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## **Technical Manual** **External Keyboard RE905**

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### **RE INSTRUMENTS AS**

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Made in Denmark

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## 1 GENERAL INFORMATION

This manual provides technical information for the RE905 Keyboard, which is to be used together with the RE201 Dual Channel Audio Analyzer.

### 1.1 Introduction

In many test situations it might be convenient to place the RE201 some distance away from the device under test in order to provide space for test jigs, power supplies, cables etc. The RE905 External Keyboard makes it possible to operate the RE201 from a distance of up to 2.5 m.

The RE905 Keyboard is an exact duplicate of the RE201 internal keyboard and the two keyboards can be operated in parallel.

### 1.2 Installation

When unpacking the Option Board the packing material should be visually inspected for physical damage. If damaged notify the carrier and your local RE INSTRUMENTS representative or the factory. The packing material should be retained for inspection by the carrier in case of complaint.

The RE905 Keyboard is connected to the RE201 Dual Channel Audio Analyzer by inserting the 14 pin connector into the equivalent found at the lower left corner of the RE201. Observe that the RE201 must be switched off during connection and disconnection in order to avoid damage of the electrical circuitry.

### 1.3 Equipment and Accessories

Description	Code No.
RE905 External Keyboard	906-032
Technical Manual	983-283

## 2 PRINCIPLES OF OPERATION

### 2.1 Principles of Operation

The RE905 Keyboard is provided with a 1.56 m coiled cable, which can be extended to approx. 2.5 m. The pin-out of the 14-pin connector of the cable, which matches the connector placed in the lower left corner of the front panel of the RE201, is shown in fig. 2.1.

When the RE905 Keyboard is connected to the RE201 the two keyboards may be used in parallel, the only difference being that the external keyboard uses interrupt line I12, whereas the built-in keyboard uses interrupt line I11.

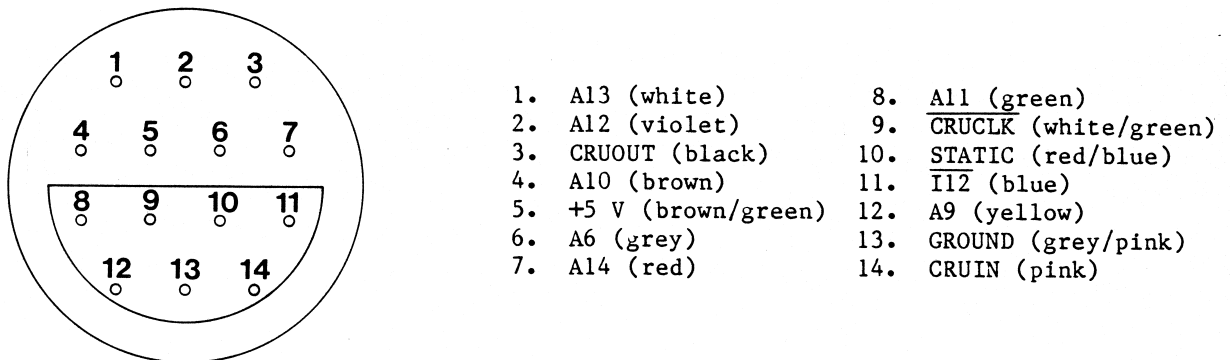


Fig. 2.1 - RE905 Keyboard Connector Pin-out

### 3 CIRCUIT DESCRIPTION

#### 3.1 Circuit Description

The RE905 Internal PC Board (Code No. 901-610) is electrically almost identical to the RE201 internal keyboard (code No. 901-410 - refer to section 3.2.7 of the RE201 Basic Unit Technical Manual). A diagram of the RE905 Keyboard is enclosed (drawing 985-177) and a Block Diagram is found in fig. 3.1.

To prevent electrical damage to the internal C-MOS circuits when the RE905 is connected and disconnected the inputs are - when necessary - provided with TTL buffers (QD9 and QD10).

When you depress one of the 36 push buttons on the RE905 Keyboard an interrupt of the Static CPU, governing the keyboards, is generated by forcing line No. 10 (interrupt line 11) to logic zero. The Static CPU responds by writing a logic 1 to QD8 pin 6. As the address space is common for the internal keyboard and the RE905 Keyboard, a logic 1 is also written to pin 6 on QD8 on the internal keyboard, thus enabling the RE905 Keyboard to transmit data on CRUIN and disabling the internal keyboard. This is used during keyboard scan. A logic zero on QD8 pin 6 will disable the RE905 Keyboard and allow the static CPU to scan the internal keyboard.

When the RE905 Keyboard has been selected the static computer performs a scan of the 36 push buttons (QD1, QD2) and when the depressed button is detected (indicated by a logic 1 on CRUIN) the computer resets the interrupt by toggling pin No. 7 on QD8.

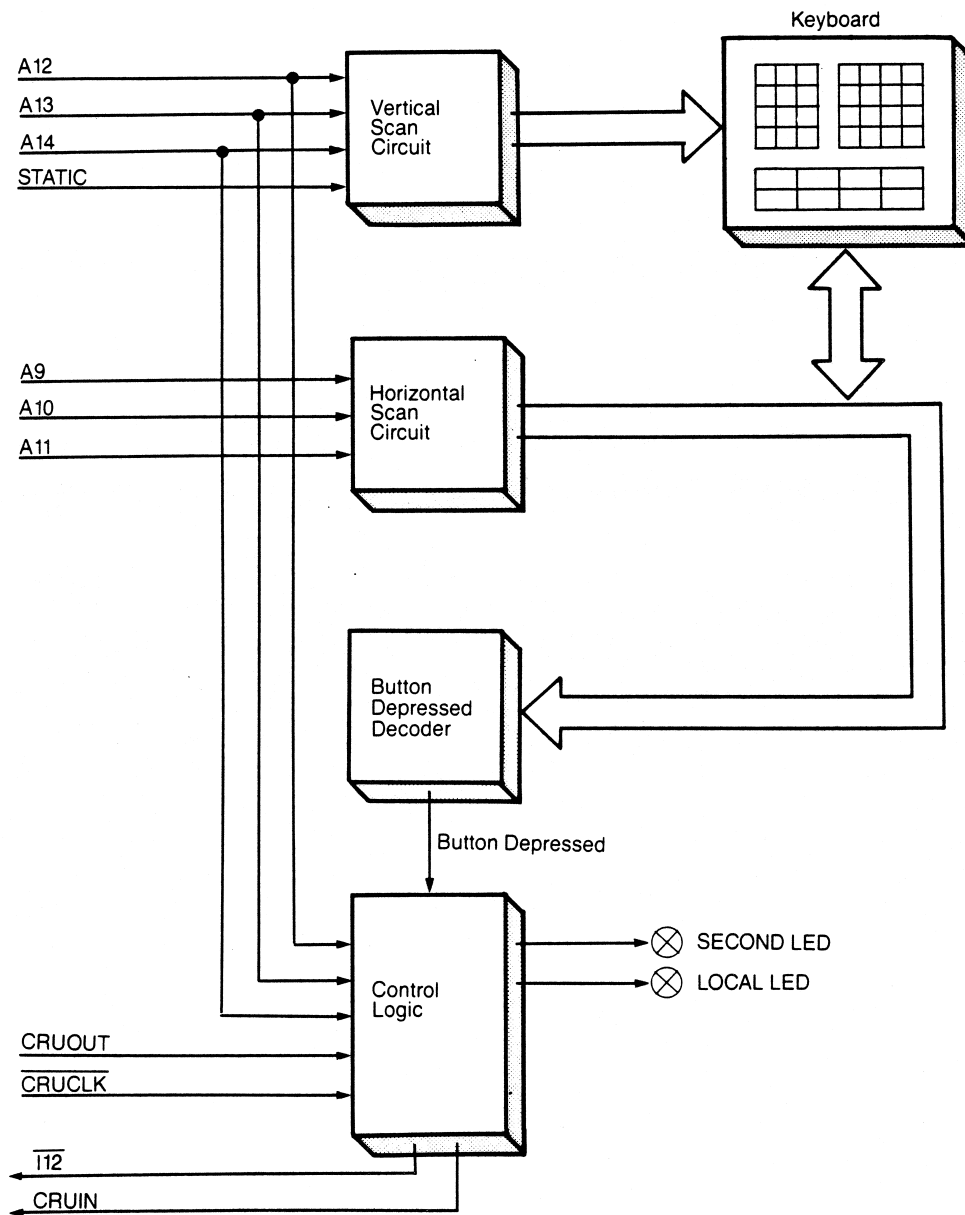


Fig. 3.1 - RE905 Block Diagram

#### 4 PERFORMANCE TEST

##### 4.1 Performance Test

Before the performance test is carried out please observe that:

- \* RE201 should be turned off when the RE905 Keyboard is connected or disconnected to the RE201.
- \* Press buttons until the RE201 reacts (may be 1-2 sec.).
- \* Only buttons on the RE905 Keyboard are used during this test.

The performance test is now carried out as follows:

- a. Connect the RE905 Keyboard to the RE201 and power up the RE201.
- b. Press 'LEARN' and check that the green LED on the RE905 is turned on.
- c. Press function key F1, <SYSTEM>, and check that the RE201 displays 'SYSTEM PARAMS'.
- d. Press the 'cursor down' and 'cursor up' buttons one after another, and check that the cursor (>) moves down and up.
- e. Press '2nd' and 'EXIT' and check that the red LED is lit when '2nd' is pressed and extinguishes when 'EXIT' is activated.
- f. Press function key F5, <BASIC>, and check that the RE201 displays 'BASIC PARAMS'.
- g. Press 'cursor right' and 'cursor left' and check that the cursor moves right and left.
- h. Press 0 - 9 and check that all the digits, when activated, are displayed in the righthanded character field in the brackets.
- i. Press '2nd' and 'EXIT'.
- j. Press function key F2, <FUNCT>, and check that the RE201 displays 'ENTER FUNCTION'.
- k. Press '2nd' and 'EXIT'.
- l. Press function key F6, <DEFLT>, and check that the RE201 displays 'ENTER FUNCTION'.



- m. Press '2nd' and 'EXIT'.
- n. Press function key F3, <SEQUEN>, and check that the RE201 displays 'ENTER SEQUENCE NUMBER'.
- o. Press '2nd' and 'EXIT'.
- p. Press function key F7, <SETUP>, and check that the RE201 displays 'ENTER SETUP NUMBER'.
- q. Press '2nd' and 'EXIT'.
- r. Press function key F4, <PROGRAM>, and check that the RE201 displays 'SELECT USING SOFTKEY'.
- s. Press '2nd' and 'EXIT' and '2nd' and 'EXIT'.
- t. Press one by one: THD, IM, DFIM, TIM, PHASE, FREQ, SEP, LEV. Check that the RE201 starts executing each measurement when the appropriate key is activated.
- u. Press '2nd' and 'TEST' and check that the RE201 performs a self-test.
- v. Press 'COPY' and check that the RE201 displays 'PRINTER NOT READY' or 'PRINTING IN PROGRESS PLEASE WAIT' depending on whether a printer is connected to the RE201.
- x. Press 'LEARN', 'PHASE' and function key F8, <DEFLT>, and check that the RE201 displays 'SELECT USING SOFTKEY'.
- y. Press '2nd' and 'EXIT'.

When all steps are performed successfully the RE905 Keyboard should work perfectly.

If one or more keys do not work properly, disassemble the cable connector housing by unscrewing the rear part of the connector and check bad connections. If no error is found the fault is to be found either in the RE905 Keyboard or in the RE201.

#### 4.2 Dismantling

To gain access to the RE905 PC Board the following steps should be carried out:

- a. Disconnect the RE905 from the RE201.
- b. Unscrew the two screws on each side panel and remove panels.

- c. Move the top panel a few centimetres to the right, as shown in fig. 4.1.
- d. Unscrew the screw securing the cable and remove the cable from the keyboard profile.
- e. Remove the top panel by moving it to the left until it leaves the keyboard profile.
- f. Unscrew the four nuts in each corner of the PC Board and remove the board from the top panel.

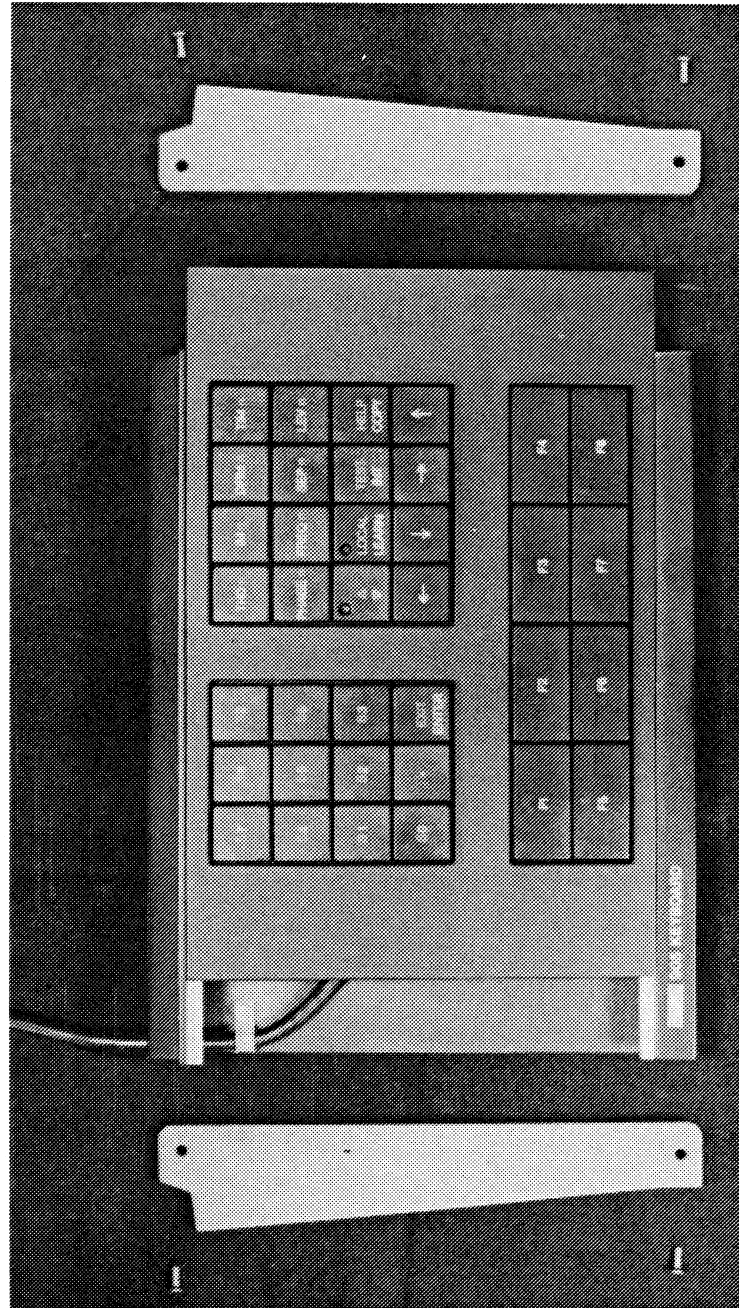


Fig. 4.1 - Dismantling the RE905

RE201/TM/RE905/8507

## 5 PARTS LIST AND SCHEMATIC DIAGRAM

5.1 Parts List

All electronic components are included in the parts list. Parts marked with a \* are manufactured by RE INSTRUMENTS AS.

When ordering spare parts it is important that you give the following information.

- \* Code No. and description of the part.
- \* Circuit reference from the schematic diagram.
- \* Complete type designation of RE product.

## PARTS LIST \_\_\_\_\_ SECTION 5

## EXTERNAL KEYBOARD RE905 (901-610)

## CAPACITORS

<u>Designation</u>	<u>Description</u>	<u>Code no.</u>
C1	Tantal Capacitor 10uF 16V	267-000
C2	Ceramic Capacitor 0.1uF 50V	213-401
C3	Ceramic Capacitor 0.1uF 50V	213-401
C4	Ceramic Capacitor 0.1uF 50V	213-401
C5	Ceramic Capacitor 0.1uF 50V	213-401

## DIODES

<u>Designation</u>	<u>Description</u>	<u>Code no.</u>
CR1	Diode BAV10	350-022
CR2	Diode BAV10	350-022
CR3	Diode BAV10	350-022
CR4	Diode BAV10	350-022
CR5	Diode BAV10	350-022
CR6	Diode BAV10	350-022
CR7	Diode BAV10	350-022
CR8	Diode BAV10	350-022

## CONNECTORS

<u>Designation</u>	<u>Description</u>	<u>Code no.</u>
J1	Terminal Strip 2*8 Pol mod II, Angled	806-006

## INTEGRATED DIGITAL CIRCUITS

<u>Designation</u>	<u>Description</u>	<u>Code no.</u>
QD 1	8-Bit Addressable Latch HEF4724BP	364-412
QD 2	8-Bit Data Selector HEF4512BP	364-279
QD 3	Quad 2-Input XOR Gate SN74HC386N	364-642
QD 4	Quad 2-Input XOR Gate SN74HC386N	364-642
QD 5	8-Input Nor Gate HEF4078BP	364-268
QD 6	Dual D-Type FLip-FLop HEF4013P	364-222
QD 7	Hex Inverter SN74LS05N, Open Collector	364-214
QD 8	8-Bit Addressable Latch SN74LS259N	364-397
QD 9	Quad Buffer SN74LS126N	364-273
QD10	Quad Buffer SN74LS126N	364-273

## PARTS LIST

## SECTION 5

## EXTERNAL KEYBOARD RE905 (901-610)

## RESISTORS

<u>Designation</u>	<u>Description</u>	<u>Code no.</u>
R1	Carbon-Film Resistor 8*1k 5% 0.1W	146-010
R2	Carbon-Film Resistor 8*2k2 5% 0.1W	146-013
R3	Carbon-Film Resistor 390E 5% 0.1W	107-339
R4	Carbon-Film Resistor 390E 5% 0.1W	107-339
R5	Carbon-Film Resistor 8*10k 5% 0.1W	146-003

## SWITCHES

<u>Designation</u>	<u>Description</u>	<u>Code no.</u>
S 1	Marquardt Keyboard Switch	520-209
S 2	Marquardt Keyboard Switch	520-209
S 3	Marquardt Keyboard Switch	520-209
S 4	Marquardt Keyboard Switch	520-209
S 5	Marquardt Keyboard Switch	520-209
S 6	Marquardt Keyboard Switch	520-209
S 7	Marquardt Keyboard Switch	520-209
S 8	Marquardt Keyboard Switch	520-209
S 9	Marquardt Keyboard Switch	520-209
S10	Marquardt Keyboard Switch	520-209
S11	Marquardt Keyboard Switch	520-209
S12	Marquardt Keyboard Switch	520-209
S13	Marquardt Keyboard Switch	520-209
S14	Marquardt Keyboard Switch	520-209
S15	Marquardt Keyboard Switch	520-209
S16	Marquardt Keyboard Switch	520-209
S17	Marquardt Keyboard Switch with Red LED	520-210
S18	Marquardt Keyboard Switch	520-209
S19	Marquardt Keyboard Switch with Green LED	520-211
S20	Marquardt Keyboard Switch	520-209
S21	Marquardt Keyboard Switch	520-209
S22	Marquardt Keyboard Switch	520-209
S23	Marquardt Keyboard Switch	520-209
S24	Marquardt Keyboard Switch	520-209
S25	Marquardt Keyboard Switch	520-209
S26	Marquardt Keyboard Switch	520-209
S27	Marquardt Keyboard Switch	520-209
S28	Marquardt Keyboard Switch	520-209
S29	Marquardt Keyboard Switch	520-209
S30	Marquardt Keyboard Switch	520-209
S31	Marquardt Keyboard Switch	520-209
S32	Marquardt Keyboard Switch	520-209
S33	Marquardt Keyboard Switch	520-209
S34	Marquardt Keyboard Switch	520-209

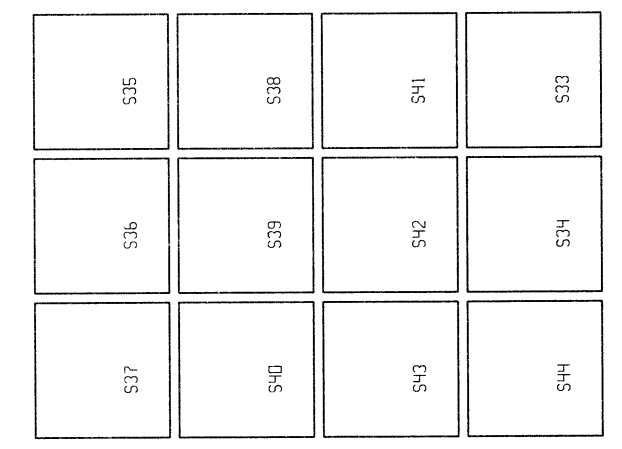
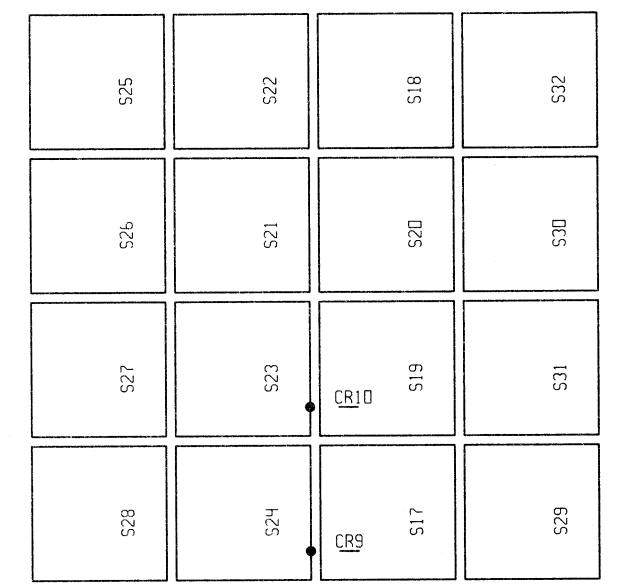
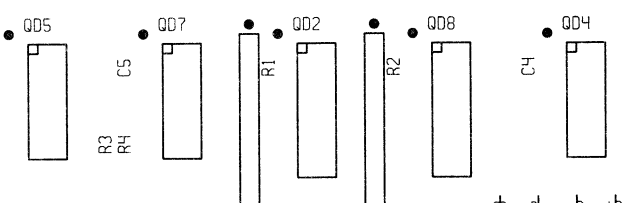
PARTS LIST 

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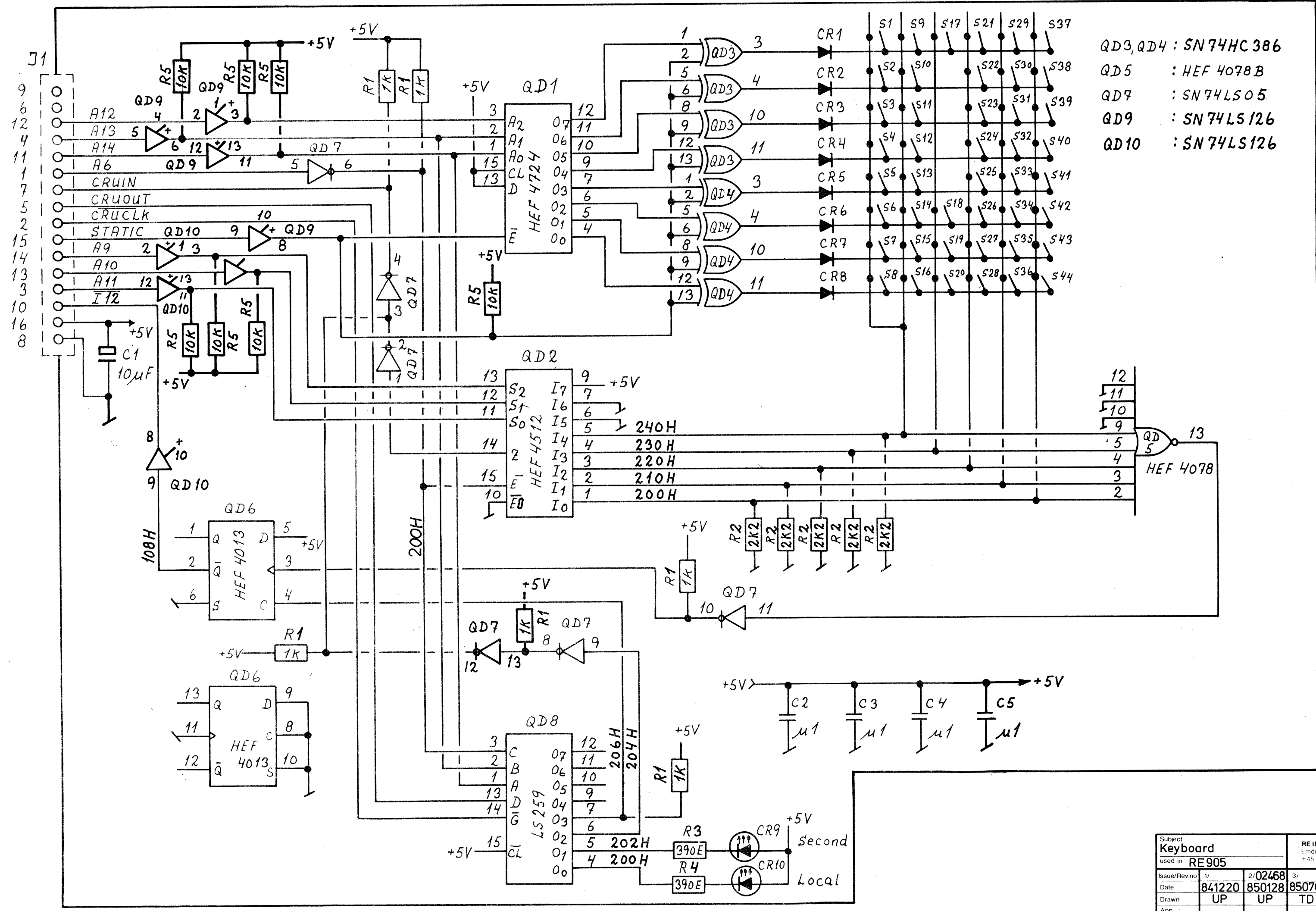
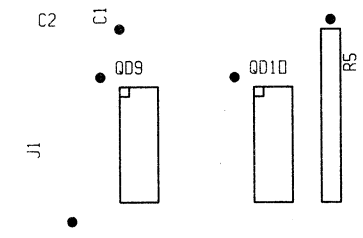
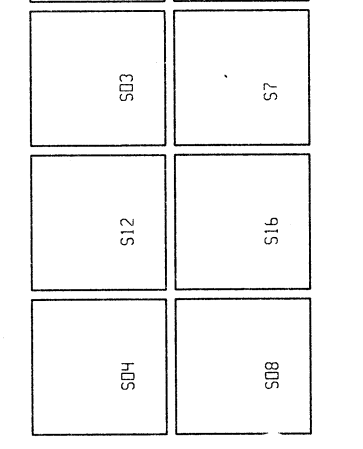
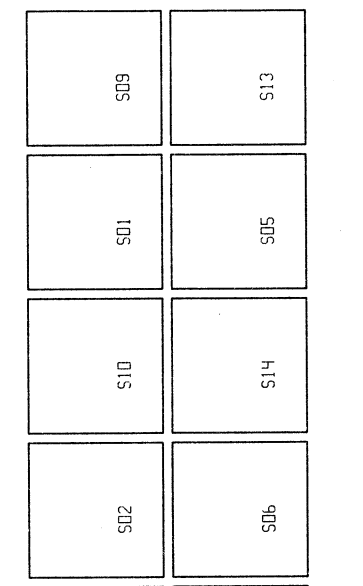
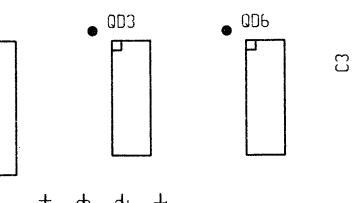
 SECTION 5

## EXTERNAL KEYBOARD RE905 (901-610)

S35	Marquardt Keyboard Switch	520-209
S36	Marquardt Keyboard Switch	520-209
S37	Marquardt Keyboard Switch	520-209
S38	Marquardt Keyboard Switch	520-209
S39	Marquardt Keyboard Switch	520-209
S40	Marquardt Keyboard Switch	520-209
S41	Marquardt Keyboard Switch	520-209
S42	Marquardt Keyboard Switch	520-209
S43	Marquardt Keyboard Switch	520-209
S44	Marquardt Keyboard Switch	520-209



RE-INSTRUMENTS AS 901-610 ISS.2



QD3, QD4 : SN74HC386  
QD5 : HEF 4078B  
QD7 : SN74LS05  
QD9 : SN74LS126  
QD10 : SN74LS126

- |             |             |
|-------------|-------------|
| S1 - F4     | S23 - FREQ  |
| S2 - F3     | S24 - PHASE |
| S3 - F2     | S25 - TIM   |
| S4 - F1     | S26 - DFIM  |
| S5 - F8     | S27 - IM    |
| S6 - F7     | S28 - THD   |
| S7 - F6     | S29 -       |
| S8 - F5     | S30 -       |
| S9 - F4     | S31 -       |
| S10 - F3    | S32 -       |
| S11 - F2    | S33 - ENTER |
| S12 - F1    | S34 -       |
| S13 - F8    | S35 - 9     |
| S14 - F7    | S36 - 8     |
| S15 - F6    | S37 - 7     |
| S16 - F5    | S38 - 6     |
| S17 - 2ND   | S39 - 5     |
| S18 - COPY  | S40 - 4     |
| S19 - LEARN | S41 - 3     |
| S20 - INT   | S42 - 2     |
| S21 - SEP   | S43 - 1     |
| S22 - LEV   | S44 - 0     |

Subject Keyboard used in RE905					RE-INSTRUMENTS AS Emdrupvej 26 DK-2100 Copenhagen O Denmark +45 (0)118 44 22 Telex +45 1184401 Telex 22211 reds					Sheet Scale
Issue/Rev no	1/	2/02468	3/	4/	5/	PCB	971-249			
Date	841220	850128	850709	850905		PCB Assy	901-610			
Drawn	UP	UP	TD	BD		Schematic	985-177			
App				ME		Drawing				