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Description

**Receiver Diversity  
ED 1710**



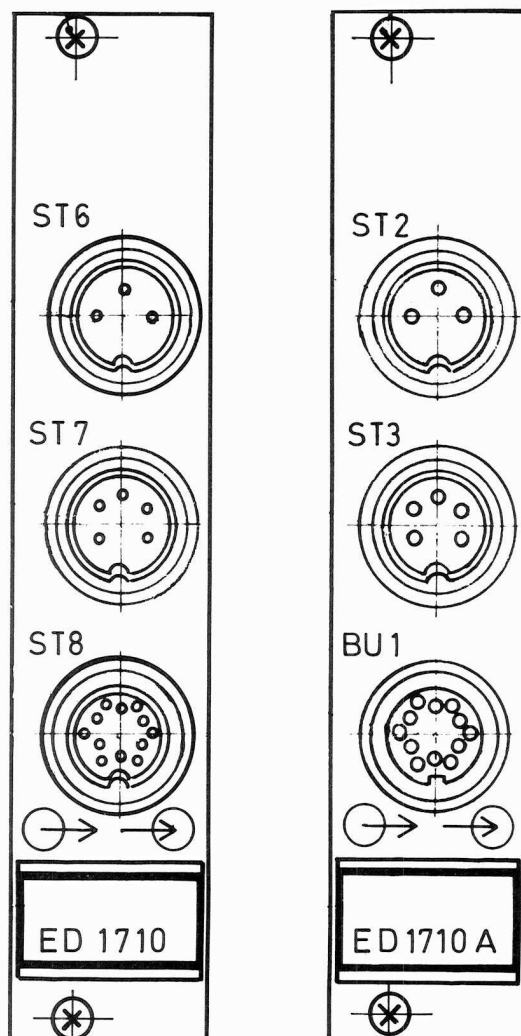
for AF diversity operation with  
two Receivers E 1800/...

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Receiver Diversity Module ED 1710  
and Adapter Module ED 1710 A





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## **1 DESCRIPTION**

### **1.1 General Information**

#### **1.1.1 Designation**

The module bears the designation "Receiver Diversity ED 1710".

#### **1.1.2 Possible Applications**

The Receiver Diversity ED 1710 is used in systems for reception of F1B and F7B transmissions with a telegraphy speed up to 200 Baud. This module automatically switches over between two receivers such that the receiver whose antenna is picking up the larger signal at the set reception frequency is always the currently active receiver. This improves the signal transmission quality over the link and thus reduces the error rate.

The module ED 1710 is used for AF diversity operating mode but can also be switched over for diversity switching of the IF signals.

#### **1.1.3 General Description**

The Receiver Diversity ED 1710 is intended as auxiliary module for the HF Receivers E 1700 and E 1800.

The module consists of a printed circuit card with a front panel on one narrow edge and a plug connector strip on the opposite narrow edge. The printed circuit card carries the circuits for the diversity function. The front panel carries three jack connectors via which all required connections are established to the demodulator and to telegraphy demodulator as well as to the second receiver. The internal connections of the module to the receiver are established via the 64-pole plug strip connector.

The second receiver which is required for diversity operation must be equipped with the Adapter Module ED 1710 A. This module too consists of a printed circuit card fitted with a front panel and a 64-pole plug strip connector. It serves only to route the inputs and outputs required for diversity operation, to the rear side of the receiver. The front panel of the adapter module carries two plugs and one jack for the external connections.

## 1.2 Scope of Delivery

### 1.2.1 Standard Version

Pos.	Qty.	Description	Part Number
1		Receiver Diversity ED 1710 (set) comprising:	52.1830.000.00
1.1	1	Receiver Diversity Module ED 1710	52.1830.001.00
1.2	1	Adapter Module ED 1710 A	52.1830.501.00
1.3	2	Connecting Cable	52.1830.883.00
1.4	2	Connecting Cable	52.1830.882.00
1.5	1	Connecting Cable	52.1830.881.00
2	1	Description for Receiver Diversity ED 1710	5X.0172.226.79

### 1.2.2 Special Accessories

No special accessories are required.

### 1.2.3 Replacement Parts

No replacement parts are required for basic maintenance.

See Annex 8 for a list of recommended spare parts.

### 1.3 Technical Data

#### 1.3.1 Electrical Data

The following electrical data are valid when the ambient temperature lies in the range  $25\text{ }^{\circ}\text{C} \pm 15\text{ }^{\circ}\text{C}$ .

##### Inputs

AGC voltage	+ 2 V . . . + 5 V (Ri about 100 kOhm)
Data stream	TTL signal levels
IF signal	200 kHz (Ri about 1 kOhm), 80 mV . . . 100 mV

##### Outputs

AGC voltage (only ED 1710 A)	+ 2 V . . . + 5 V (Ri about 10 kOhm)
Data stream	TTL signal levels
IF signal (only ED 1710 A)	200 kHz (Ri about 50 Ohms) 80 mV...100 mV EMF
Control signals (only ED 1710 A)	TTL signal levels (static)
Diversity threshold	Adjustable, 5%, 10% and 15% relative to normal IF signal level (factory setting: 15%)
Switchover time (after drop below the IF threshold)	$\leq 15\text{ }\mu\text{s}$
Search time	4 ms (dwell time on one receiver when antenna signal level is inadequate)
Functional check	Indication of the currently selected receiver by LEDs in the "ANT" key of the Receiver E 1800/...

#### 1.3.2 Environmental Conditions

The auxiliary module ED 1710 is always part of an equipment unit, thus please consult Section 1.3.2 of the description for the particular equipment unit in which it is operated.

#### 1.3.3 Dimensions and Weights

	Height mm	Width mm	Depth mm	Weight kg
ED 1710	128.5	25	310	0.5
ED 1710 A	128.5	25	310	0.2
overall dimensions				

## 1.4 Technical Description

The auxiliary module ED 1710 is used for automatic receiver selection when receiving F1B and F7B transmissions up to 200 Baud. For this purpose, two receivers E 1800/... are required, each with its own permanently connected antenna. These antennas must either be separated in space or they must use different polarizations.

A further necessary condition for diversity operation (AF diversity) is that both receivers must be equipped with a Telegraphy Demodulator TD 1710 auxiliary module.

The F1B communications signals are demodulated in the respective TD 1710 and filtered, before they are taken to the Receiver Diversity ED 1710. This has the advantage that the changeover switching for diversity channel selection causes no transient response disturbances in the signal paths.

The receiver diversity module compares the IF signal levels of the two receivers against a fixed threshold. When the signal of the currently selected receiver drops below the threshold on a rapid selective fadeout which the AGC system of the receiver can no longer follow and correct, then a trigger stage drives an electronic switch which selects the other receiver. The expectation that this will usually give a better signal is based on the fact that the field strength correlation is less than 1 for antennas which are separated in space or which use different polarizations.

The IF signal level is very suitable for deriving the switchover criterion for short duration signal break-ins (lasting several ms), because the IF signal level directly follows the fluctuations of the field strength seen by the antenna.

However, if the field strength changes only very slowly (attenuation fading), so that the AGC system of the receiver can follow and correct this fading, then the IF signal level becomes unsuitable as switchover criterion. Under unfavourable conditions it may even happen then, that the receiver with the poorer signal to noise ratio is selected, because the noise voltage at the IF output is amplified to the full nominal signal level.

In order to prevent this undesired effect, the AGC voltages of the two receivers are also used in deriving the diversity selection criterion. The two AGC voltage values are compared in a comparator and the receiver which is obtaining the larger antenna voltage is selected.

After the receiver selection switching circuit, a transient-free level translation is made in the module TD 1710, to convert the TTL data stream into floating single or double current levels and a grounded V.28 data signal.

The teletypewriter of the equipment is always connected to the TD 1710 of the receiver which also contains the ED 1710 module. The currently selected receiver (manual or automatic selection) is indicated by two LEDs in the "ANT" key on the front panel of the receiver. However, the operating mode "receiver diversity" is selected with the two keys "ANT" and "DIV". Their function is described in Section 2.4.2.

## 2 MOUNTING AND OPERATING INSTRUCTIONS

### 2.1 Special Precautions to Prevent Accidents

The auxiliary module ED 1710 can be operated only in an equipment unit. Thus the instructions given in Section 2.1 of the description for the equipment unit in which this module is used, apply for this module too.

### 2.2 Setting-Up and Taking-Down

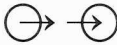
The auxiliary module ED 1710 must be fitted in the provided slot of the modules carrier frame (push in and secure with two screws) in one of the two receivers which are required for diversity operation. The Adapter Module ED 1710 A must be fitted in the same place in the other receiver.

Then establish the cable connections as described in Section 2.2.2 and in Annex 6.

#### 2.2.1 Explanation of the Plug Connectors

(see frontispiece or Annex 3 and 5)

**Note:** No external equipment units may be connected to the plug connectors of the auxiliary module ED 1710 and of the Adapter Module ED 1710 A.

Legend	Symbol	Explanation / Contact Function
ST 8 (ED 1710) BU 1 (ED 1710 A)		A IF signal voltage from receiver 2 B Shield (for A) C AGC voltage from receiver 2 D 0 V (ground) E Input, teletype data (TTL) from receiver 2 F Output, teletype data (TTL) to receiver 2 G Control command bit B from receiver 2 H Control command bit A from receiver 2 J Shield (for C) and outer shield K +5 V L 0 V (ground) M not connected
ST 6 (ED 1710) ST 2 (ED 1710 A)		1 not connected 2 0 V (shield) 3 AGC voltage from Receiver 1 (ED 1710, ST 6) or Receiver 2 (ED 1710 A, ST 2)
ST 7 (ED 1710) ST 3 (ED 1710 A)		1 IF signal voltage from Receiver 1 (ED 1710, ST 7) or Receiver 2 (ED 1710 A, ST 3) 2 0 V (ground) 3 Shield (for 1) 4 Teletype data (TTL) from Receiver 1 (ED 1710, ST 7) or Receiver 2 (ED 1710 A, ST 3) 5 Teletype data (TTL) to Receiver 1 (ED 1710, ST 7) or Receiver 2 (ED 1710 A, ST 3)

### 2.2.2 Cable Connections on the Rear of the Receivers (see Annex 6)

For receiver diversity operation (AF diversity), establish the following connections with the cables contained in the scope of delivery (see Section 1.2.1):

#### Receiver No.1 (RX1) with ED 1710

Connecting cables Pos. No.	from	to	Designation of the plug connectors on the cable
1.3	DE 1710, BU 2	ED 1710, ST 6	ST 2 — BU 1
1.4	TD 1710, BU 1 } TD 1710, BU 2 }	ED 1710, ST 7	ST 1 > BU 2 ST 2

#### Receiver No.2 (RX2) with ED 1710 A

Connecting cables Pos. No.	from	to	Designation of the plug connectors on the cable
1.3	DE 1710, BU 2	ED 1710 A, ST 2	ST 2 — BU 1
1.4	TD 1710, BU 1 } TD 1710, BU 2 }	ED 1710 A, ST 3	ST 1 > BU 2 ST 2

#### Between Receiver No.1 and Receiver No.2

Connecting cable Pos. No.	from	to	Designation of the plug connectors on the cable
1.5	ED 1710, ST 8	ED 1710 A, BU 1	BU 3 — ST 1

### 2.3 Checks before Commissioning

Make sure that

- a complete set of cables is present and connected for the connections between the modules ED 1710 and ED 1710 A and from there to the modules DE 1710 and TD 1710 (see Section 2.2.2),
- all plugged connections are correct and seated firmly.

## 2.4 Commissioning and Operation

### 2.4.1 Function of the Manual Control Elements

The auxiliary module ED 1710 has no own manual control elements. All manual control elements for receiver diversity operation are located on the manual control panel of the associated receiver (see Section 2.4.2).

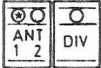
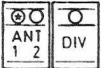

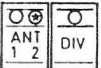

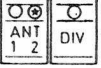


### 2.4.2 Manual Control (see Annex 1)

Annex 1 shows the manual control panel of a Receiver E 1800/3.

The following settings are required for diversity operation:

Manual Control Element Pos. No. in Annex 1		Designation	Setting, Explanation
4		F1B (or F7B)	For setting the operating mode.
10 or 11		Frequency tuning	Tune the receiver which contains the module ED 1710 to the center frequency, using the tuning aid (Pos.3 in Annex 1).
1 and 2		IF filter selection	Set the bandwidth according to the line separation and the keying speed of the F1B transmission.
9		RF gain control	Switch to automatic gain control mode (AGC).
6		Teletypewriter ON/OFF	Switch-on the teletypewriter.
5		Code inversion	Mark state NORMAL or INVERSE.

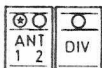
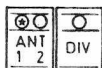






Receiver selection is made with the key ANT 1/2 (Pos.8 in Annex 1). The two LEDs in this key indicate which one of the two receivers is currently selected. The following possibilities exist:

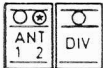
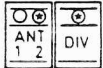
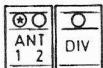



Pos. No. in Annex 1	Receiver 1	Receiver 2	Effect, Explanation
8, 7			Only Receiver 1 sends information to the teletypewriter.
8, 7			Only Receiver 2 sends information to the teletypewriter.
8, 7			The two receivers operate mutually independently (parallel operation).
7			Diversity operation. The currently selected receiver is indicated by the LEDs in the keys ANT 1/2.

### 2.4.3 Functional Check

A power divider with two equivalent outputs (e.g. a resistance network divider with 50 Ohm connections) is required for the functional check of the module ED 1710.

Connect the HF band inputs of the two receivers (RX1 and RX2) to one antenna, via this power divider. Then make the settings and checks specified below.

Manual Control Elements	Pos. No. Annex 1	Setting		Remarks	Check
		Receiver 1	Receiver 2		
Antenna switchover and diversity	8 and 7				LEDs for 1 in RX1 and for 1 in RX2 lit.
Operating mode	4				
RF gain control mode	9			AGC	
Bandwidth	1 and 2			± 3 kHz	

Manual Control Elements	Pos. No. Annex 1	Setting		Remarks	Check
		Receiver 1	Receiver 2		
Tuning	10 or 11	to A3E broadcast transmitter			RX1 can be tuned using the tuning aid (Pos. 3 in Annex 1).
Antenna switchover and diversity	8 and 7				LEDs for 2 in RX1 and for 2 in RX2 lit.
Tuning	10 or 11		to A3E broadcast transmitter		RX2 can be tuned using the tuning aid (Pos. 3 in Annex 1).
Antenna switchover and diversity	8 and 7				LEDs for 1 in RX1 and for 2 in RX2 lit.
Antenna diversity	7				LEDs for 1 or 2 in RX1 and RX2 light simultaneously.
		Disconnect RX1 and RX2 from the antenna.			LEDs for 1 or 2 in RX1 light alternately.
		Reconnect RX1 to the antenna.			LED for 1 in RX1 lit.
		Reconnect RX2 too to the antenna.			LED for 1 in RX1 lit.

If the indications are incorrect, test and repair the auxiliary module ED 1710 and the two receivers E 1800/... according to Section 4 of the respective descriptions. This must be carried out by trained persons.



### **3            MAINTENANCE AND SERVICING BY THE OPERATING STAFF**

#### **3.1           Maintenance**

See Section 3.2

#### **3.2           Repairs by the Operating Staff**

Maintenance and repairs of the module can not be carried out by the operating staff.

The module is always part of an equipment unit, thus please consult Section 3 of the description for the particular equipment unit in which it is operated.

#### **3.3           Instructions for conservation of the module when operation thereof is discontinued for a prolonged period**

No special maintenance tasks are required when operation of the module is discontinued for a prolonged period. The module contains no components whose characteristics change or which are subject to selfconsumption during prolonged storage. However, the module should be stored in a dry and dustproof room, in which contamination with dirt is ruled out. Otherwise special packing is required, e.g. sealing in plastic film.



## 4 REPAIRS BY TRAINED PERSONS

### 4.1 Special Tools, Measuring Units and Test Equipment

- (1)\* RF signal generator, W & G Type PSM 5
- (2) Power divider, AEG type ATR 103, distributor: 1 input, 2 outputs
- (3) Attenuator network 0...60 dB, W & G type RT 1
- (4) Attenuator network 0...60 dB, W & G type RT 1
- (5) DC multimeter (voltmeter), 10 V,  $R_i \geq 100 \text{ k}\Omega/\text{Volt}$

\* The running numbers in this list are specified too when measuring units and test equipment are referenced in the text below.

### 4.2 Functional Principles (see Annex 2 and 4)

The auxiliary module Receiver Diversity ED 1710 contains the following printed circuit cards:

- |                           |   |           |
|---------------------------|---|-----------|
| ● Basic card (logic card) | } | ED 1710   |
| ● Wideband amplifier 1    |   |           |
| ● Wideband amplifier 2    |   |           |
| ● Adapter card            |   | ED 1710 A |

The two wideband amplifiers are plugged onto the basic card and shielded individually with one can each. Together these three printed circuit cards constitute the module ED 1710 which contains all circuits required for the diversity function.

The adapter card is a self-contained separate unit which is fitted in the second receiver which is required for receiver diversity operation. Via this adapter, the control signals of this receiver, which are otherwise available only internally, are routed to the exterior and then go via a link cable to the module ED 1710.

The IF signals of both receivers are taken via ST 7/3,1 and ST 8/A,B respectively to one of the two wideband amplifiers. In each wideband amplifier circuit, the IF signal is taken via a calibrated IF signal divider R 1 (751) to R 7 (757) and via the signal level adjustment control R 8 (758) to the integrated circuit wideband amplifier IS 1 (751). The gain of IS 1 (751) can be adjusted with the potentiometer R 10 (760). The output signal is rectified by GR 1 (751) and GR 2 (752) and then taken to the input of IS 2 (752), a Schmitt trigger circuit. The switching threshold of the latter can be adjusted with R 24 (774) such that switchover takes place far below the 3 dB limiting threshold of IS 1 (751). This achieves that in the vicinity of the respective diversity threshold the greatest possible linear relationship exists between the arriving and the rectified IF signal. The Schmitt trigger changes its output state whenever the rectified IF signal voltage drops below the threshold which has been set with R 24 (774).

The wideband amplifier generates the switching states which are caused by the rapid signal level changes (selective fading).

The signals are taken from the two outputs (measuring points 16 and 17) to an evaluation logic consisting of the gates in the integrated circuits IS 12 (712), IS 13 (713) and IS 19 (719). The two signals act with equal priority on the input of this logic circuit.

The AGC voltages from the two receivers are taken via ST 6/3,2 and ST 8/C,L to one operational amplifier each, which functions as impedance changer: IS 15 (715) and IS 16 (716). The AGC voltages difference for equal RF signal levels is compensated with the potentiometer R 6 (706). The output signals of the impedance changers are connected to the inputs 2 and 3 of the voltage comparator IS 14 (714), which has a switching hysteresis given by R 2 (702). The purpose of this switching hysteresis is to prevent continual switchover when the AGC voltages are equal. The signals from the comparator output (measuring point 18) and from the outputs of the wideband amplifiers act with equal priority in the evaluation logic. The logic combination of these signals has been chosen such that, if the RF signal voltages are unequal, always the receiver with the higher signal voltage is switched through and, if the RF signal voltages are equal, always the receiver which contains the module ED 1710 is selected.

The selection process for a receiver with adequate field strength runs as follows, taking that the field strength drops considerably at the antenna of the currently selected receiver:

- Selective fading

The IF signal voltage follows the rapidly falling antenna signal voltage and thereby drops below the fixed IF threshold in the wideband amplifier, producing a signal level jump at its output.

- Attenuation fading

A very slow signal level fade also produces a signal level jump at the output of the comparator IS 14 (714) as a result of the AGC voltages comparison.

Every signal level jump at the input of the evaluation logic also produces a jump (L → H) at its output (measuring point 19). This triggers the monoflop IS 23 (723) which remains in the pulsed state for about 5 ms.

The output  $\bar{Q}$  of the monoflop IS 23 (723) is connected to the clock input of the latch flipflop IS 18 (718) which thus changes the logic state at its output whenever IS 23 (723) returns to its resting state. The logic state change of the latch flipflop controls the receiver selection via the decoder matrix IS 1 (701) to IS 9 (709).

In diversity operation, the output of the latch flipflop IS 18 (718) drives this circuit which connects through the selected data signal via ST 7/5,2 to the TD 1710 (TD 1710 and ED 1710 in the same receiver). A further task of the decoder matrix is to make possible manual selection of the receivers. For this purpose, the BCD-encoded control commands for antenna selection ST 1/16,17 and ST 8/H,G which are already present in each receiver, are taken to the matrix where they are combined in an appropriate logic circuit. The provided possibilities are shown in Section 2.4.1 (see there).

#### 4.3 Fault Tracing

Fault tracing at the individual components level is not intended. Do not carry out soldering operations on the printed circuit cards except in the provided positions (soldered connections, soldered jumpers). Otherwise the protective lacquer coating would become damaged, thus impairing the long-term dependability of the module.

However, faults can be traced by consulting the description of the functional principles (Section 4.2) in conjunction with the circuit diagrams and the components layout diagrams in the annexes, as well as the contact functions list in Section 2.2.1.

#### 4.4 Instructions for Making Repairs

Receiver settings (both receivers):

Manual Control Element	Setting
STANDBY key	Power ON
Level indicator mode switch	RF
RF gain control mode (AGC)	Automatic (AGC ON)
Automatic noise limiter (Squelch)	OFF
Loudspeaker	ON
Volume control potentiometer (AF LEVEL)	About to center
Beat frequency oscillator (BFO) for A1B	About to 0.5
Tuning control knob	SL / FA
Frequency setting (with tuning control knob or with numerical keys)	$f = 5 \text{ MHz}$
Service type	F1B
Antenna switchover (ANT 1/2)	Switch to Antenna 1 (corresponds here to Receiver 1)

##### 4.4.1 Calibration (See Annex 7 for test set-up)

The following tasks must be carried out to calibrate the ED 1710 to the two IF signal levels of the Receivers 1 and 2 and to their AGC voltages:

- Set the RF signal generator (1) to 5 MHz and 300  $\mu\text{V}$ . Set the two attenuator networks (3) and (4) to attenuation factor 0 dB (the signal voltage at the antenna inputs of the two receivers is then about 50  $\mu\text{V}$ ).
- **Calibration IF 1:** (upper wideband amplifier (1) on the ED 1710 basic card)  
Set switch S 1 (751) to position 1 (26 dB attenuation) and turn the potentiometer R 8 (758) to the left. Connect the voltmeter (5) to measuring point 16 and to ground potential (TTL H level).
- Turn potentiometer R 8 (758) to the right only as far that voltmeter (5) at measuring point 16 just reads TTL L level.
- Set switch S 1 (751) to position 2 (16 dB attenuation). The voltmeter (5) at measuring point 16 should still indicate logic level "L".
- **Calibration IF 2:** (lower wideband amplifier (2) on ED 1710 basic card)  
The calibration procedure here is analogously the same as just described for IF 1. Connect the voltmeter (5) to measuring point 17 for alignment of IF 2.
- Leave the RF signal generator (1) set to 5 MHz and 300  $\mu\text{V}$ . Leave the attenuator networks (3) and (4) set to 0 dB attenuation factor. Connect the voltmeter (5) between measuring point 23 and measuring point 24. Then adjust R 6 (756) for voltmeter reading 0 V ( $\pm 0.01 \text{ V}$ ).

#### 4.4.2 Checking the Static IF Signal Switchthrough

- Set the attenuator networks (3) and (4) to 60 dB attenuation factor. Set the RF signal generator (1) to 5 MHz (about 300  $\mu$ V).  
Bandwidth = 6 kHz.
- Select the antenna 1 on the two receivers (1 and 2).

**Note:** Only the tuning aid of receiver 1 is operating. "Noise" must be visible, and audible in the two loudspeakers.

- Set the attenuator network (3) to 0 dB attenuation factor. A reading should result on the tuning aid and a whistle should be heard in the loudspeaker of Receiver 1.
- Select the antenna 2 on the two receivers. "Noise" should be visible, and audible in the loudspeaker of Receiver 2 (the whistle in the loudspeaker of Receiver 1 remains unchanged).
- Set the attenuator network (4) to 0 dB attenuation factor. A noise free display should appear on the tuning aid, and a whistle should now be heard in the loudspeakers of both receivers.

#### 4.4.3 Diversity Operation Test

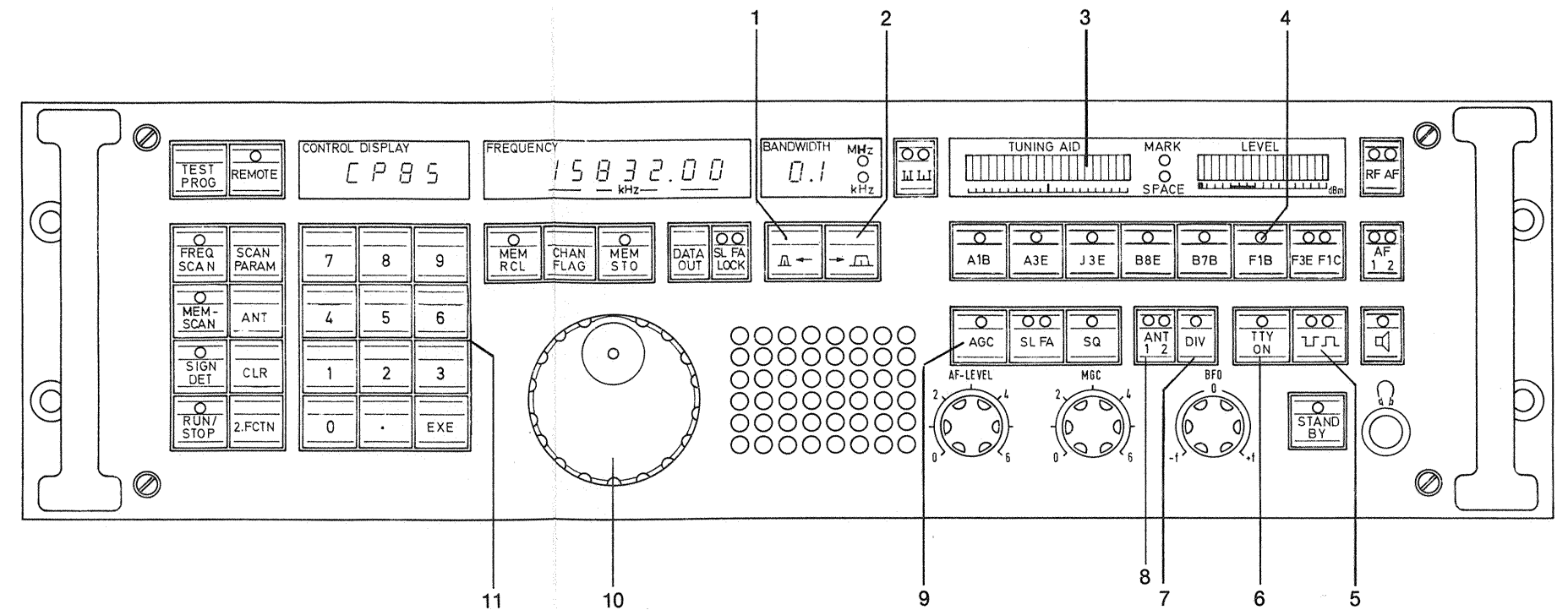
- Set diversity operating mode on both receivers and set the attenuator networks (3) and (4) to 0 dB attenuation factor. The module ED 1710 will select the receiver which (by chance) happens to have the larger AGC voltage.
- Disconnect the antenna cable from the selected receiver (indication on Receiver 1). Switchover to the other receiver should take place.
- Reconnect the disconnected antenna cable to the antenna jack. No switchover should take place.
- Disconnect the antenna cable from the now selected receiver. Switchover back to the first receiver should take place.
- Reconnect the disconnected antenna cable. No switchover should take place.

ITEM	DESCRIPTION			PART NUMBER	ELECTRICAL VALUES	REMARKS
4.6 LISTS OF COMPONENTS						
4.6.1	WIDEBAND AMPLIFIER			52.1364.750.00		
BU 752 ... 753	ENTH. 52.1364.750.00ST					
C 751 ... 752	CAP.PLASTIC FILM			5L.5241.026.64	UF 0,1 +-20 % 100 V MKT B 32234-B 1104-M	
C 753	CAP.PLASTIC FILM			5L.5241.041.03	UF 0,022 +-20 % 400 V MKT 1822-322/40 / 01...M400	
C 754	CAPACITOR CERAMIC			5L.5224.009.86	PF 470 +- 2 % N 1500 EDRT5 6 X9 63 V	
C 755 ... 756	CAP.PLASTIC FILM			5L.5241.026.64	UF 0,1 +-20 % 100 V MKT B 32234-B 1104-M	
C 757 ... 758	CAP.PLASTIC FILM			5L.5241.026.39	UF 0,047 +-20 % 250 V MKT 1822-347/25 / 01...M250	
C 759	CAP.PLASTIC FILM			5L.5241.026.64	UF 0,1 +-20 % 100 V MKT B 32234-B 1104-M	
C 760	CAPACITOR CERAMIC			5L.5224.009.86	PF 470 +- 2 % N 1500 EDRT5 6 X9 63 V	
C 761	CAPACITOR CERAMIC			5L.5224.009.69	PF 220 +- 2 % N 750 EDRT5 6 X7 63 V	
GR 751 ... 753	SI-DIODE			5L.5532.101.47	1N 4151 BAY 95	
JS 751	SEMICONDUCTOR CIRC			5L.5443.001.55	CA 3020 A BREITBANDVERST.	
JS 752	SEMICONDUCTOR CIRC			5L.5443.001.08	709 /RM..T/LM..H/UA..HM/MC1..G OPERATIONSVERST.	
L 751	CHOKE			5L.5053.003.31	UH 47 +-10 % 0,11 A 4,5 OHM TYP MS75085-3	
R 751	FILM RESISTOR			5N.5106.001.71	OHM 953 +- 1 % 0,1 W RN 55 C 9530 F	
R 752	FILM RESISTOR			5N.5106.230.06	OHM 909 +- 1 % 0,1 W RN 55 C 9090 F	
R 753	FILM RESISTOR			5N.5106.001.67	OHM 845 +- 1 % 0,1 W RN 55 C 8450 F	
R 754	FILM RESISTOR			5N.5106.230.42	OHM 187 +- 1 % 0,1 W RN 55 C 1870 F	
R 755	FILM RESISTOR			5N.5106.229.66	OHM 110 +- 1 % 0,1 W RN 55 C 1100 F	
R 756 ... 757	FILM RESISTOR			5N.5106.230.36	OHM 105 +- 1 % 0,1 W RN 55 C 1050 F	
R 758	VARIABLE RESISTOR			5L.5131.023.25	KOHM 1 +-20% 1 W LIN WELLE D 4 D/ 12 TYP 61CDP/0620313	
R 759	FILM RESISTOR			5N.5102.002.47	OHM 82 +- 5 % 0,25 W RC 07 GF 820 J	
R 760	VARIABLE RESISTOR			5L.5135.002.34	KOHM 2,2 +-20% 0,5 W LIN TYP VA 05 H /HC 10 P-K /E 10 CS 1	
R 761	FILM RESISTOR			5N.5102.002.99	KOHM 12 +- 5 % 0,25 W RC 07 GF 123 J	
R 762	FILM RESISTOR			5N.5102.002.43	OHM 56 +- 5 % 0,25 W RC 07 GF 560 J	
R 763	FILM RESISTOR			5N.5102.002.47	OHM 82 +- 5 % 0,25 W RC 07 GF 820 J	
R 764	FILM RESISTOR			5N.5102.002.73	KOHM 1 +- 5 % 0,25 W RC 07 GF 102 J	
R 765	FILM RESISTOR			5N.5102.002.85	KOHM 3,3 +- 5 % 0,25 W RC 07 GF 332 J	
R 766	RESISTOR NTC			5L.5173.001.86	KOHM 1 +-20% 0,5 W B 3825 TYP 2322 642 11102	
R 767 ... 768	FILM RESISTOR			5N.5102.002.77	KOHM 1,5 +- 5 % 0,25 W RC 07 GF 152 J	
R 769 ... 770	FILM RESISTOR			5N.5102.002.91	KOHM 5,6 +- 5 % 0,25 W RC 07 GF 562 J	
R 771	FILM RESISTOR			5N.5102.002.97	KOHM 10 +- 5 % 0,25 W RC 07 GF 103 J	
R 772	FILM RESISTOR			5N.5102.002.73	KOHM 1 +- 5 % 0,25 W RC 07 GF 102 J	
R 773	FILM RESISTOR			5N.5102.002.57	OHM 220 +- 5 % 0,25 W RC 07 GF 221 J	
R 774	VARIABLE RESISTOR			5L.5135.002.32	OHM 470 +-20% 0,5 W LIN TYP VA 05 H /HC 10 P-K /E 10 CS 1	
R 775	FILM RESISTOR			5N.5102.002.79	KOHM 1,8 +- 5 % 0,25 W RC 07 GF 182 J	
R 776	FILM RESISTOR			5N.5102.003.24	KOHM 120 +- 5 % 0,25 W RC 07 GF 124 J	
R 777	FILM RESISTOR			5N.5102.002.77	KOHM 1,5 +- 5 % 0,25 W RC 07 GF 152 J	
R 778	FILM RESISTOR			5N.5102.003.06	KOHM 22 +- 5 % 0,25 W RC 07 GF 223 J	
R 779	FILM RESISTOR			5N.5102.002.97	KOHM 10 +- 5 % 0,25 W RC 07 GF 103 J	
R 780	FILM RESISTOR			5N.5102.002.95	KOHM 8,2 +- 5 % 0,25 W RC 07 GF 822 J	
R 781	FILM RESISTOR			5N.5102.002.73	KOHM 1 +- 5 % 0,25 W RC 07 GF 102 J	
S 751	SWITCH ROTARY			5L.4601.008.92	1EB. 2POLE/EB. 4STELLG. PA 150VWS 1 VA SB20M-1-2E00-04-P0-AU4	
TS 751 ... 752	SI-NPN-TRANSISTOR			5L.5512.202.92	BCY 59 IX	

ITEM	DESCRIPTION		PART NUMBER	ELECTRICAL VALUES	REMARKS
4.6.2	RECEIVER	DIVERSITY	ED 1710	52.1378.702.00	
C 701		CAPACITOR TANTALUM	5L.5275.001.45	UF 4,7 +-20% 10 V	
C 702	... 704	CAP.PLASTIC FILM	5L.5241.026.64	ETR 1/TAD 45322/B45181/T340/7900 UF 0,1 +-20 % 100 V MKT B 32234-B 1104-M	
C 705		CAP.PLASTIC FILM	5N.5241.001.03	UF 0,22 +-20 % 63 V MKT 1822-422/06 / 01...M63	
C 706		CAP.PLASTIC FILM	5L.5241.026.64	UF 0,1 +-20 % 100 V MKT B 32234-B 1104-M	
C 707	... 708	CAP.PLASTIC FILM	5L.5241.041.01	UF 0,01 +-20 % 400 V MKT B 32234-B 6103-M	
GR 701	... 702	SI-DIODE	5L.5532.101.47	1N 4151 BAY 95	
IS 701		SEMICONDUCTOR CIRC	5L.5441.017.40	SN 54LS 10 J /..DM/DM..J/..F/ T..D2 GATTER	
IS 702		SEMICONDUCTOR CIRC	5L.5441.017.35	SN 54LS 00 J /..DM/DM..J/..F/ T..D2 GATTER	
IS 703		SEMICONDUCTOR CIRC	5L.5441.017.42	SN 54LS 20 J /..DM/DM..J/..F/ T..D2 GATTER	
IS 704		SEMICONDUCTOR CIRC	5L.5441.017.35	SN 54LS 00 J /..DM/DM..J/..F/ T..D2 GATTER	
IS 705		SEMICONDUCTOR CIRC	5L.5441.017.40	SN 54LS 10 J /..DM/DM..J/..F/ T..D2 GATTER	
IS 706		SEMICONDUCTOR CIRC	5L.5441.017.35	SN 54LS 00 J /..DM/DM..J/..F/ T..D2 GATTER	
IS 707	... 708	SEMICONDUCTOR CIRC	5L.5441.017.40	SN 54LS 10 J /..DM/DM..J/..F/ T..D2 GATTER	
IS 709		SEMICONDUCTOR CIRC	5L.5441.017.38	SN 54LS 04 J /..DM/DM..J/..F/ T..D2 GATTER	
IS 710	... 711	SEMICONDUCTOR CIRC	5L.5441.017.45	SN 54LS 30 J /..DM/DM..J/..F/ T..D2 GATTER	
IS 712		SEMICONDUCTOR CIRC	5L.5441.017.35	SN 54LS 00 J /..DM/DM..J/..F/ T..D2 GATTER	
IS 713		SEMICONDUCTOR CIRC	5L.5441.017.36	SN 54LS 01 J /..DM/DM..J/..F GATTER	
IS 714		SEMICONDUCTOR CIRC	5L.5443.002.57	LM 311 H /CA..T/UA..HC/ SG..T/LM..H SPANNUNGSKOMPARAT.	
IS 715	... 716	SEMICONDUCTOR CIRC	5L.5443.002.20	741 /LM741H OPERATIONSVERST.	
IS 717		SEMICONDUCTOR CIRC	5L.5441.001.62	SN 54 121 J /MC54121L/S54121FA /54121DM/DM54121J MULTIVIBRATOR	
IS 718		SEMICONDUCTOR CIRC	5M.5441.021.59	SN 54LS 74 AJ /DM..AF/SN..AJ 5L.5441.021.59 5F.1531.001.01	
IS 719		SEMICONDUCTOR CIRC	5L.5441.017.51	SN 54LS 86 J /54LS86DM/S54LS86A /DM54LS86J/RM...J GATTER	
IS 720		SCHALTKREIS			
IS 721		SEMICONDUCTOR CIRC	5L.5441.003.93	SN 54 05 J /5405DM/MC5405L/ DM5405J/S5405FA INVERTER	
IS 722		SEMICONDUCTOR CIRC	5L.5441.017.35	SN 54LS 00 J /..DM/DM..J/..F/ T..D2 GATTER	
IS 723		SEMICONDUCTOR CIRC	5L.5441.001.62	SN 54 121 J /MC54121L/S54121FA /54121DM/DM54121J MULTIVIBRATOR	
R 701		FILM RESISTOR	5N.5102.002.97	KOHM 10 +- 5 % 0,25 W RC 07 GF 103 J	
R 702		FILM RESISTOR	5N.5102.003.40	KOHM 560 +- 5 % 0,25 W RC 07 GF 564 J	
R 703	... 704	FILM RESISTOR	5N.5102.002.97	KOHM 10 +- 5 % 0,25 W RC 07 GF 103 J	
R 705		FILM RESISTOR	5N.5102.002.89	KOHM 4,7 +- 5 % 0,25 W RC 07 GF 472 J	
R 706		VARIABLE RESISTOR	5L.5135.005.28	KOHM 100 +-10% 0,5 W LIN TYP 784 / 433P	
R 707	... 708	FILM RESISTOR	5N.5102.003.22	KOHM 100 +- 5 % 0,25 W RC 07 GF 104 J	
R 709		FILM RESISTOR	5N.5102.002.89	KOHM 4,7 +- 5 % 0,25 W RC 07 GF 472 J	
R 710		FILM RESISTOR	5N.5102.003.06	KOHM 22 +- 5 % 0,25 W RC 07 GF 223 J	
R 711		FILM RESISTOR	5N.5102.002.89	KOHM 4,7 +- 5 % 0,25 W RC 07 GF 472 J	
R 712		FILM RESISTOR	5N.5102.002.61	OHM 330 +- 5 % 0,25 W RC 07 GF 331 J	
R 713		FILM RESISTOR	5N.5102.002.89	KOHM 4,7 +- 5 % 0,25 W RC 07 GF 472 J	
R 714		FILM RESISTOR	5N.5102.002.61	OHM 330 +- 5 % 0,25 W RC 07 GF 331 J	
R 715	... 717	FILM RESISTOR	5N.5102.002.89	KOHM 4,7 +- 5 % 0,25 W RC 07 GF 472 J	
R 718		FILM RESISTOR	5N.5102.003.06	KOHM 22 +- 5 % 0,25 W RC 07 GF 223 J	
R 719		FILM RESISTOR	5N.5102.002.81	KOHM 2,2 +- 5 % 0,25 W RC 07 GF 222 J	

ITEM	DESCRIPTION	PART NUMBER	ELECTRICAL VALUES	REMARKS
R 720 ... 721	FILM RESISTOR	5N.5102.002.89	KOHM 4,7 +- 5 % 0,25 W RC 07 GF 472 J	
ST 701	EDGE CONNECTOR	5L.4561.010.75	32POL 553 013 2-164718-4/09020326931/242202589481	
ST 702	EDGE CONNECTOR	5L.4561.007.71	4POL 4 A CUSN6 NI2,5AU1,25 TYP -	
ST 703	EDGE CONNECTOR	5L.4561.007.75	2POL 4 A CUSN6 NI2,5AU1,25 TYP -	
ST 704	EDGE CONNECTOR	5L.4561.007.71	4POL 4 A CUSN6 NI2,5AU1,25 TYP -	
ST 705	EDGE CONNECTOR	5L.4561.007.75	2POL 4 A CUSN6 NI2,5AU1,25 TYP -	
4.6.3	ADAPTER BOARD	52.1378.800.00		
R 801 ... 802	FILM RESISTOR	5N.5102.002.89	KOHM 4,7 +- 5 % 0,25 W RC 07 GF 472 J	
ST 801	EDGE CONNECTOR	5L.4561.010.75	32POL 553 013 2-164718-4/09020326931/242202589481	
4.6.4	RECEIVER DIVERSITY	ED 1710	52.1830.001.00	
ST 6	PLUG	5L.4531.001.22	3POL 5 A 250 V GERADE FLANSCH LOET 3262 000 / 09-0307-00-03	
ST 7	PLUG	5L.4531.001.24	5POL 5 A 250 V GERADE FLANSCH LOET 3362 000 / 09-0315-00-05	
ST 8	PLUG	5L.4541.001.99	12POL 3 A 60 V GERADE FLANSCH LOET 3637 000 / 09-0331-00-12	
4.6.5	ADAPTER	ED 1710 A	52.1830.501.00	
BU 1	SOCKET	5L.4531.001.99	12POL 3 A 60 V GERADE FLANSCH LOET 3638 004 / 09-0332-00-12	
ST 2	PLUG	5L.4531.001.22	3POL 5 A 250 V GERADE FLANSCH LOET 3262 000 / 09-0307-00-03	
ST 3	PLUG	5L.4531.001.24	5POL 5 A 250 V GERADE FLANSCH LOET 3362 000 / 09-0315-00-05	

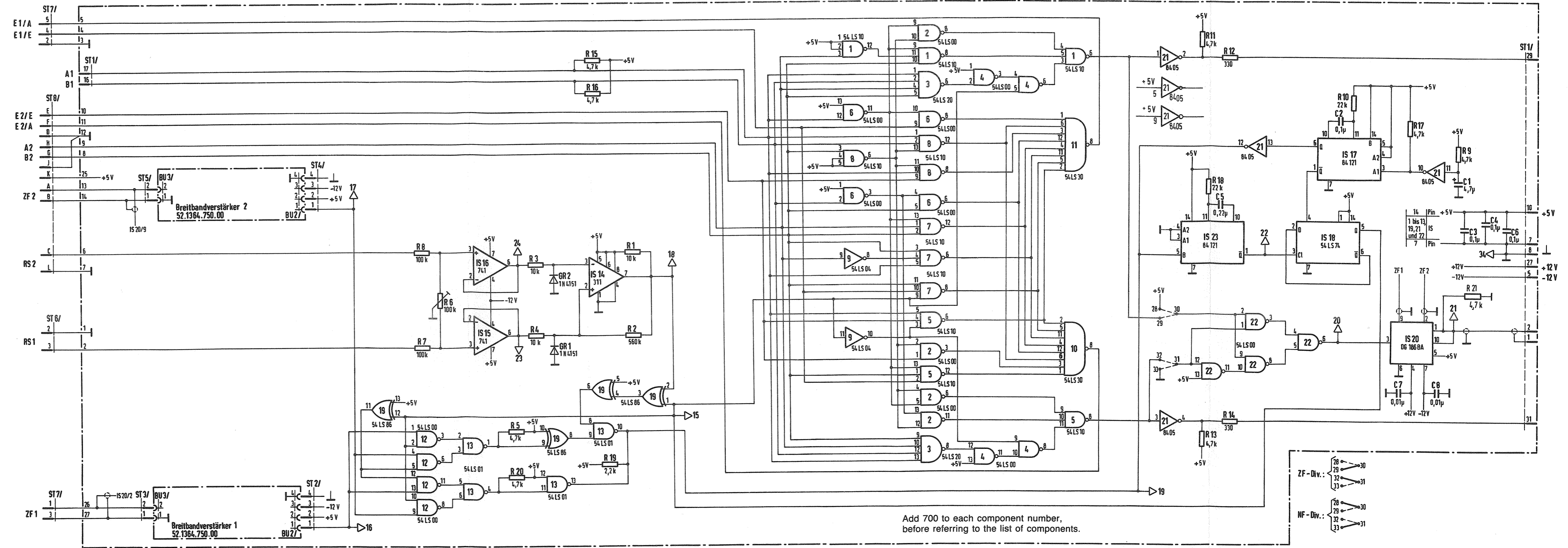




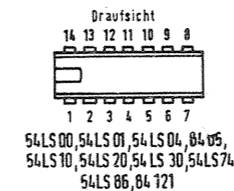
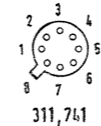
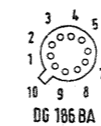
- 1 IF filter selection: Move to smaller bandwidths
- 2 IF filter selection: Move to greater bandwidths
- 3 Tuning aid
- 4 Setting the service type (demodulation type): F1B
- 5 Mark state NORMAL/INVERSE
- 6 Teletypewriter (Teleprinter) ON/OFF
- 7 Diversity operation ON/OFF
- 8 In this case: switches over between Receiver 1 and Receiver 2
- 9 Switchover of gain control mode: Automatic (AGC) / Manual gain control (MGC)
- 10 Tuning knob for manual tuning
- 11 Numerical keys

Manual Control Panel Receiver E 1800/3,  
manual control elements for receiver diversity operation  
Annex 1



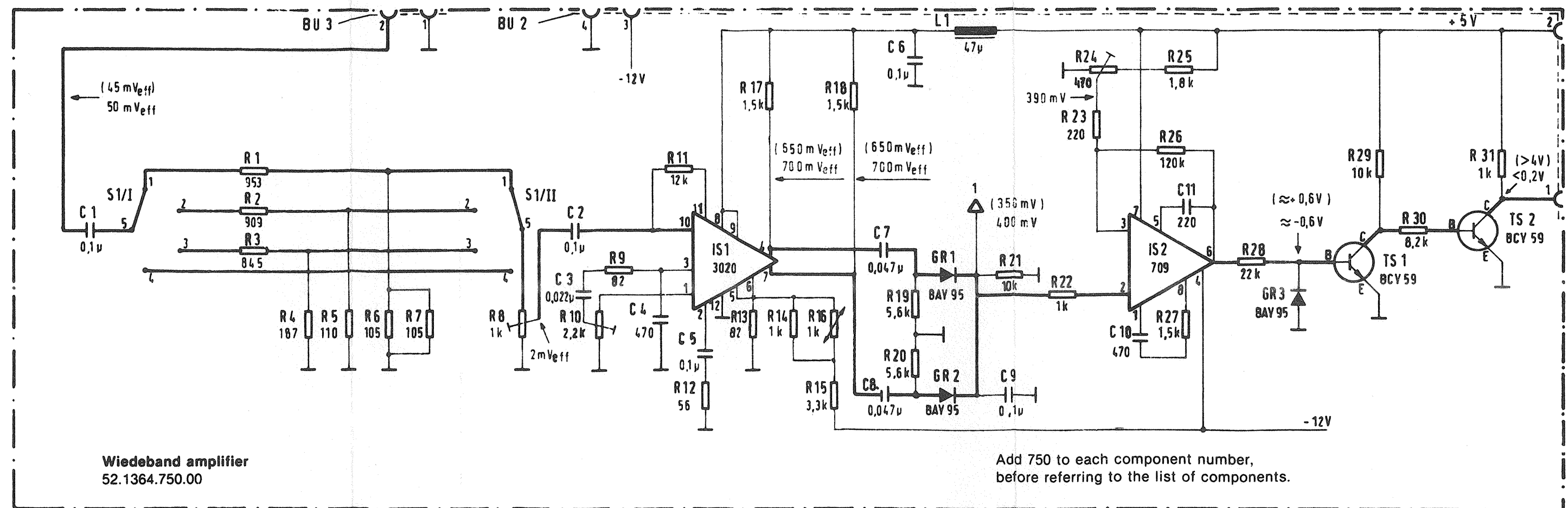


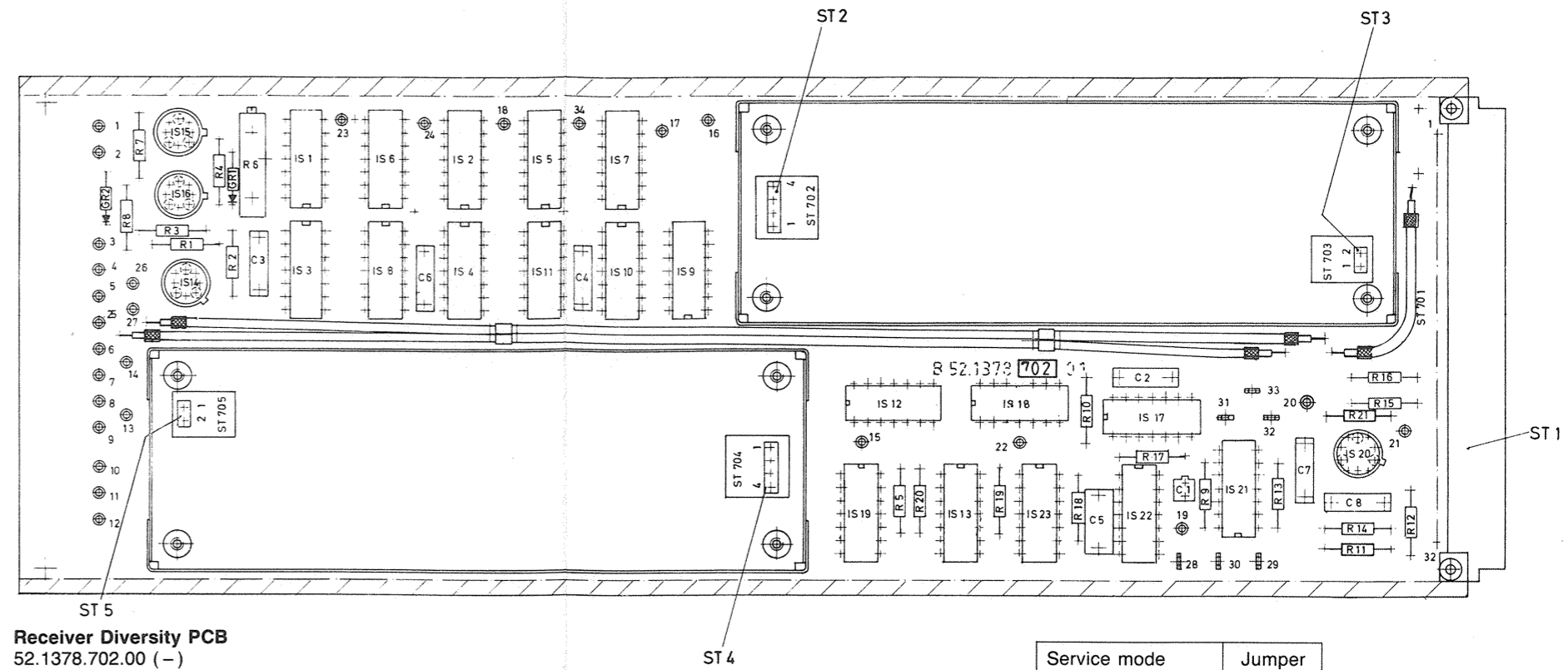
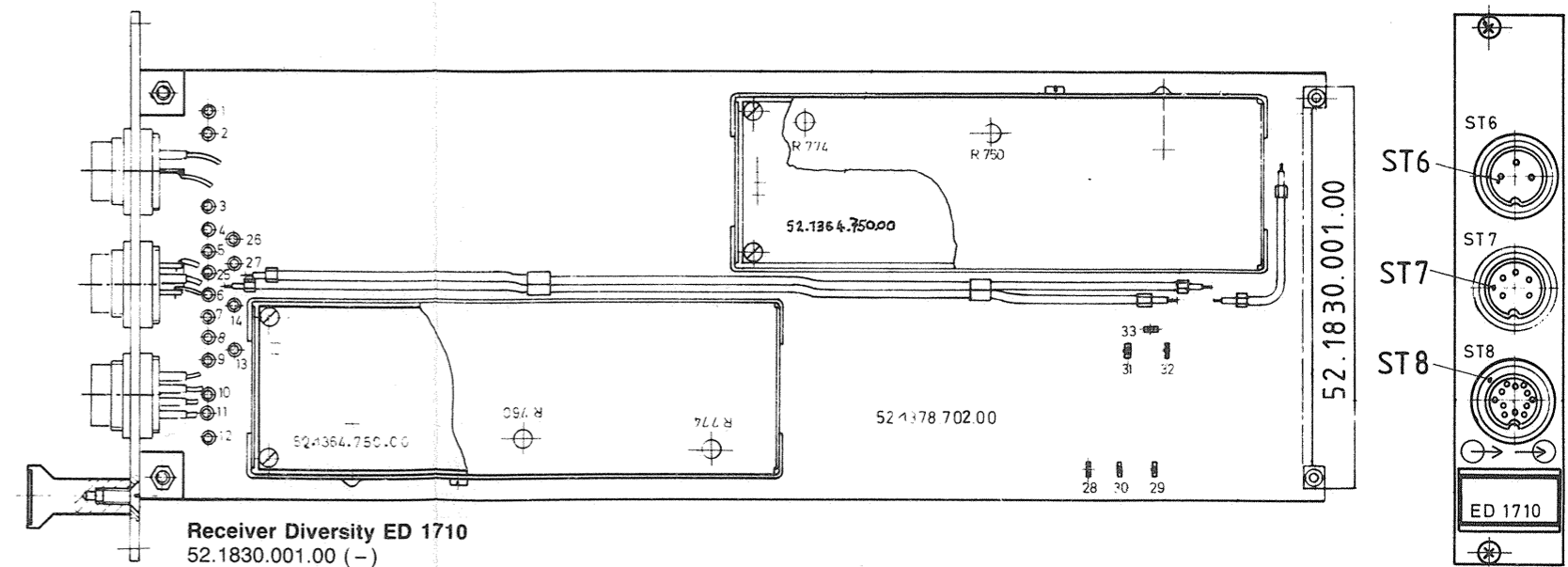
52.1378.700.00 STR (01)  
ED 1710



Circuit diagram  
Receiver Diversity ED 1710  
Annex 2, Sheet 1

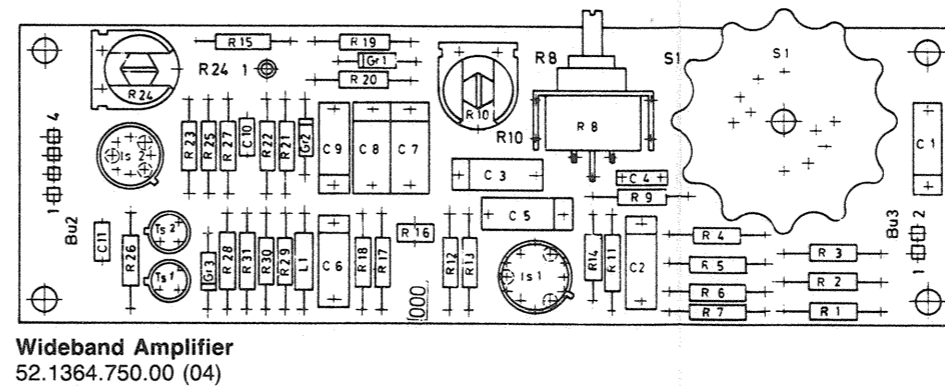






Add 700 to each component number, before referring to the list of components.

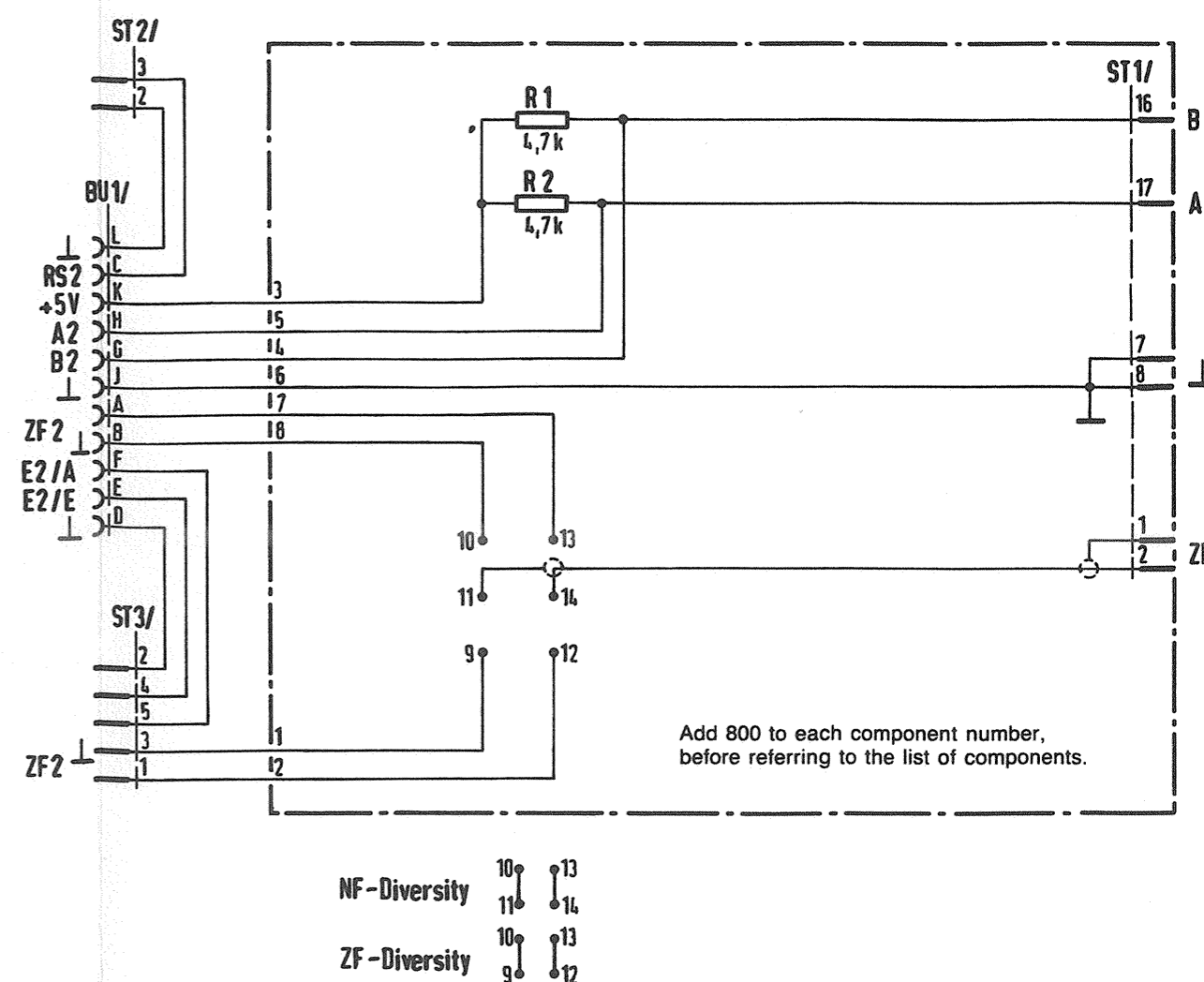
Service mode	Jumper
AF Diversity	28 – 30 31 – 33
IF Diversity	29 – 30 31 – 32

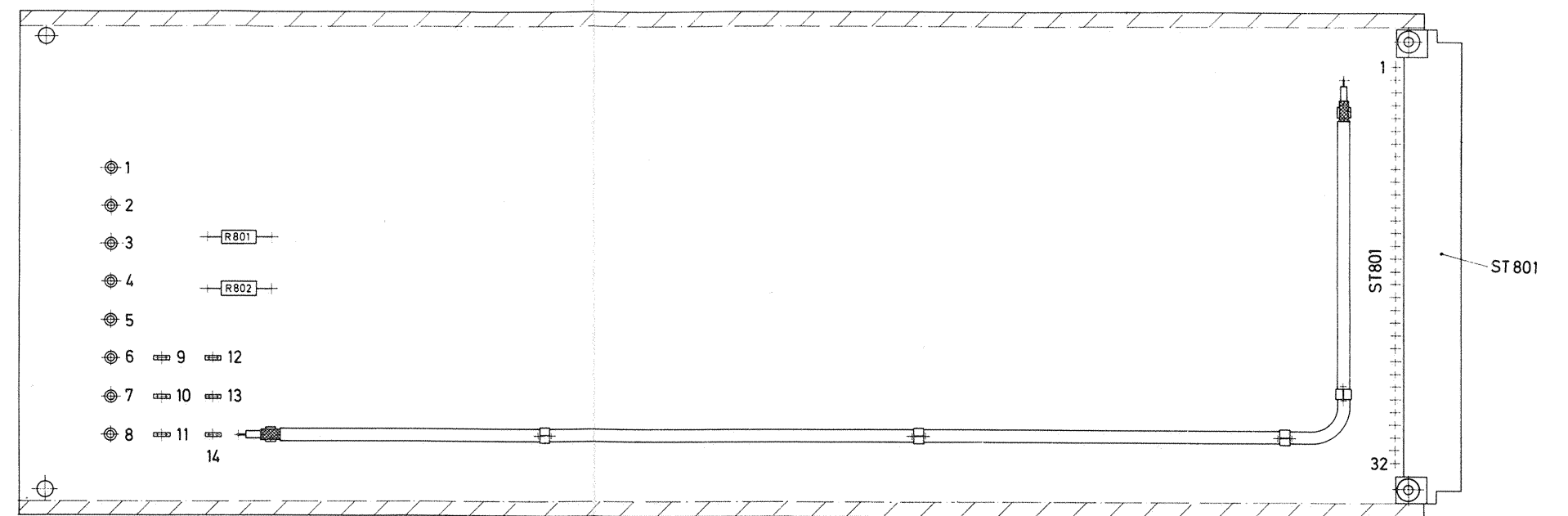
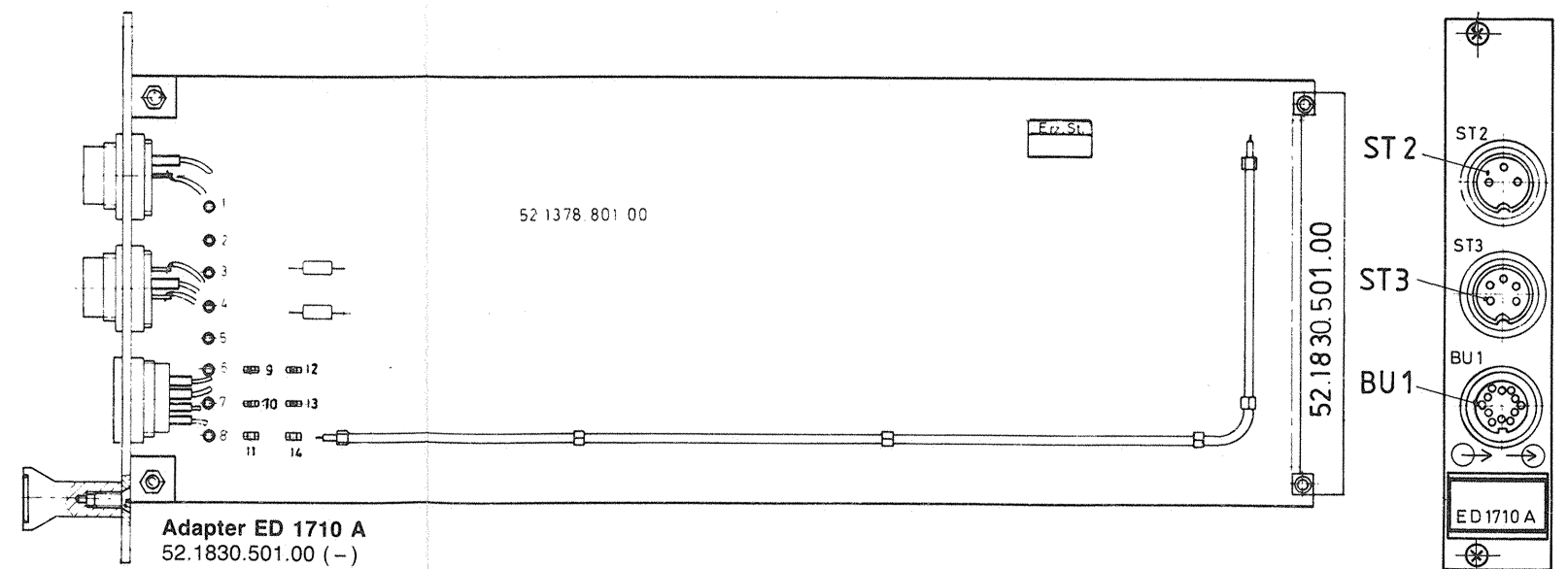


Add 750 to each component number, before referring to the list of components.

Components layout diagrams  
Receiver Diversity ED 1710  
inclusive of Wideband Amplifier  
**Annex 3**



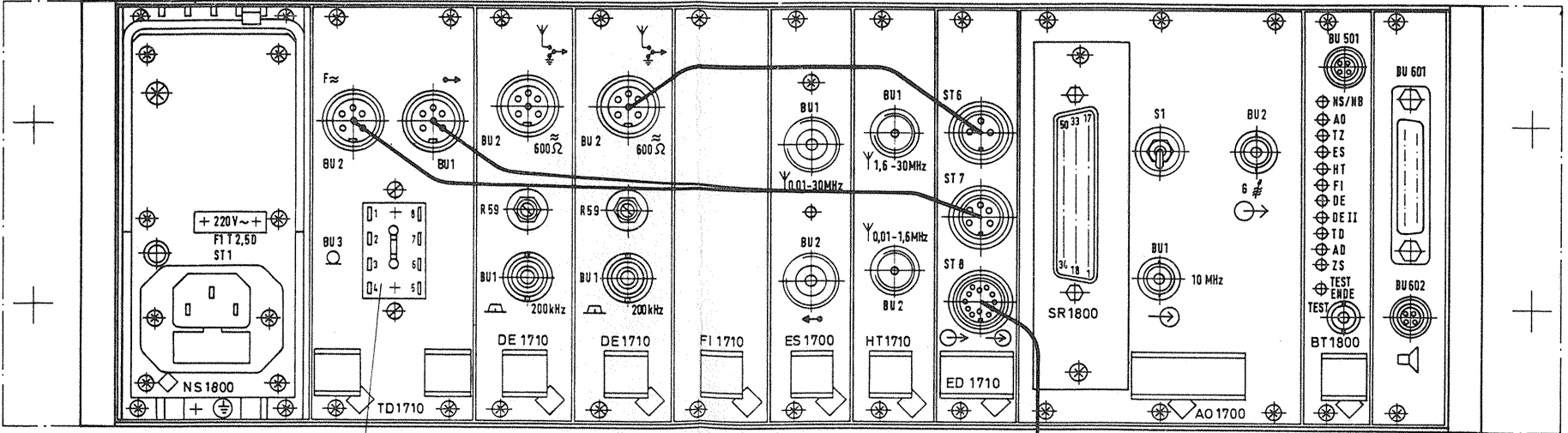




**Adapter PCB**  
52.1378.801.00 (01)

Service mode	Jumper
AF Diversity	10 – 11
	13 – 14
IF Diversity	9 – 10
	12 – 13



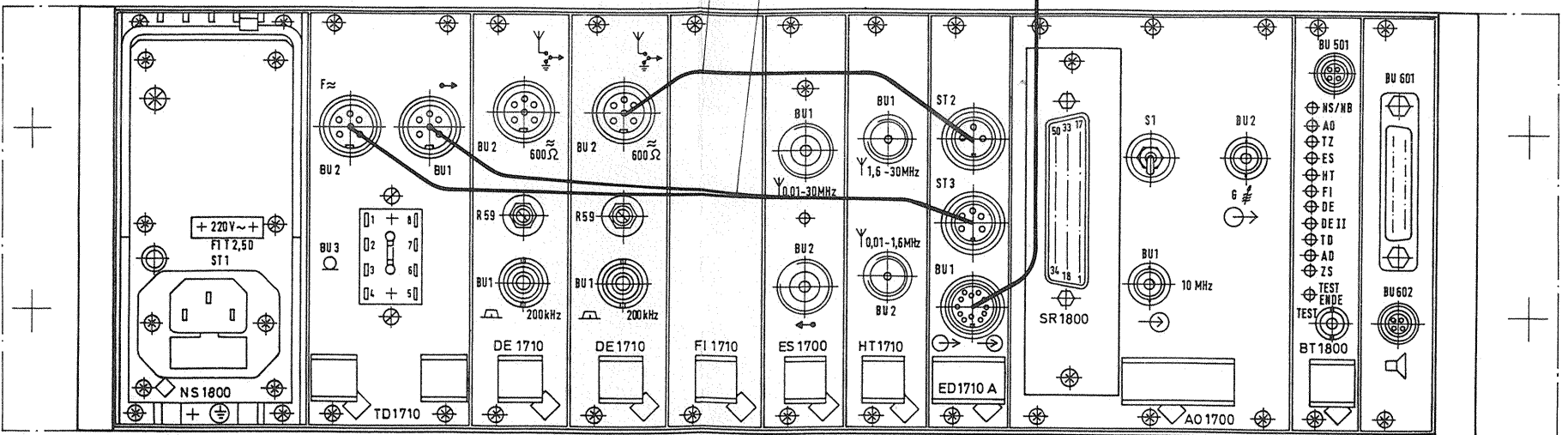


Receiver No.1  
(E 1800/...)

Connection  
to teleprinter

Cable Pos. No. 1.3  
Cable Pos. No. 1.4

Cable Pos. No. 1.5



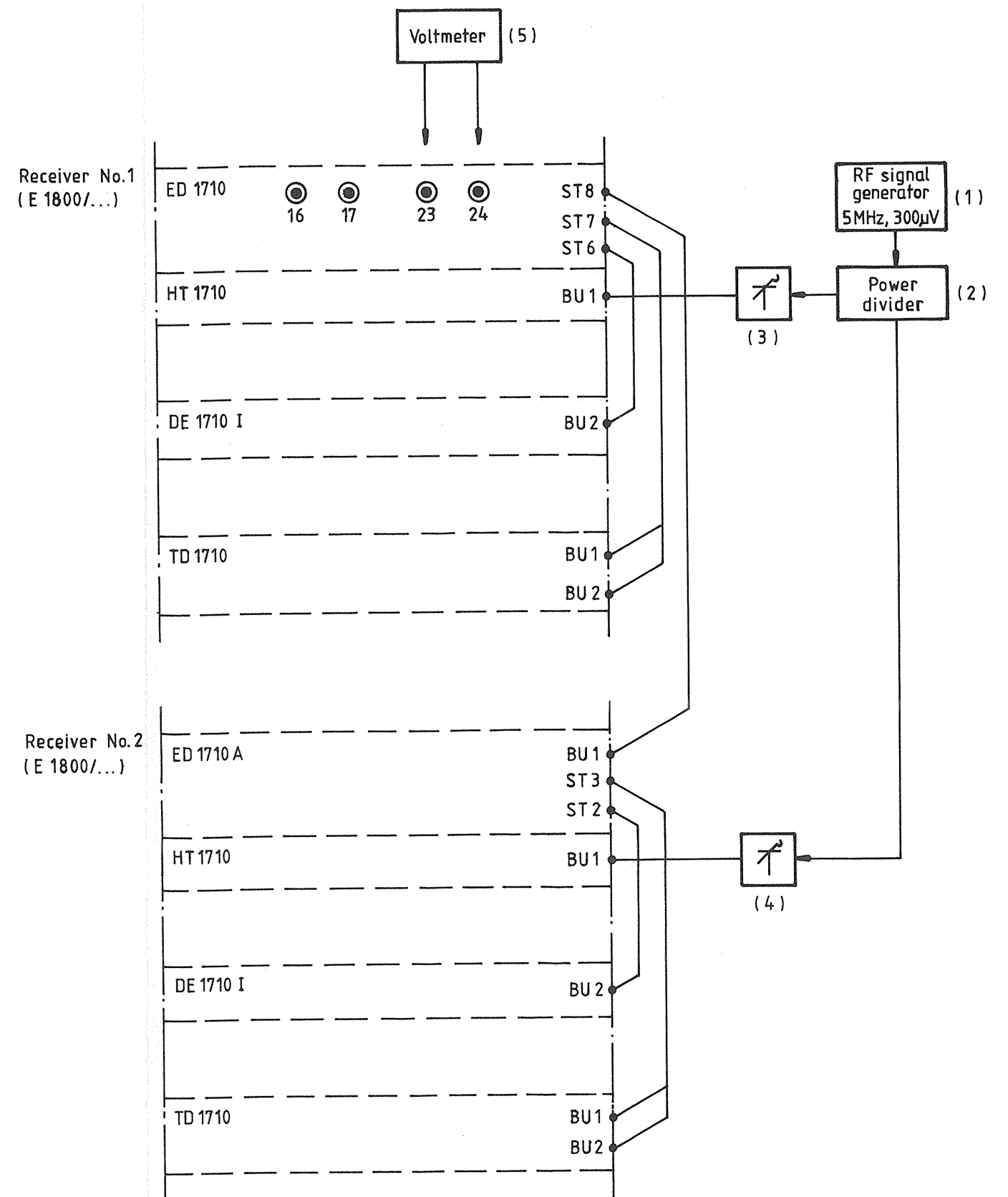
Receiver No.2  
(E 1800/...)

**Note:** Setting of the soldered jumpers on the PCBs (for NF diversity)

Module	Part No. of PCB	Soldered jumper
TD 1710	52.1825.100.00	54 – 55 opened
ED 1710	52.1378.702.00	28 – 30 closed 31 – 33 closed
ED 1710 A	52.1378.801.00	10 – 11 closed 13 – 14 closed

Cable connection plan  
for receiver diversity operation  
with two Receivers E 1800/...  
**Annex 6**





HT 1710, BU 1: Antenna input, 50µV  
DE 1710, BU 2: Gain control voltage



Pos. No.	Part No.	Description	Qty/Unit
		Receiver or Frequency Diversity Unit ED 1710	
1.01	52.1830.000.00	Receiver Diversity Unit ED 1710, compl.	1
1.02	52.1830.001.00	Receiver Diversity Unit ED 1710	1
1.03	52.1830.501.00	Adapter ED 1710 A	1
1.04	52.1364.750.00	Wideband Amplifier	2
1.05	52.1830.881.00	Connection Cable	1
1.06	52.1830.882.00	Connection Cable	1
1.07	52.1830.883.00	Connection Cable	1



