | K6              |
| R28               | 22kΩ  | 10% 1/4W             | comp grade 2 ins | C5               | L7              |
| R29               | 220kΩ | 10% 1/4W             | comp grade 2 ins | CD67             |                 |
| R30               | 10kΩ  | 10% 1/4W             | comp grade 2 ins | D5               | L7              |
| R31               | 120kΩ | 10% 1/4W             | comp grade 2 ins | DE5              | L6              |
| R32               | 220kΩ | 10% 1/4W             | comp grade 2 ins | E67              |                 |
| R33               | 47kΩ  | 10% 1/4W             | comp grade 2 ins | E5               | K7              |
| R34               | 220kΩ | 10% 1/4W             | comp grade 2 ins | F67              |                 |
| R35               | 10kΩ  | 10% 1/4W             | comp grade 2 ins | F5               | H7              |
| R36               | 1MΩ   | 10% 1/4W             | comp grade 2 ins | G7               |                 |
| R37               | 10kΩ  | 10% 1/4W             | comp grade 2 ins | F7               | K7              |
| R38               | 100kΩ | 10% 1/4W             | comp grade 2 ins | F67              | J7              |
| R39               | 100kΩ | 10% 1/4W             | comp grade 2 ins | F5               | H7              |

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Table 2001 - (contd)

| Circuit reference                  | Value  | Tolerance and rating | Type               | Location         |                 |
|------------------------------------|--------|----------------------|--------------------|------------------|-----------------|
|                                    |        |                      |                    | Circuit Fig 2003 | Layout Fig 2005 |
| <b>RESISTORS - FIXED - (contd)</b> |        |                      |                    |                  |                 |
| R40                                | 100kΩ  | 10% 1/4W             | comp grade 2 ins   | G6               |                 |
| R41                                | 15kΩ   | 10% 1/4W             | comp grade 2 ins   | G5               | F78             |
| R42                                | 1MΩ    | 10% 1/4W             | comp grade 2 ins   | H6               | E8              |
| R43                                | 100kΩ  | 10% 1/4W             | comp grade 2 ins   | H6               |                 |
| R44                                | 22kΩ   | 10% 1/4W             | comp grade 2 ins   | H5               | E7              |
| R45                                | 1MΩ    | 10% 1/4W             | comp grade 2 ins   | J6               | C8              |
| R46                                | 100kΩ  | 10% 1/4W             | comp grade 2 ins   | J67              |                 |
| R47                                | 47kΩ   | 10% 1/4W             | comp grade 2 ins   | J5               | C6              |
| R48                                | 68kΩ   | 10% 1/4W             | comp grade 2 ins   | K5               | C6              |
| R49                                | 470kΩ  | 10% 1/4W             | comp grade 2 ins   | H3               |                 |
| R50                                | 220kΩ  | 10% 1/4W             | comp grade 2 ins   | L5               | CD5             |
| R51                                | 1MΩ    | 10% 1/4W             | comp grade 2 ins   | K7               |                 |
| R52                                | 100kΩ  | 10% 1/4W             | comp grade 2 ins   | L6               | D6              |
| R53                                | 220kΩ  | 10% 1/4W             | comp grade 2 ins   | K6               | D67             |
| R54                                | 39kΩ   | 10% 1/4W             | comp grade 2 ins   | L7               | B4              |
| R67                                | 1MΩ    | 10% 1/4W             | comp grade 2 ins   | L7               | B5              |
| R70                                | 270Ω   | 10% 1/4W             | comp grade 2 ins   | M5               | G7              |
| R71                                | 39Ω    | 5% 1.1/2W            | wirewound          | NO4              | K3              |
| R72                                | 27Ω    | 5% 1.1/2W            | wirewound          | M4               |                 |
| <b>RESISTORS - VARIABLE</b>        |        |                      |                    |                  |                 |
| RV1                                | 500kΩ  | 20% 3/4W             | composition        | L6               |                 |
| <b>CAPACITORS</b>                  |        |                      |                    |                  |                 |
| C1                                 | 680pF  | +100% -0% 500V       | ceramic            | A2               |                 |
| C2                                 | 100pF  | 5% 750V              | ceramic tub ins    | A2               | L3              |
| C3                                 | 18pF   | 5% 750V              | ceramic tub ins    | B2               | L4              |
| C4                                 | 0.01μF | 20% 200V             | pap tub ins        | B2               | K4              |
| C5                                 | 200pF  | 5% 500V              | silvd cerm tub     | B2               | KL4             |
| C6                                 | 0.01μF | 20% 350V             | pap tub ins        | B3               | JK3             |
| C7                                 | 5-12pF |                      | trimmer            | B2               | KL45            |
| C8                                 | 7-36pF |                      | gang               | B2               |                 |
| C9                                 | 680pF  | +100% -0% 500V       | ceramic            | C4               | K34             |
| C10                                | 100pF  | 5% 750V              | ceramic tub ins    | C2               | J3              |
| C11                                | 16pF   | +0.5pF 750V          | cerm temp comp ins | C2               | J4              |
| C12                                | 0.01μF | 20% 200V             | pap tub ins        | C2               | HJ45            |
| C13                                | 200pF  | 5% 500V              | silvd cerm tub     | C2               | J4              |
| C14                                | 5-12pF |                      | trimmer            | C2               | J45             |
| C15                                | 15pF   | 5% 750V              | cerm tub ins       | C2               |                 |
| C16                                | 0.01μF | 20% 350V             | pap tub ins        | C4               | F3              |
| C17                                | 7-36pF |                      | gang               | C2               |                 |
| C18                                | 680pF  | +100% -0% 500V       | ceramic            | D4               | F34             |
| C19                                | 680pF  | +100% -0% 500V       | ceramic            | D4               | F3              |
| C20                                | 18pF   | 5% 750V              | cerm tub ins       | D2               | G3              |
| C21                                | 15pF   | 5% 750V              | cerm tub ins       | E2               | J56             |
| C22                                | 0.01μF | 20% 200V             | pap tub ins        | E2               | J56             |

Table 2001 - (contd)

| Circuit reference    | Value  | Tolerance and rating | Type             | Location         |                 |
|----------------------|--------|----------------------|------------------|------------------|-----------------|
|                      |        |                      |                  | Circuit Fig 2003 | Layout Fig 2005 |
| CAPACITORS - (contd) |        |                      |                  |                  |                 |
| C23                  | 5-12pF |                      | trimmer          | E2               | H45             |
| C24                  | 7-36pF |                      | gang             | E2               |                 |
| C25                  | 0.01μF | 20% 200V             | pap tub ins      | E4               | J6              |
| C26                  | 0.01μF | 20% 350V             | pap tub ins      | EF4              | FG6             |
| C27                  | 7-36pF |                      | gang             | F2               |                 |
| C28                  | 5-12pF |                      | trimmer          | F2               | G45             |
| C29                  | 9pF    | +0.5pF 750V          | cerm tub non-ins | F2               | GH5             |
| C30                  | 100pF  | 5% 750V              | cerm tub ins     | F2               | GH6             |
| C31                  | 0.01μF | 20% 200V             | pap tub ins      | F2               | G56             |
| C32                  | 100pF  | 5% 750V              | cerm tub ins     | G4               | G6              |
| C33                  | 27pF   | 5% 750V              | cerm tub ins     | G3               | F67             |
| C34                  | 0.01μF | 20% 350V             | pap tub ins      | G4               | H6              |
| C35                  | 0.01μF | 20% 350V             | pap tub ins      | H4               | EF56            |
| C36                  | 0.01μF | 20% 350V             | pap tub ins      | H4               | EF7             |
| C37                  | 0.01μF | 20% 350V             | pap tub ins      | J3               |                 |
| C38                  | 0.01μF | 20% 350V             | pap tub ins      | A7               | M3              |
| C39                  | 15pF   | 5% 750V              | cerm tub ins     | B5               | L5              |
| C40                  | 200pF  | 5% 500V              | silvd cerm tub   | B5               | L5              |
| C41                  | 5-12pF |                      | trimmer          | B5               | LM45            |
| C42                  | 100pF  | 5% 750V              | cerm tub ins     | B6               | K5              |
| C43                  | 7-36pF |                      | gang             | B5               |                 |
| C44                  | 0.01μF | 20% 350V             | pap tub ins      | BC7              | LM45            |
| C45                  | 25pF   | 5% 500V              | silvd cerm tub   | C5               |                 |
| C46                  | 0.01μF | 20% 200V             | pap tub ins      | C5               |                 |
| C47                  | 100pF  | 5% 750V              | cerm tub ins     | C6               |                 |
| C48                  | 25pF   | 5% 500V              | silvd cerm tub   | D5               |                 |
| C49                  | 0.01μF | 20% 200V             | pap tub ins      | D5               |                 |
| C50                  | 0.01μF | 20% 200V             | pap tub ins      | DE7              | M7              |
| C51                  | 100pF  | 5% 750V              | cerm tub ins     | E6               |                 |
| C52                  | 25pF   | 5% 500V              | silvd cerm tub   | E5               |                 |
| C53                  | 0.01μF | 20% 200V             | pap tub ins      | E7               |                 |
| C54                  | 100pF  | 5% 750V              | cerm tub         | E6               |                 |
| C55                  | 25pF   | 5% 500V              | silvd cer tub    | F5               |                 |
| C56                  | 0.01μF | 20% 200V             | pap tub ins      | F7               | JK7             |
| C57                  | 68pF   | 2% 750V              | cerm tub ins     | F6               | J78             |
| C58                  | 100pF  | 5% 750V              | cerm tub ins     | G6               |                 |
| C59                  | 0.01μF | 20% 200V             | pap tub ins      | G4               |                 |
| C60                  | 0.01μF | 20% 200V             | pap tub ins      | G5               |                 |
| C61                  | 25pF   | 5% 500V              | silvd cerm tub   | G5               |                 |
| C62                  | 0.01μF | 20% 200V             | pap tub ins      | H7               |                 |
| C63                  | 100pF  | 5% 750V              | cerm tub ins     | H6               |                 |
| C64                  | 0.01μF | 20% 200V             | pap tub ins      | H7               | E78             |
| C65                  | 25pF   | 5% 500V              | silvd cerm tub   | H5               |                 |
| C66                  | 0.01μF | 20% 200V             | pap tub ins      | J7               |                 |
| C67                  | 100pF  | 5% 750V              | cerm tub ins     | J6               |                 |
| C68                  | 0.01μF | 20% 200V             | pap tub ins      | J7               | C78             |

Table 2001 - (contd)

| Circuit reference          | Value   | Tolerance and rating | Type               | Location         |                 |
|----------------------------|---------|----------------------|--------------------|------------------|-----------------|
|                            |         |                      |                    | Circuit Fig 2003 | Layout Fig 2005 |
| CAPACITORS - (contd)       |         |                      |                    |                  |                 |
| C69                        | 25pF    | 5% 500V              | silvd cerm tub ins | K5               |                 |
| C70                        | 0.01μF  | 20% 200V             | pap tub ins        | J5               |                 |
| C71                        | 0.01μF  | 20% 200V             | pap tub ins        | K7               | BC67            |
| C72                        | 50pF    | 10% 750V             | cerm tub ins       | K6               |                 |
| C73                        | 100pF   | 5% 500V              | silvd cerm tub     | K5               |                 |
| C74                        | 100pF   | 5% 500V              | silvd cerm tub     | K6               |                 |
| C75                        | 10pF    | 10% 750V             | cerm tub ins       | L5               |                 |
| C76                        | 0.005μF | 20% 500V             | pap tub ins        | L5               | D4              |
| C77                        | 0.01μF  | 20% 350V             | pap tub ins        | K7               |                 |
| C78                        | 0.01μF  | 20% 350V             | pap tub ins        | L6               | BC4             |
| C79                        | 100pF   | 5% 750V              | cerm tub ins       | K7               | E6              |
| C85                        | 0.01μF  | 20% 350V             | pap tub ins        | L7               | BC4             |
| C90                        | 0.01μF  | 20% 200V             | pap tub ins        | N7               | M34             |
| C91                        | 0.01μF  | 20% 350V             | pap tub ins        | M7               | D56             |
| C92                        | 0.01μF  | 20% 200V             | pap tub ins        | N6               | B78             |
| C93                        | 0.01μF  | 20% 350V             | pap tub ins        | MN6              | K6              |
| C94                        | 0.01μF  | 20% 350V             | pap tub ins        | O6               | CD7             |
| C95                        | 0.05μF  | 25% 250V             | pap tub ins        | NO6              | C6              |
| C96                        | 0.01μF  | 20% 350V             | pap tub ins        | N6               | KL7             |
| C97                        | 0.01μF  | 20% 200V             | pap tub ins        | N6               | LM78            |
| C98                        | 0.01μF  | 20% 200V             | pap tub ins        | M6               | H8              |
| C99                        | 0.01μF  | 20% 200V             | pap tub ins        | N5               | D6              |
| C100                       | 0.01μF  | 20% 200V             | pap tub ins        | N5               | LM6             |
| C101                       | 0.01μF  | 20% 200V             | pap tub ins        | O5               | F8              |
| C102                       | 0.01μF  | 20% 200V             | pap tub ins        | N5               | G7              |
| C103                       | 0.01μF  | 20% 200V             | pap tub ins        | N5               | H4              |
| C104                       | 0.01μF  | 20% 350V             | pap tub ins        | M4               | H4              |
| C105                       | 0.01μF  | 20% 350V             | pap tub ins        | N4               | J3              |
| C106                       | 22pF    | 5% 750V              | cerm tub ins       | F6               | HL7             |
| INDUCTORS AND TRANSFORMERS |         |                      |                    |                  |                 |
| L1                         |         |                      | inductor           | AB2              | L4              |
| L2                         |         |                      | inductor           | C2               | J4              |
| L3                         |         |                      | inductor           | C23              |                 |
| L4                         |         |                      | inductor           | G2               | G6              |
| L5                         |         |                      | inductor           | G3               | G6              |
| L6                         |         |                      | inductor           | A5               | L5              |
| L7                         |         |                      | inductor           | C5               |                 |
| L8                         |         |                      | inductor           | D5               |                 |
| L9                         |         |                      | inductor           | E5               |                 |
| L10                        |         |                      | inductor           | F5               |                 |
| L11                        |         |                      | inductor           | G5               |                 |
| L12                        |         |                      | inductor           | H5               |                 |
| L13                        |         |                      | inductor           | J5               |                 |
| L14                        |         |                      | inductor           | K6               |                 |
| L17                        | 25μH    | 10%                  | r.f. choke         | M7               | D6              |

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Table 2001 - (contd)

| Circuit reference                    | Value      | Tolerance and rating | Type                                    | Location         |                 |
|--------------------------------------|------------|----------------------|---|------------------|-----------------|
|                                      |            |                      |   | Circuit Fig 2003 | Layout Fig 2005 |
| INDUCTORS AND TRANSFORMERS - (contd) |            |                      |   |                  |                 |
| L18                                  | 25 $\mu$ H | 10%                  | r.f. choke                              | N6               | C78             |
| L19                                  | 25 $\mu$ H | 10%                  | r.f. choke                              | M6               | K6              |
| L20                                  | 25 $\mu$ H | 10%                  | r.f. choke                              | M6               | K7              |
| L21                                  | 25 $\mu$ H | 10%                  | r.f. choke                              | N6               | L78             |
| L22                                  | 25 $\mu$ H | 10%                  | r.f. choke                              | N5               | LM56            |
| L23                                  | 25 $\mu$ H | 10%                  | r.f. choke                              | M5               | L6              |
| L24                                  | 25 $\mu$ H | 10%                  | r.f. choke                              | N5               | G78             |
| L25                                  | 25 $\mu$ H | 10%                  | r.f. choke                              | M5               | D78             |
| L26                                  |            |                      | goalpost inductor                       | G2               | EFG6            |
| TR1                                  |            |                      | coupling trans                          | D2               | J5              |
| TR2                                  |            |                      | microphone trans                        | J3               | E5              |
| TR3                                  |            |                      | output trans                            | L5               | E4              |
| RELAYS AND SWITCHES                  |            |                      |   |                  |                 |
| RLA                                  |            |                      | relay, magnetic, min, sealed, HS, SM8-1 | L34              | C4              |
| SWB1                                 |            |                      | calibration switch                      | N4               |                 |
| SWB2                                 |            |                      | calibration switch                      | D1               |                 |
| SW3-1                                |            |                      | on/off, DPDT switch                     | K2               |                 |
| SW3-2                                |            |                      | on/off, DPDT switch                     | K1               |                 |
| LAMPS                                |            |                      |   |                  |                 |
| LP1                                  | 3.5V       | 0.15A                | dial calibration light                  | M4               |                 |
| PLUGS AND SOCKETS                    |            |                      |   |                  |                 |
| PL1                                  |            |                      | plug, 7-pole, fxd, polarised            | L12              | KL8             |
| PL2                                  |            |                      | plug, r.f. sealed                       | A1               | JK2             |
| SK1                                  |            |                      | socket, 6-pt, No 17                     | L23              | D2              |
| SK2/1                                |            |                      | } Valveholder, international octal      | (G34             | M67             |
| SK2/2                                |            |                      |   | (H7              | M67             |
| SK2/3                                |            |                      |   | (J7              | M67             |
| SK2/4                                |            |                      |   | (C3              | M67             |
| SK2/5                                |            |                      |   | (B3              | M67             |
| SK2/6                                |            |                      |   | (A6              | M67             |
| SK2/7                                |            |                      |   | (K7              | M67             |
| SK2/8                                |            |                      |   | (B3              | M67             |
| CRYSTALS                             |            |                      |   |                  |                 |
| XL1                                  | 4.3Mc/s    | 0.01%                | Osc, quartz, 4.3 Mc/s, No 2             | D3               |                 |
| XL2                                  | 6.815Mc/s  | 0.01%                | Osc, quartz, 6.815 Mc/s, No 1           | G6               |                 |

Table 2001 - (contd)

| Circuit reference | Value | Tolerance and rating | Type    | Location         |                 |
|-------------------|-------|----------------------|---------|------------------|-----------------|
|                   |       |                      |         | Circuit Fig 2003 | Layout Fig 2005 |
| VALVES            |       |                      |         |                  |                 |
| V1                |       |                      | CV 807  | B23              | K3              |
| V2                |       |                      | CV 807  | C23              | H3              |
| V3                |       |                      | CV 785  | DE23             | HJ6             |
| V4                |       |                      | CV 785  | FG23             | F6              |
| V5                |       |                      | CV 1758 | H23              | E6              |
| V6                |       |                      | CV 785  | B6               | M3              |
| V7                |       |                      | CV 1758 | C6               | JK6             |
| V8                |       |                      | CV 785  | D6               | M6              |
| V9                |       |                      | CV 785  | E6               | L78             |
| V10               |       |                      | CV 782  | F6               | J78             |
| V11               |       |                      | CV 785  | G6               | FG78            |
| V12               |       |                      | CV 1758 | H6               | DE78            |
| V13               |       |                      | CV 1758 | J6               | BC78            |
| V14               |       |                      | CV 753  | KL6              | CD67            |
| V15               |       |                      | CV 784  | L5               | CD56            |

Table 2002 - Overall check of sender

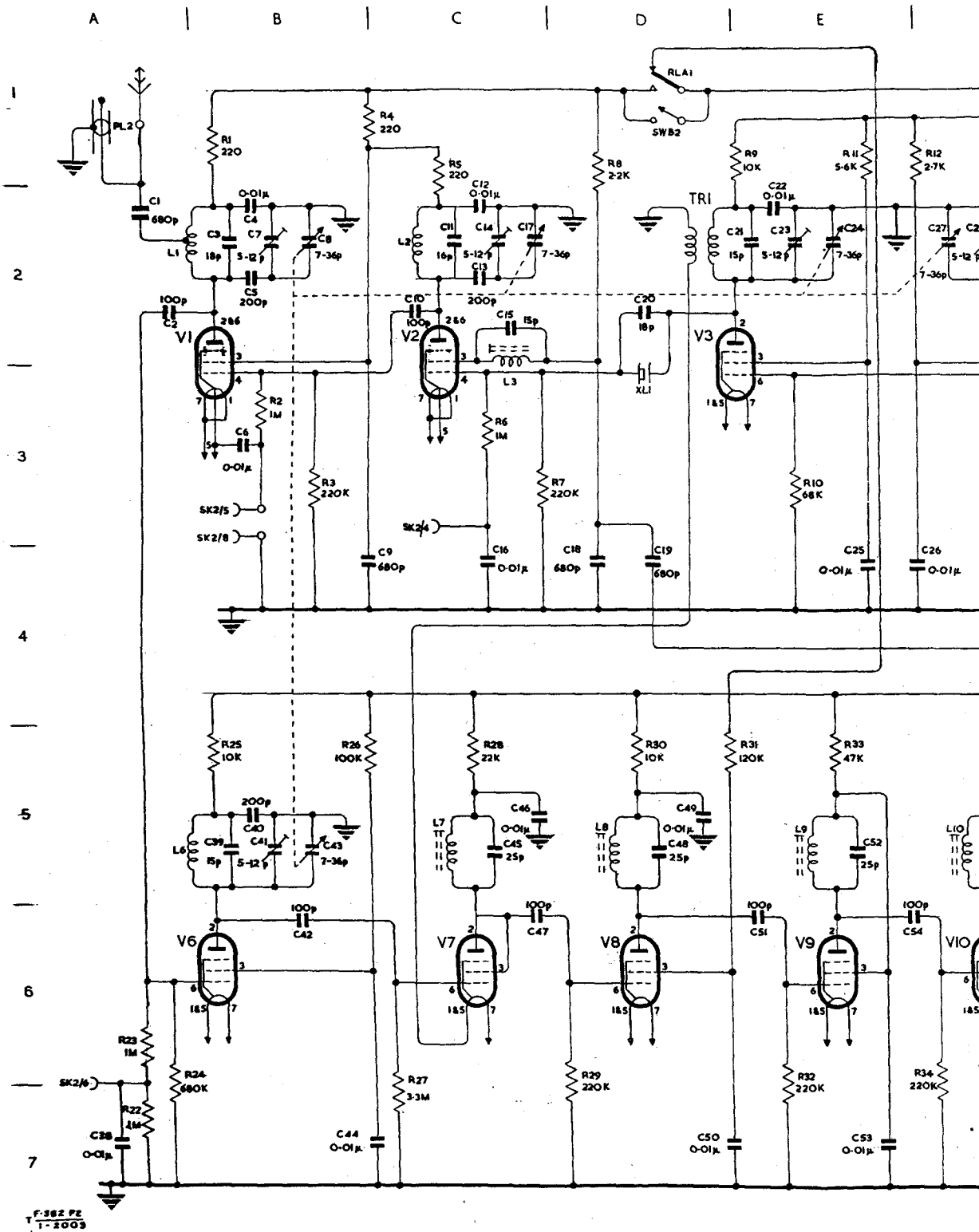
Test conditions

- (i) The set correctly loaded with either the 1/4 wave whip aerial or the Wattmeter, absorption, HF, No 2 via the 52Ω termination and the co-axial socket on the front panel of the set.
- (ii) All measurements taken with a Voltmeter, valve, No 3 between the pin indicated and earth.
- (iii) All measurements taken with the set transmitting at 44Mc/s.

Meter socket (SK2) voltages

| Pin No | Voltage   | Remarks          |
|--------|-----------|------------------|
| 1      | -2.5V min | M.O. grid        |
| 2      | -8V min   | 1st limiter grid |
| 3      | -15V min  | 2nd limiter grid |
| 4      | -17V min  | Oscillator grid  |
| 5      | -10V min  | P.A. grid        |
| 6      | -20V min  | R.F. grid        |
| 7      | +0.4V max | Discriminator    |
| 8      |           | Earth            |

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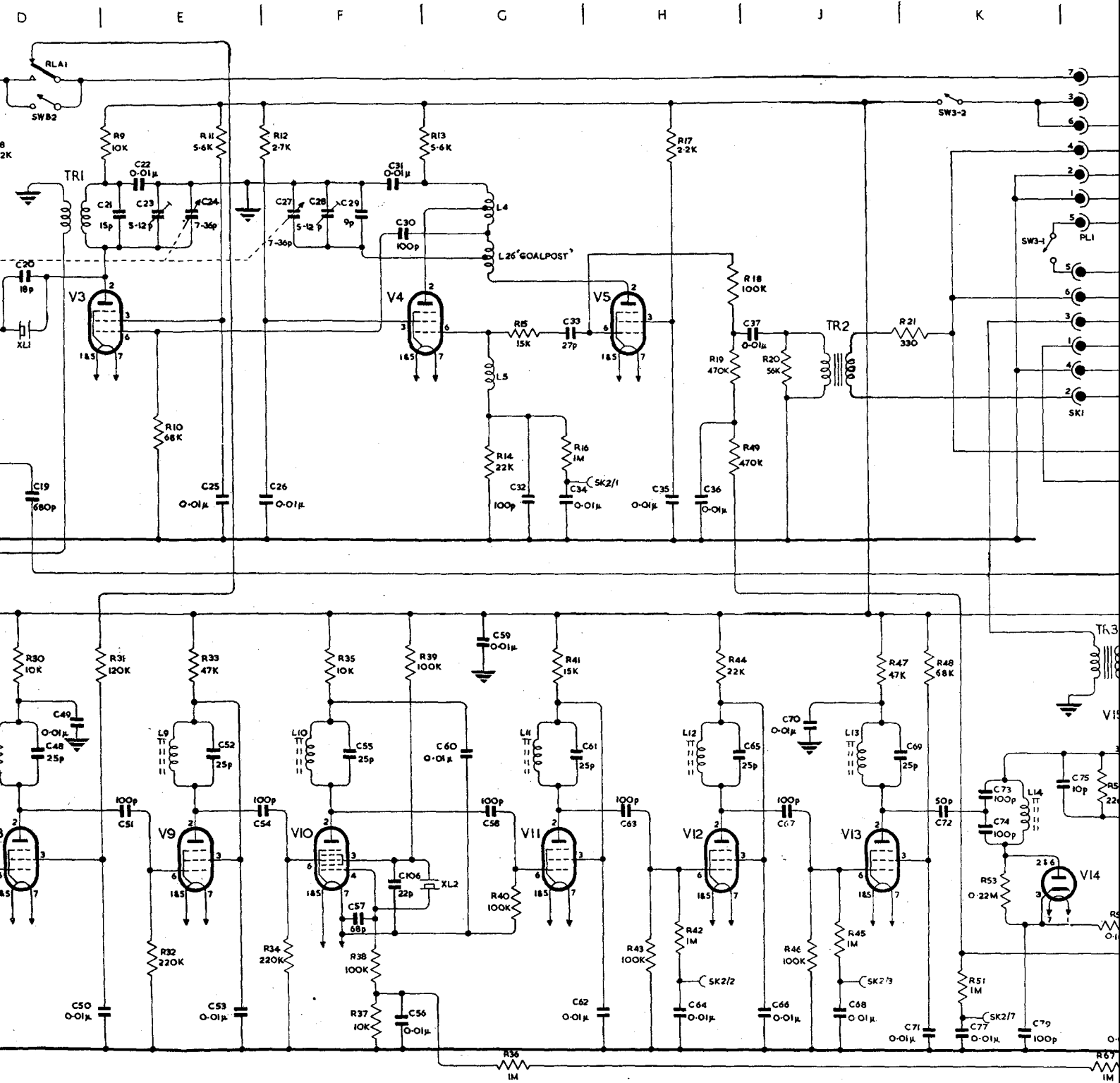
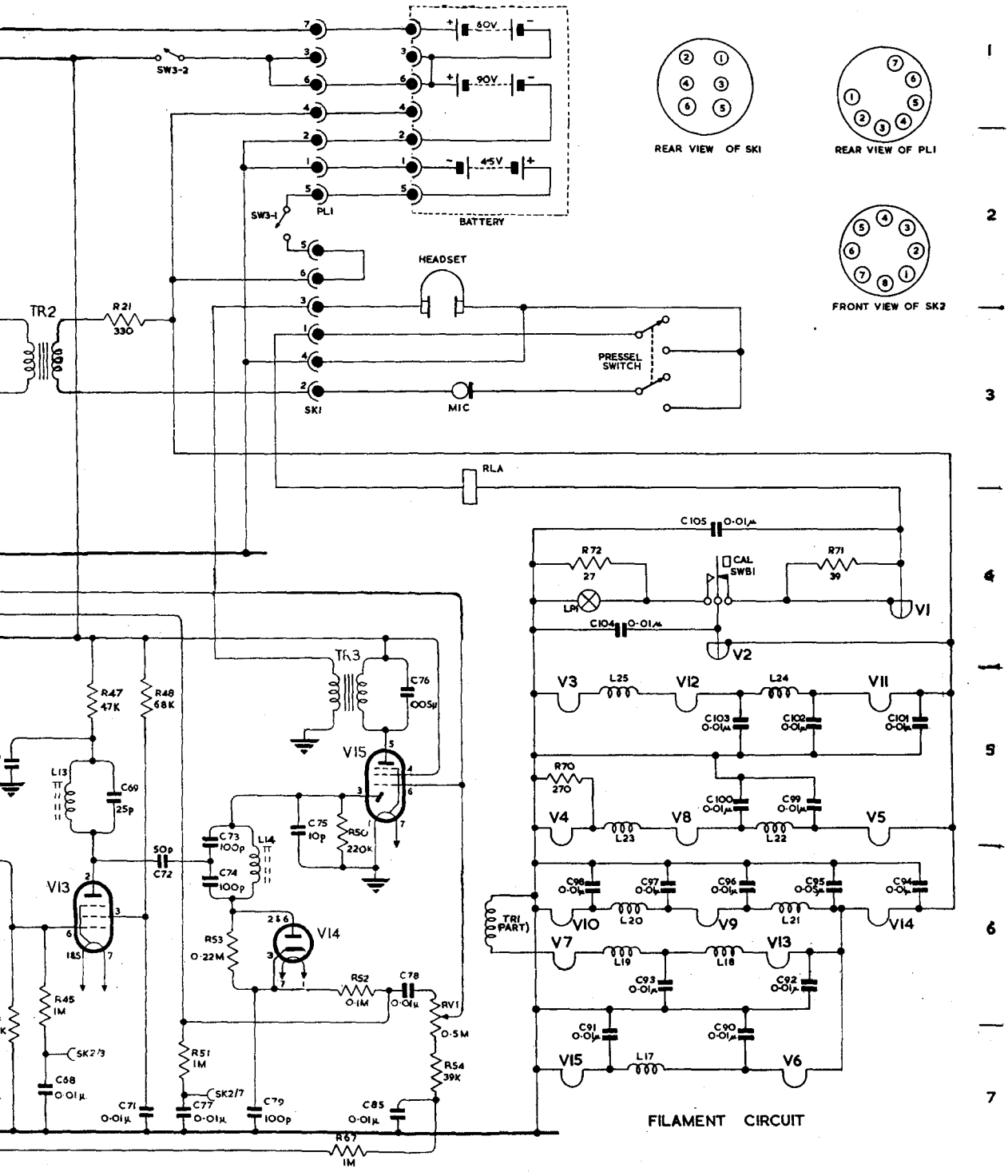


Fig 2003 - Circuit diagram (including Amendment issued 26th Sept 1958)



J | K | L | M | N | O



Amendment issued 26th Sept 1958)



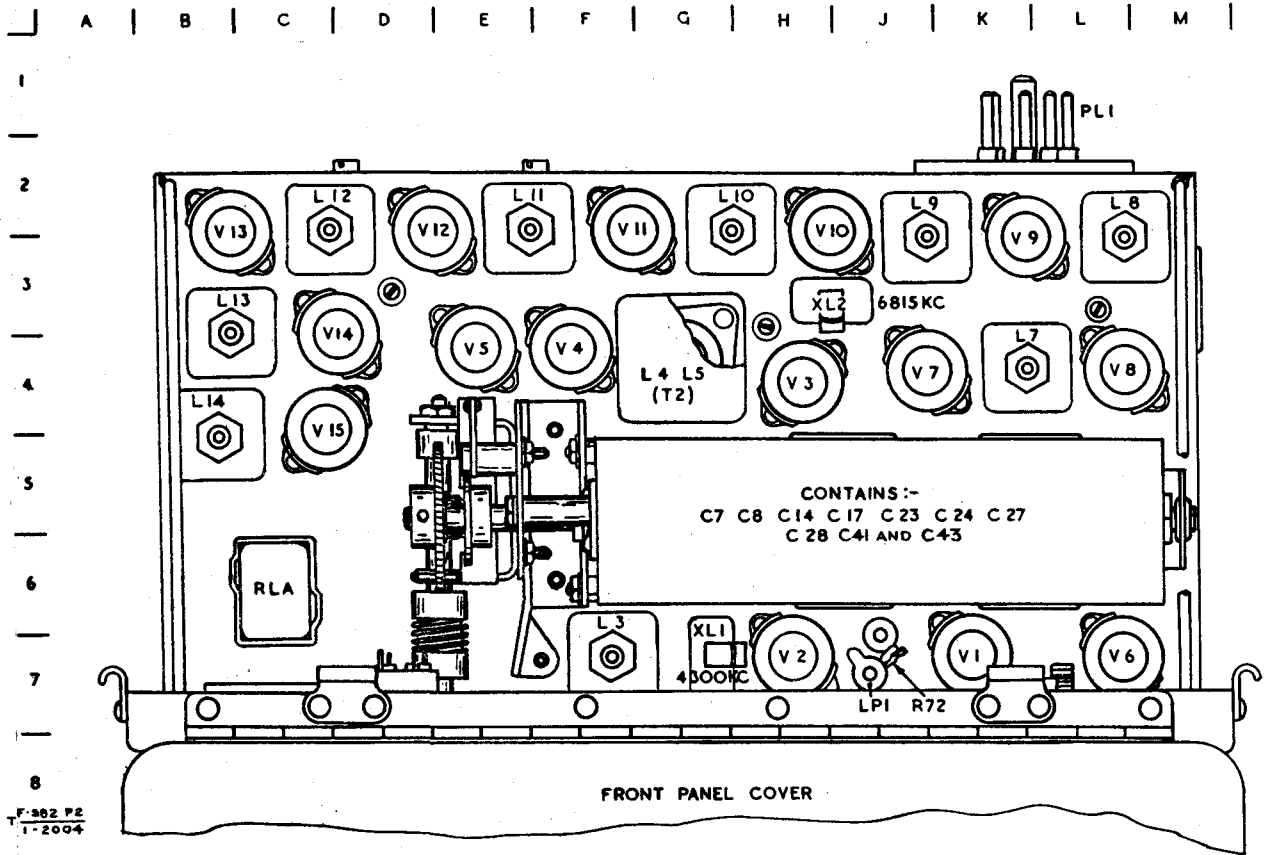
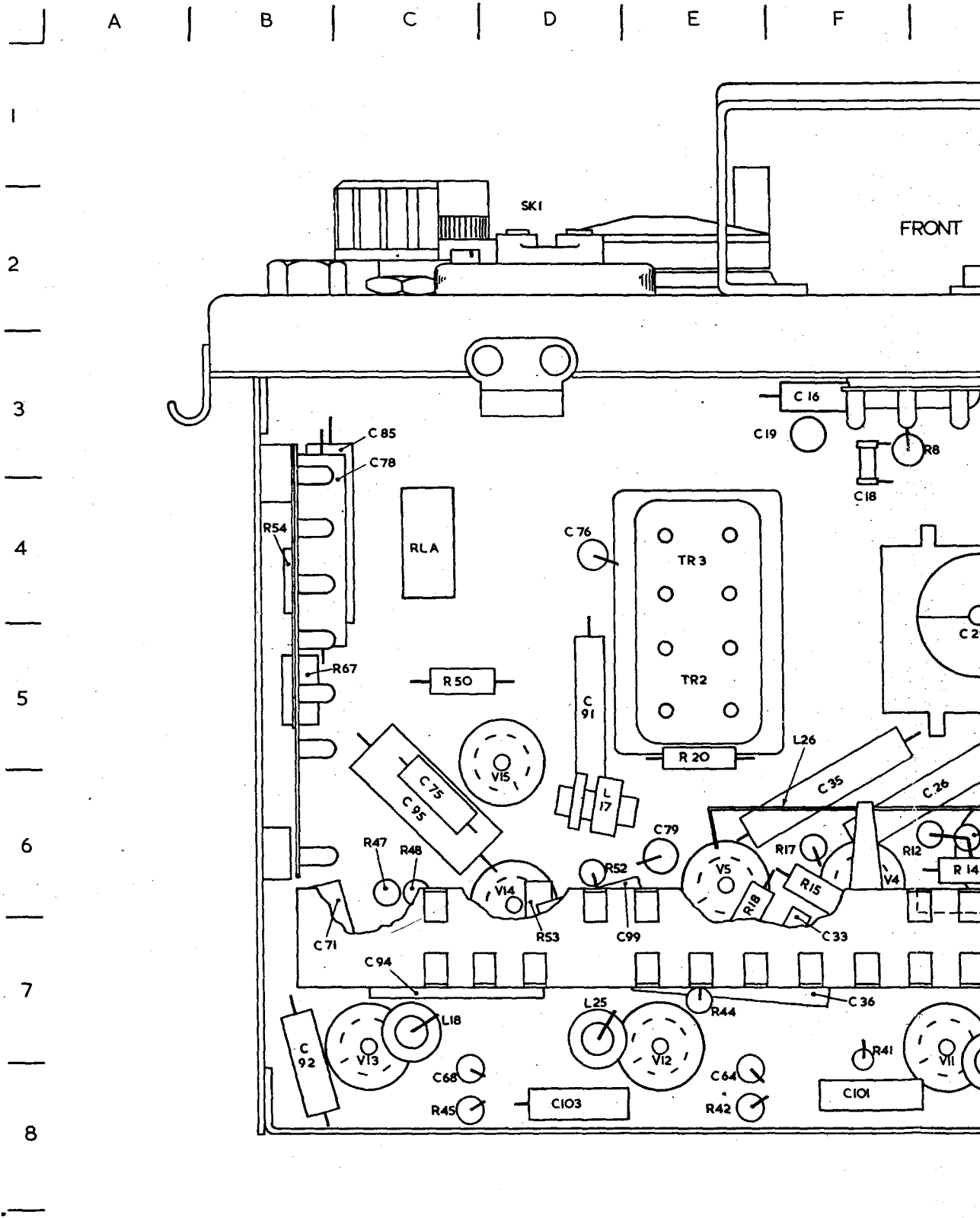


Fig 2004 - Chassis layout - top view





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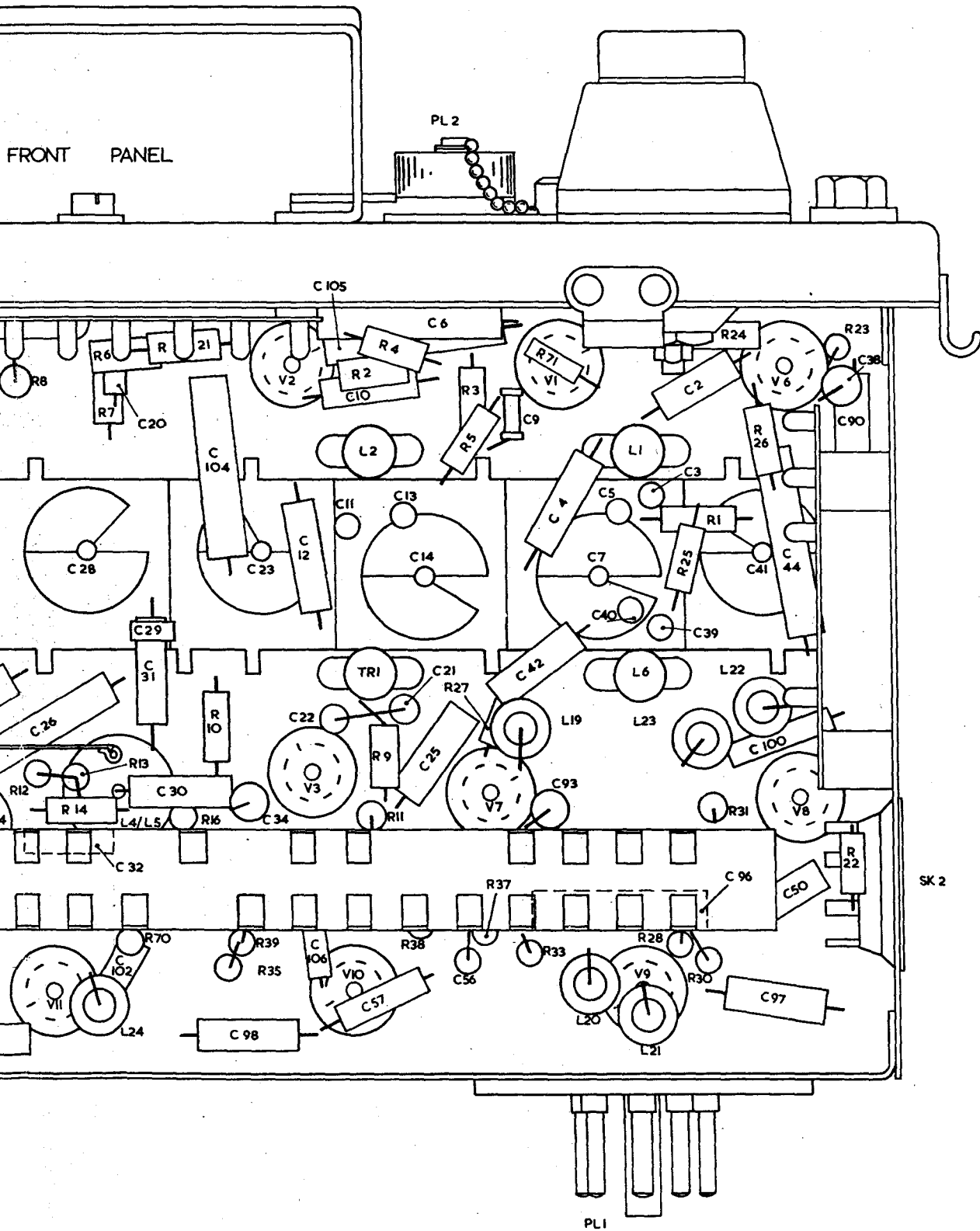
Fig 2005 - Chassis layout

END





| G | H | J | K | L | M | N |



is layout - underside view

END



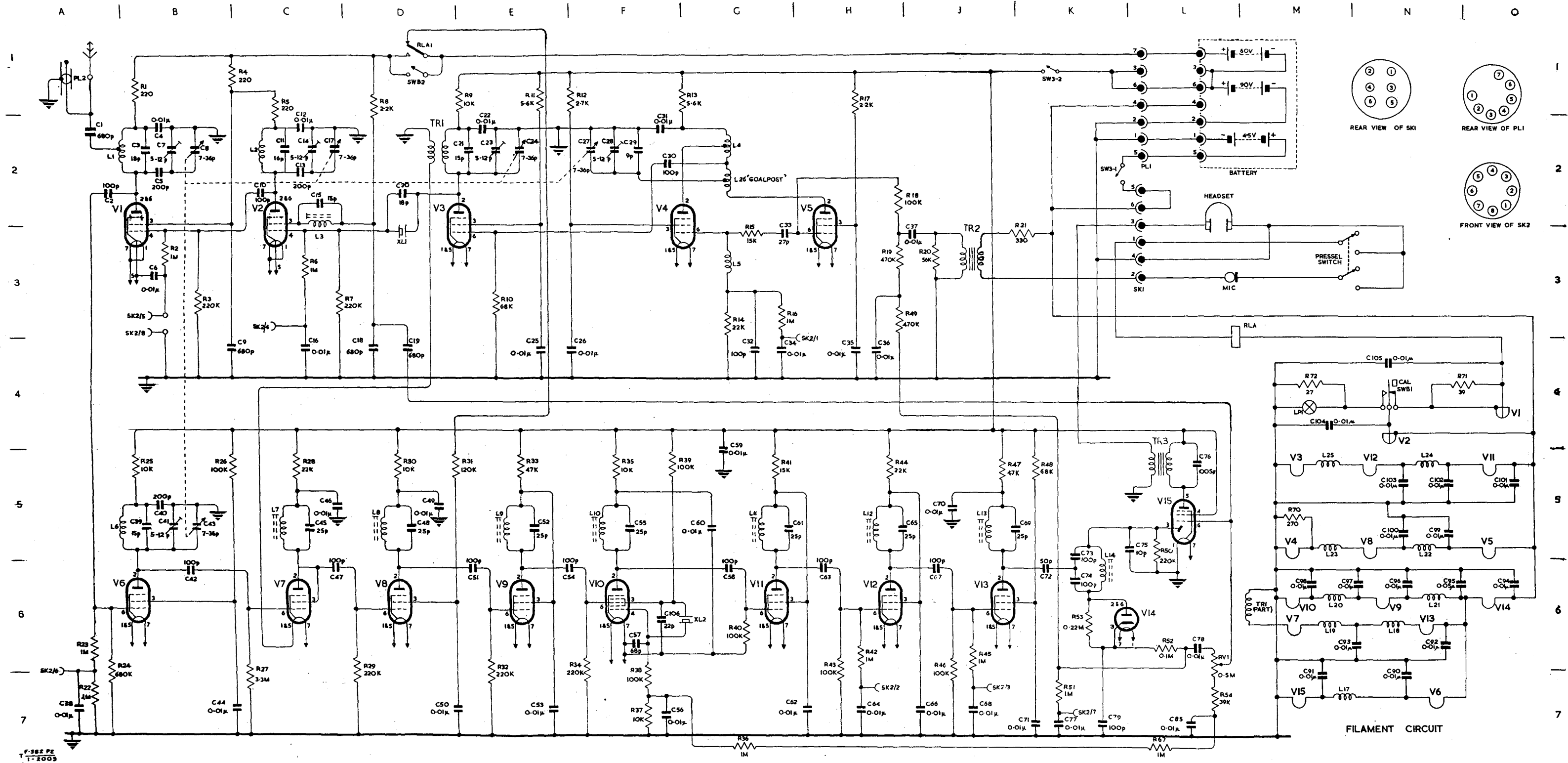
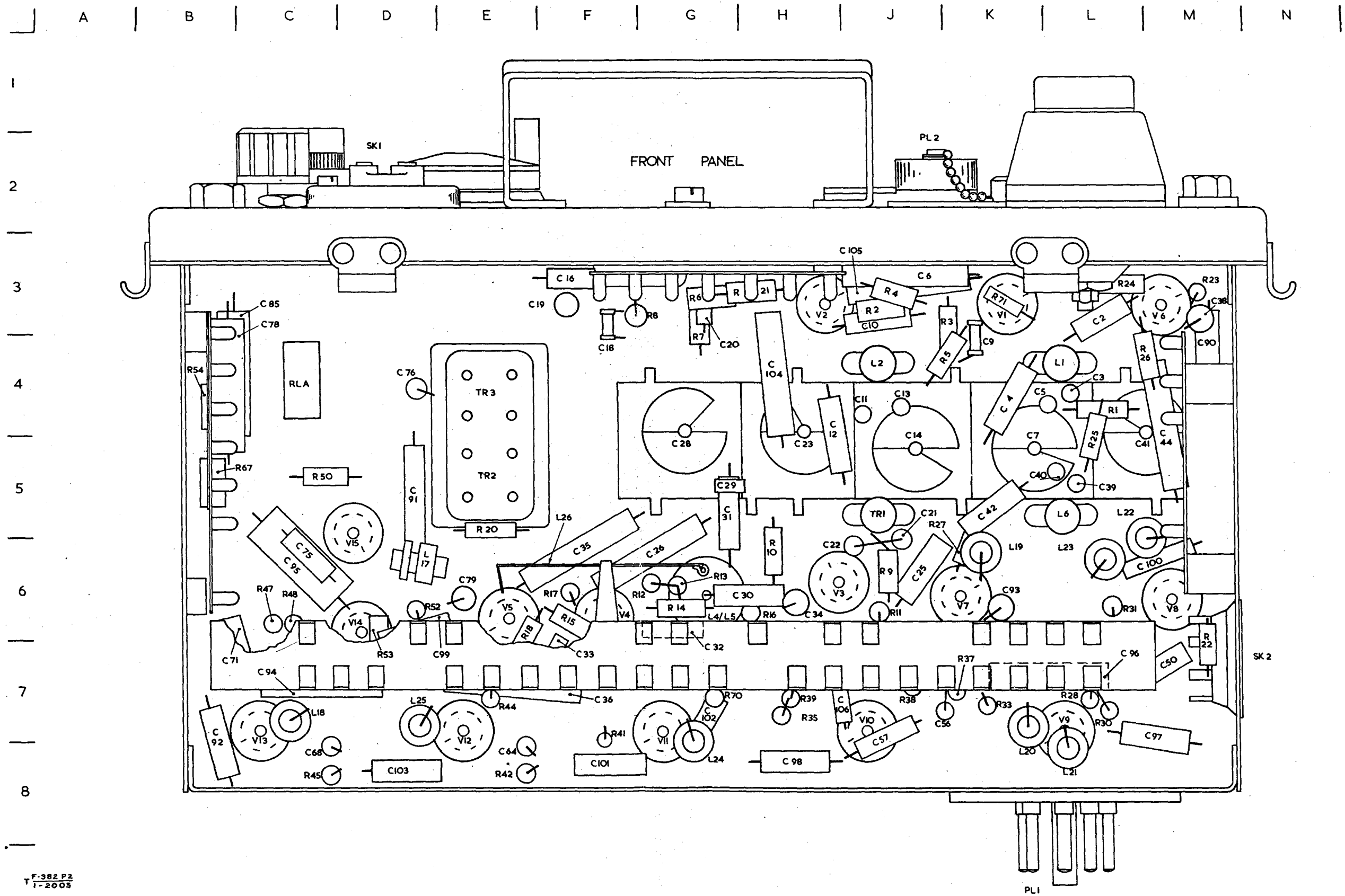


Fig 2003 - Circuit diagram (including Amendment issued 26th Sept 1958)



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Fig 2005 - Chassis layout - underside view

END