

TECHNICAL DESCRIPTION

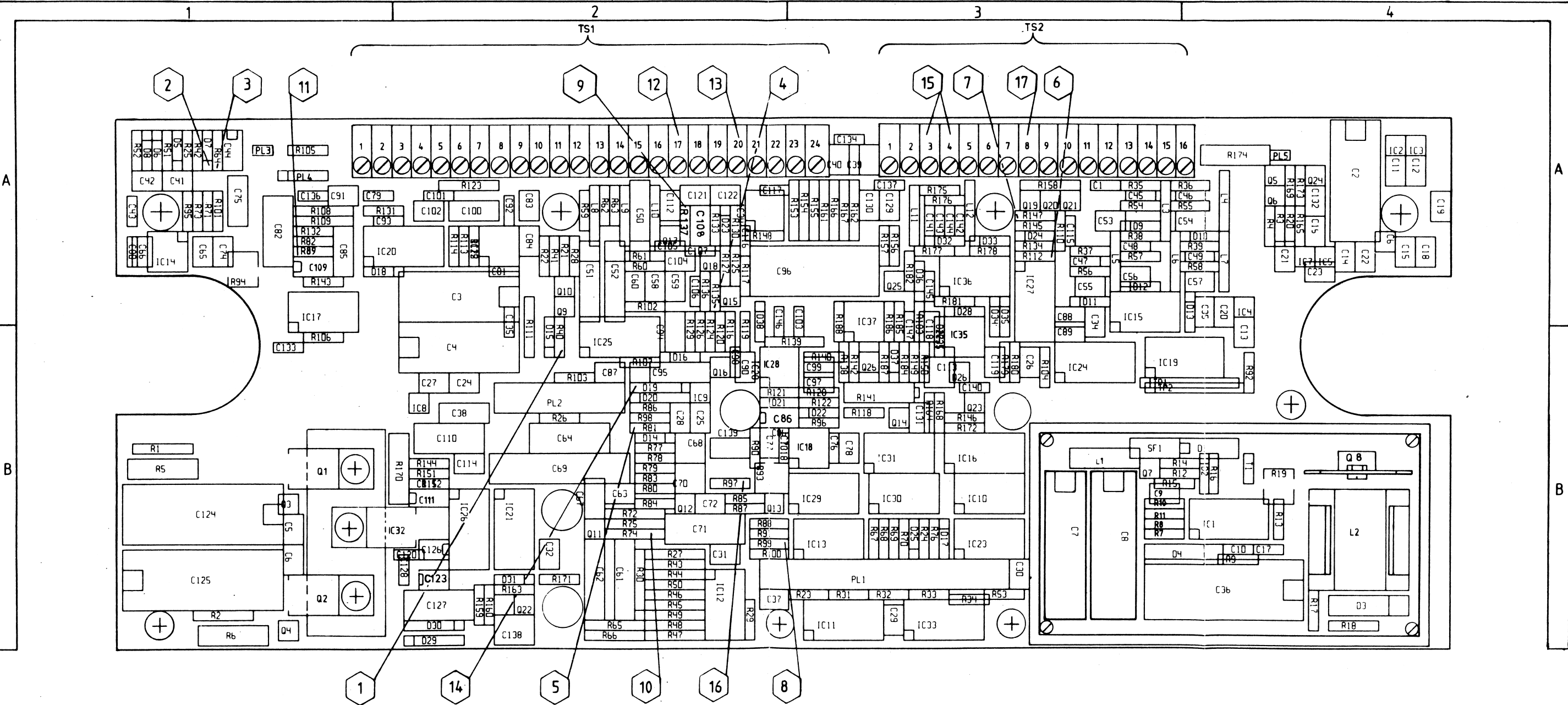
PCB 601 AUDIO PROCESSING BOARD

All power supply regulation in the Control Unit is performed on this board. Voltages of +24 V, -15 V, +15 V, -15 V are supplied from the Transceiver Unit. The +15 V and one -15 V line are current limited to approximately 0.7 A before supplying the audio power amplifier in order not to disturb the function of the equipment in case of irregularities on the loudspeaker lines. For the same reason the current from the loudspeaker is returned in these -15 V wires and not via the "GND" wire. All other circuits are supplied from the +24 V and the second -15 V voltage. To obtain the necessary regulation and isolation between the circuits, these voltages are stabilized in several small 0.1 A regulators, supplying +/-12 V and +6 V for receiver AF-circuits, +/-12 V and +6 V for transmitter AF-circuits and +/-12 V for the digital circuits. +5 V to the Control Board 600 is derived from +24 V by means of a switching regulator, capable of delivering 2 A. All functions on 601 are controlled by the microprocessor on 600 through a 3 wire serial interface. The 5V microprocessor signals are level-shifted to the 12 V logical level used on 601 and converted to a 16-bit parallel code. 3 bits control the key selector and the input selector. Before the signals enter the selectors, they pass through the filters, where they are filtered, limited and shaped (keysignals only). The microphone signal further passes through the microphone amplifier where the gain can be set from 0 to 15 dB by means of a potentiometer. A delay circuit makes it possible to delay the positive edge of the telex key signal from 0 to 30 ms in steps of 3.33 ms. The negative edge remains unaffected. Accuracy of the delay time will be within one period of the reference clock signal from the microprocessor (0.42 ms). The selectors are controlled as follows:

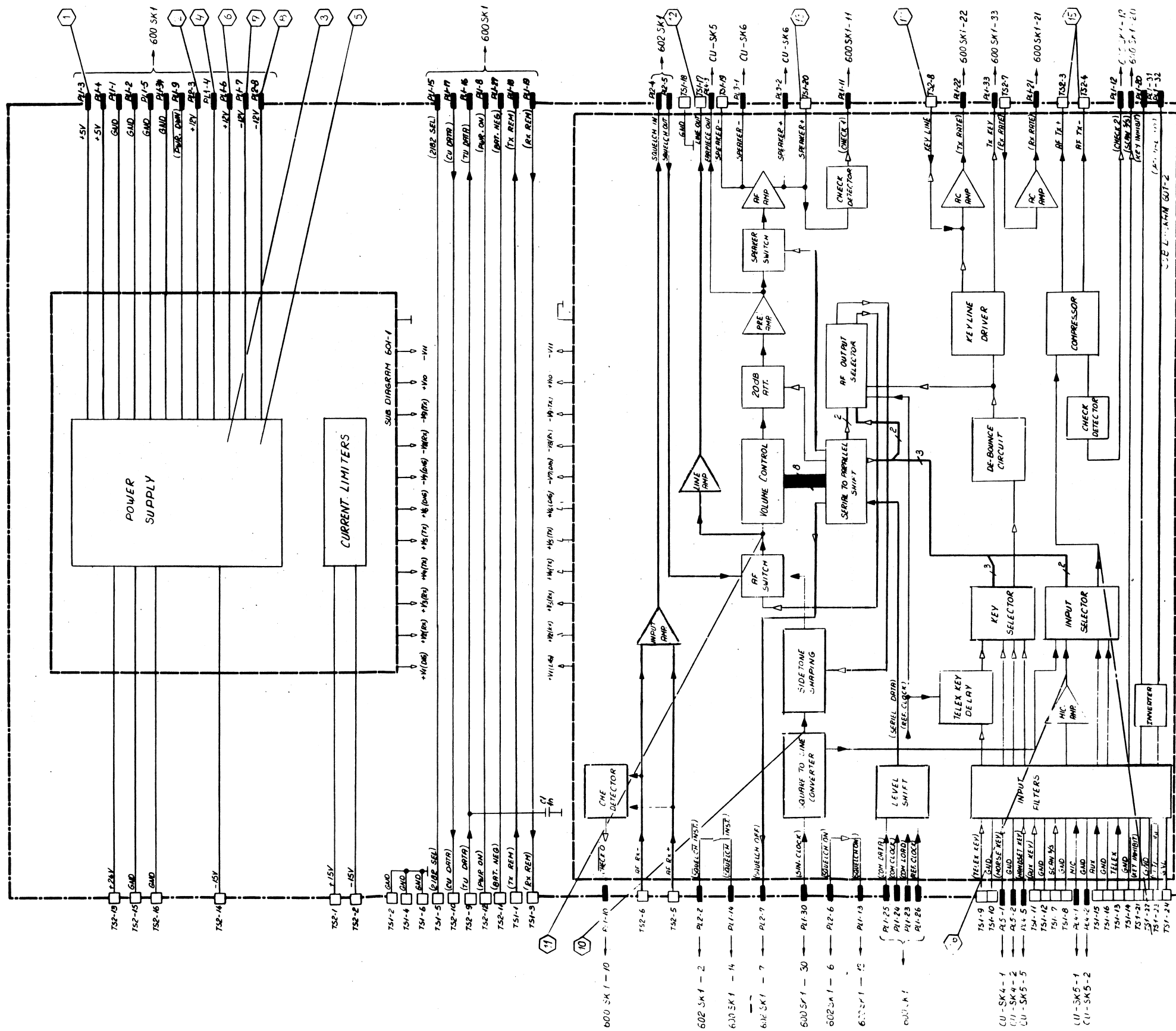
Mode	Keyselector	Inputselector
AM/R3E	Handset/aux.	Mic./aux.
USB/LSB		
CW	Morse	off
MCW	Morse	Sinetone
TELEX	Telex	Telex
ALARM SEND	Constant keyed	Sinetone
ALARM TEST	off	Sinetone

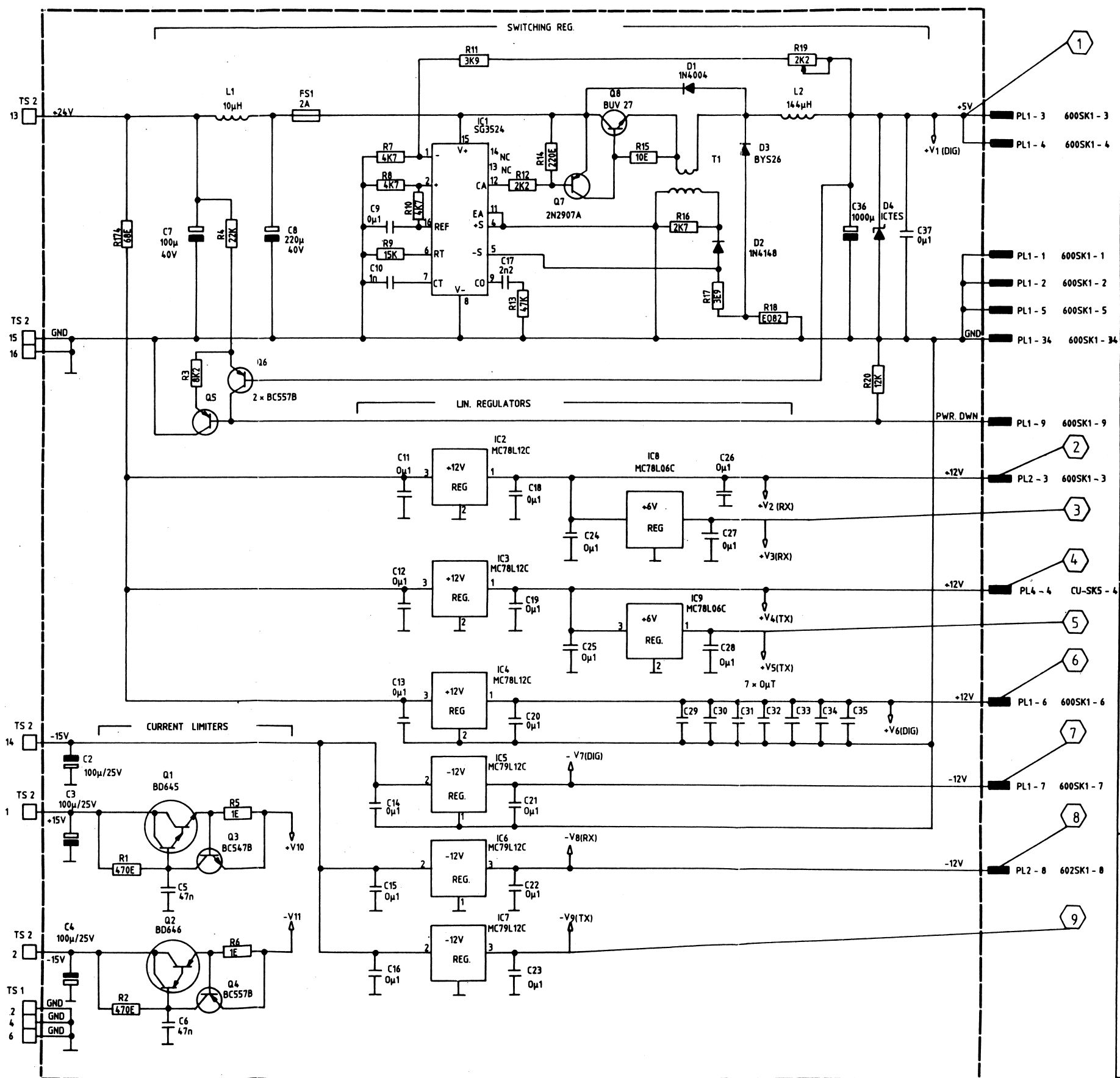
In the AM/SSB modes a keying signal from the handset will open the microphone input, and a signal from the aux. key input will open the aux. input. If both keying inputs are activated, the analog signals will be mixed. The sinetone to the input selector is derived from a clocksignal produced by the microprocessor on 600. The squarewave is converted in the square-to-sine converter circuit to a sinewave with a frequency 16 times lower than the clock frequency. The sinetone frequency is 919 Hz in MCW mode and 1300 Hz/2200 Hz in the alarm-modes. From the input selector the signal is led to the compressor circuit, where it is levelled to a 0 dBm (0.775 V RMS) balanced signal before transmission to the Transceiver Unit. A check detector circuit informs the control board 600 when the input signal is compressed (in the -3 dBm -0 dBm range). From the key selector the signal is led to the debounce circuit, which will cancel any bounce on the edges of the keying signal within

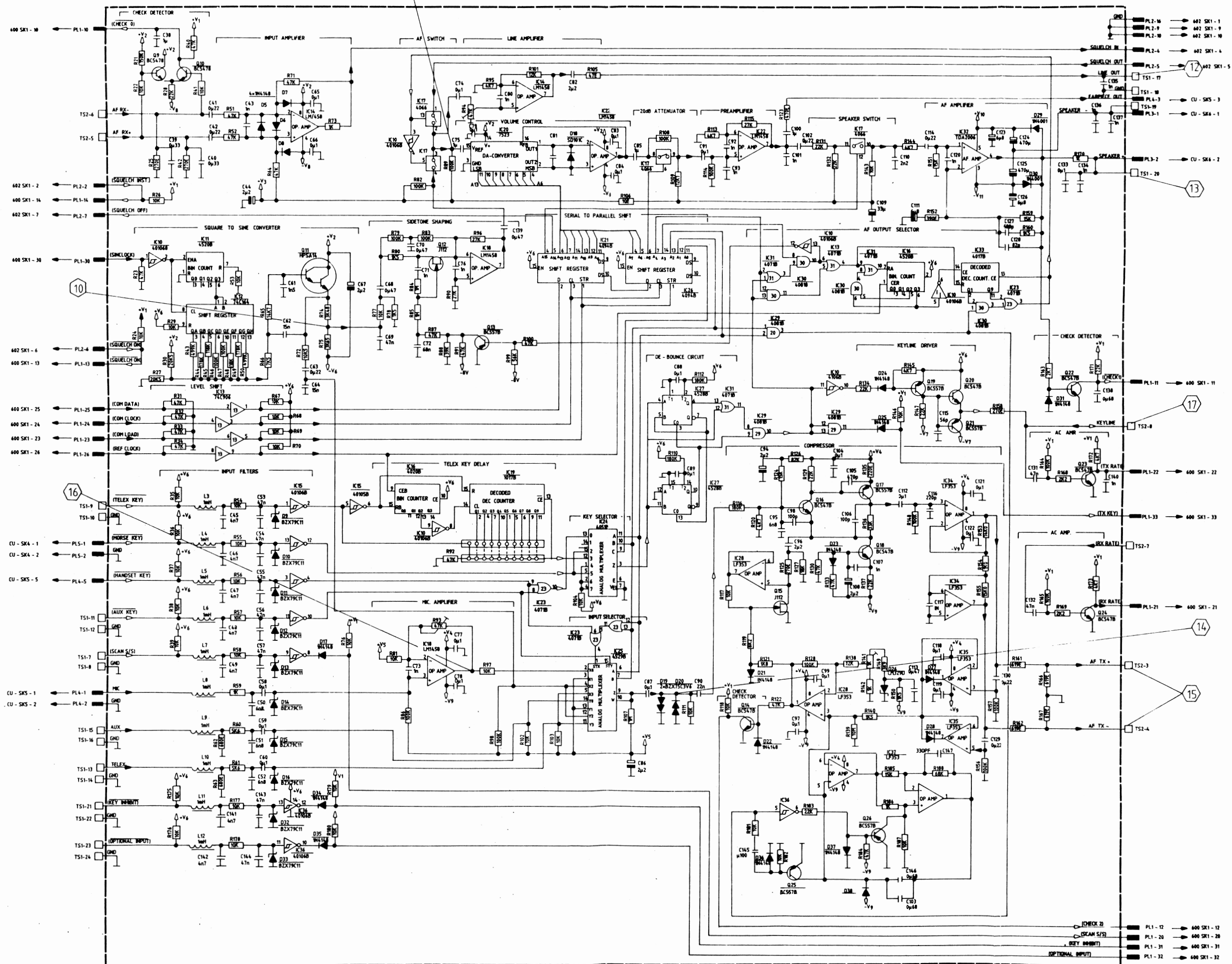
approximately 10 ms from first level-shift. The signal is separated from the keyline to the Transceiver Unit by a class B driver stage. The signal is also transmitted to the control board [600]. The keyline also carries a frequency modulated signal from the Transceiver Unit to the Control Unit with information about the transmitter RF output power. The RX-RATE line carries a similar signal representing signal strength. These signals are amplified in two equal amplifiers before they continue to the control board [600]. The RX signal path on [601] starts with a check-detector, which registers if the balanced lines from the Transceiver Unit carries a signal greater than approx. 0.5 V RMS (nominal line level is 0.775 V RMS). The input amplifier converts the differential signal to a single signal of the same level before it is fed to the Squelch Board [602] if provided. When it returns from [602] (or from the bypass socket in PL2) it enters the AF-switch. Here it is possible to select either the RX signal or the sidetone from the shaping circuit. Both shaping and AF-switch is controlled by the AF-output selector which combines RX/TX mode and keyline to obtain correct switch-timing (e.g. a 45 ms break-in time in CW and NCW modes). The clock reference is the same as for the telex key delay circuit. From the AF-switch the signal enters volume control and line amplifier. The line output signal can be adjusted from 0 to approx. 2.4 V RMS (+10 dBm) by means of a potentiometer. The volume control is build around an 8-bit digital-to-analog converter followed by a 20 dB attenuator in order to control the audio volume by the control board processor. The RX signal path further consists of a preamplifier, which also drives the earpiece, a speaker on/off switch and the audio power amplifier. The signal to the loudspeaker is monitored by a check-detector.



PCB 601 VERSION 4A
AUDIO PROCESSING BOARD
VIEWED FROM COMPONENT SIDE





PCB 601 AUDIO PROCESSING BOARD
VERSION 4A SUBDIAGRAM 2 OF 2

TEST POINTS FOR PCB 601 AUDIO PROCESSING BOARD

① + 5V DC

⑥ +12V DC

② +12V DC

⑦ -12V DC

③ +6 V DC


⑧ -12V DV


④ +12V DC


⑨ -12V DC


⑤ +6 V DC

In self test # 2 following is measured:


⑩  1.8Vpp 800Hz


⑪  2.2Vpp 800Hz

⑫  4.5Vpp 800Hz

⑬  22Vpp 800Hz

In self test # 4 following is measured:

⑭  1.8Vpp 800Hz

⑮  1Vpp 800Hz

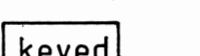
The two signals must be in phase opposition.

SSB check

SSB-mode is selected. Key-in a TX frequency (the signal route between exciter and transmitter may be removed), talk into the microphone and check the signal in:

⑯ ca. 1-5Vpp

⑮ ca. 1Vpp

⑰ 0  +12V
-12V

CW check

check that the morse key can activate the keyline ⑰ as above.

MCW check

⑮ 1Vpp shaped when keyed from morse key.

PARTS LIST FOR AUDIO PROCESSING BOARD 601 VERSION 4A

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Printed Circuit Board Complete 601							
IC1	SG3524	107	560	11			
IC2-4	UH78L12AC	850	352	40			
IC5-7	LM79L12C	850	781	21			
IC8-9	UH78L06C	850	791	21			
IC10,15,36	CD40106B	850	780	61			
IC11,16	CD4520B	854	010	60			
IC12	74C164	850	452	00			
IC13	74C906	857	416	40			
IC14,18,22	MC1458N	857	490	60			
IC17	CD4066BC	850	145	81			
IC19,33	4017B	850	406	60			
IC20	AD7523JN	850	401	70			
IC21,26	4094B	850	752	30			
IC23,31	4071B	850	409	40			
IC24	4051B	850	407	10			
IC25	4529B	850	405	10			
IC27	4528B	850	452	90			
IC28,34,37	LF353	850	452	80			
IC29-30	4081B	850	035	30			
IC32	TDA2006H	850	408	10			
IC35	LF353	850	200	60			
Q1	BD645	842	064	50			
Q2	BD646	842	064	60			
Q3,9-10,14,16, 18,20,22-24	BC547B	840	054	70			
Q4-6,13,17,19,21, 25,26	BC557B	840	055	70			
Q7	2N2907A	840	290	70			
Q8	BUV27	842	002	70			
Q11	MPSA14	840	001	40			
Q12,15	J112	843	011	20			
D1	10D4	831	010	40			
D2,5-8,17,21-25, 27-28,31,34-38	1N4148	830	414	80			
D3	BYS26	831	002	60			
D4	ICTE-5	839	000	51			
D9-16,32-33	BZX79C11	832	791	10			
D18	SD101C	830	010	10			
D19-20	BZX75C3V6	832	753	60			
D26	LM329DZ	830	032	90			
D29-30	10D05	831	100	51			
R1-2							
R3,119							
R4,28,129,131, 132,134,137,147, 171,183							
R5-6,170							
R7-8,10,95,113,120, 144-145,172-173							
R9,124,151,159,185							
R11,149							
R12,168-169							
R13,23,31-34,40, 51-52,64,71,87, 91-92,100,122, 130,133,184							
R14,135							
R15,106							
R16,163							
R17							
R18							
R19							
R20,120,138							
R21							
R22,24,26,29, 35-39,41,53-58, 67-70,76-77,81, 97,102-104,117-118, 143,146,175-182, 187							
R25,42,125							
R27,30							
R43,50							
R44,49							
R45,48							
R46-47,108							
R59,73,142,186							
R60-61							
R62-63							
R65							
R66							
R72							
R74							
R75							

PARTS LIST FOR AUDIO PROCESSING BOARD 601 VERSION 4A

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R78, 80, 140, 150, 160	1.5 kohm	5%	1/8W	MF	500 315 00	C17	2.2 nF	10%	63V	Cer.	602 322 00
R79, 82-83, 86, 89, 98, 114, 128, 148, 156-157, 164-165	100 kohm	5%	1/8W	MF	500 510 00	C36	1000 uF		16V	W.alum.	651 910 00
R84-85, 107	1 Mohm	5%	1/8W	MF	500 610 01	C38, 75, 85, 100	1 uF	10%	63V	Polyst.	622 610 02
R88	39 kohm	5%	1/8W	MF	500 439 00	C39-40	0.33 uF	20%	63V	Polyst.	622 533 01
R90, 96, 115	27 kohm	5%	1/8W	MF	500 427 01	C41-42, 63, 102, 114, 129-130	0.22 uF	20%	63V	Polyst.	622 522 01
R93-94	47 kohm	5%	1/8W	Pot.	583 447 01	C44, 67, 86, 94, 108	2.2 uF		35V	Tan.	652 622 01
R99	56 kohm	5%	1/8W	MF	500 456 00	C45-49, 141-142	4.7 nF	10%	63V	Cer.	602 347 02
R105	47 ohm	5%	1/8W	MF	500 147 00	C50-52, 95	6.8 nF	1%	160V	Polyst.	612 368 00
R109	12.1 kohm	1%	1/8W	MF	511 412 10	C61	1.5 nF	1%	63V	Polyst.	613 315 01
R110, 112, 116	180 kohm	5%	1/8W	MF	500 518 00	C62, 64	15 nF	1%	63V	Polyst.	612 415 00
R111	10 kohm	5%	1/8W	MF	511 410 00	C68, 70, 113, 139	0.47 uF	10%	63V	Polyst.	622 547 01
R121	1.8 kohm	5%	1/8W	MF	500 318 00	C69	47 nF	1%	160V	Polyst.	613 447 00
R123	470 ohm	5%	1/4W	Car.	501 247 00	C71	1 nF	1%	125V	Polyst.	613 310 02
R126	82 kohm	5%	1/8W	MF	500 482 00	C72	68 nF	20%	63V	Polyst.	622 468 00
R127	18 kohm	5%	1/8W	MF	500 418 00	C82	2.2 uF	10%	63V	Polyst.	622 622 00
R136	33 kohm	5%	1/8W	MF	500 433 00	C90	22 nF	20%	63V	Polyst.	622 422 00
R139	10 Mohm	5%	1/4W	Car.	501 710 00	C96	2.2 uF	20%	250V	Polyst.	624 622 02
R141	1 kohm	5%	1/8W	Pot.	581 310 00	C98, 106	100 pF	2%	63V	N150	602 210 00
R152	390 ohm	1%	1/8W	MF	500 239 00	C103, 146	0.68 uF	10%	63V	Polyst.	622 568 02
R153	14.0 kohm	1%	1/8W	MF	511 310 00	C105	470 pF	10%	63V	Cer.	602 247 00
R154	1.0 kohm	1%	1/8W	MF	511 414 00	C109	33 uF	-20+40%	10V	Tan.	651 733 00
R155	15.0 kohm	1%	1/8W	MF	511 310 00	C110	2.2 nF	1%	125V	Polyst.	613 322 00
R158	270 ohm	5%	1/4W	Car.	511 415 00	C111	6.8 uF	-20+40%	25V	Tan.	652 668 00
R161-162, 166-167	619 ohm	1%	1/8W	MF	501 227 00	C115	56 pF	2%	63V	N150	602 156 00
R174	68 ohm	5%	1.6W	MF	511 261 90	C116	220 pF	10%	63V	Cer.	602 222 00
R188	68 kohm	1%	1/8W	MF	525 168 00	C123, 126	6.8 uF		25V	Sol.al.	652 888 01
C1, 10, 43, 73, 76, 80, 81, 92-93, 101, 107, 117, 120, 134-137, 140	1 nF	10%	63V	Cer.	602 310 02	C124-125	470 uF		40V	Tan.	652 847 00
C2-4	100 uF		25V	W.alum.	652 810 00	C127	680 pF	1%	250V	Polyst.	614 268 00
C5-6, 53-57, 131-132, 143, 144	47 nF	20%	63V	Polyst.	622 447 01	C128	82 pF	2%	63V	N150	602 182 00
C7	100 uF	-10+50%	40V	W.alum.	651 810 04	C147	330 pF	10%	63V	Cer.	602 233 00
C8	220 uF	-10+50%	40V	W.alum.	651 822 02	L1	10 uH				740 110 00
C9, 11-16, 18-35, 37, 58-60, 65-66, 74, 77-79, 83-84, 87-89, 91, 97, 99, 104, 112, 118-119, 121-122, 133, 145	0.1 uF	20%	63V	Polyst.	622 510 00	L2	144 uH				383 576 7X
						L3-12	1 mH	5%			740 310 03
						T1	TRANSFORMER				103 576 81
						TS1	TERMINAL STRIP			10 pcs	770 000 19
						FS1	2A/125V				720 320 02
						PL1	34 POL HEADER				756 034 01
						PL2	10 POL HEADER				756 010 02
						PL3, 5	5 POL				751 001 42
						PL4	2 POL				751 001 41