

8.11 T2000-50 Handsfree Kit

The T2000-50 handsfree kit is designed for use with all T2000 Series II mobiles, and allows communication through the normal PTT microphone, or 'handsfree' operation through a directional microphone.

When 'handsfree' operation is being used, the transmitter is activated either by the foot-switch (Manually Operated Transmit) or automatically, by detecting the sound of a voice. The latter is known as the Voice Operated Transmit (VOX) mode. VOX operation is only intended for use in quiet modern vehicles.

Note: With trunked radios, a call needs to be established before VOX or footswitch becomes operative. Normal handsfree operation can be used on a conventional channel.

The following topics are covered in this Section:

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8.11.1 Components Required

The T2000-50 kit contains the following components:

Quantity	Description
1	T2000-50 PCB assembly
1	directional microphone (with optional sunvisor clip or tie clip)
1	footswitch
1	9 way D-range assembly with 2 in-line connectors & microphone socket attached
1	shroud (alternative shroud - not required for T2000 Series II radios)
1	2 way in-line connector
3	M3x8 pan Pozi Taptite screws
2	4-40x¼ pan Pozi Taptite screws (black)

8.11.2 Fitting

- 1 Refer to Figure 8.11.1.

Remove the top cover of the radio by unscrewing the four cover screws, unclip the D-range blanking plate in the rear of the T2000 radio, unscrew the logic PCB and fold-out.

Position the T2000-50 PCB as shown, and connect the Micromatch connectors P13 and P14 to S13 and S14 on the T2000 logic PCB.

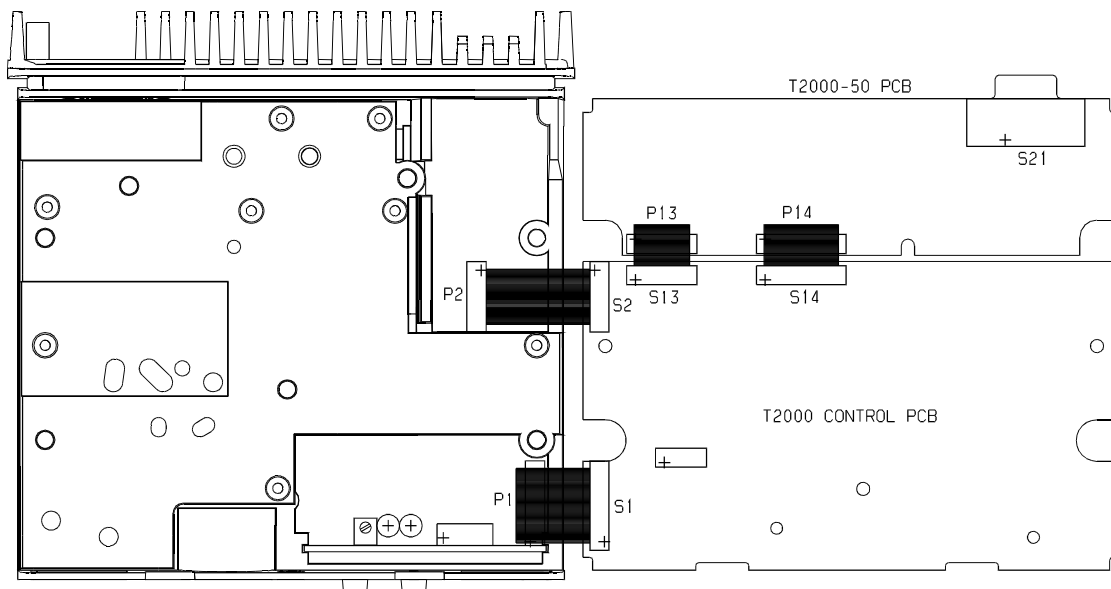


Figure 8.11.1 T2000-50 Handsfree PCB Mounting

- 2 **T2010 & T2015:** Remove R513 (0Ω resistor) on the logic PCB.

- 3 After manufacture, the T2000-50 PCB links are left open and will need to be customer selected. For details of optional links, refer to the Link Options Table in the circuit diagram.

Non-trunked radios: standard links are 4B and 5A.

- 4 Set up the T2000-50, as described in Section 8.11.4, "T2000-50 Set-Up".

A +5V logic signal is provided to indicate VOX activity (S21 pin 7). 'VOX' (violet wire) and 'ground' (grey wire) are both available from the D-range assembly red in-line connector.

A spare in-line connector is also included in the kit for interfacing to an appropriate visual indicator e.g. an LED.

- 5 Carefully fold the logic and T2000-50 PCBs back in position, guiding the D-range connector through the hole provided in the T2000 chassis.

Check that no electrolytic capacitors are touching the T2000 chassis (e.g. C21 or C51.)

- 6 Secure using the three logic PCB retaining screws and the three M3x8 screws provided and refit the top cover.

Plug the D-range assembly provided in the kit into the D-range connector (S21).

Note: Holes are provided in the T2000 chassis for the D-range plug locking screws. Use the two black 4-40x¼ Taptite screws provided in the kit to form the threads.

8.11.3 Fitting The Complete Unit In The Vehicle

Microphone Mounting

The handsfree directional microphone plugs into the T2000 via the D-range assembly microphone socket. The positioning of the microphone is important for correct operation of the handsfree unit and some experimentation may be necessary to obtain the best performance from the VOX.



- The microphone should be mounted in a position 20cm or less from the driver.
- The microphone location should be free from vibration.
- The microphone must face the driver.

Footswitch Mounting

The footswitch plugs into the D-range interface via the black 2 way in-line connector. It is recommended that the footswitch be screwed to the floor.

Note: The 3m lengths of the footswitch and microphone can be effectively extended by fitting a standard 9 way D-range extender cable between the radio and the D-range assembly. These extension cables are not included as standard but are available from most computer outlets.

Radio Programming

The radio may need reprogramming to accommodate the handsfree unit. The **auxiliary** key  for the T2010, T2015 and T2020 or the **function** key  for trunked radios must be programmed for latching if VOX mode is to be used. Refer to the T2000 programming manual.

For T203X and T2040 radios, the 'handsfree' option will also need to be selected under 'Specifications' (refer to the 'Specifications' section of the programming manual).

Vox Sensitivity

Although the VOX circuitry has been designed to operate in varying conditions, it may be necessary to change the minimum threshold for VOX operation.

Monitor TP5 without the directional microphone connected and adjust RV67. Turning RV67 clockwise increases sensitivity, and anticlockwise decreases sensitivity.

Note: For the majority of applications, it is recommended that the setting is left at the factory setting of 0.8V.

8.11.4 T2000-50 Set-Up

Test Equipment Required

Note: T2000-50 set-up should only be necessary after major repair.

- AF signal generator
- modulation analyser
- high impedance voltmeter (e.g. VTVM)
- oscilloscope
- power supply (+13.8V)
- RF power meter or load
- 30dB RF attenuator

The following diagram shows a typical test set-up.

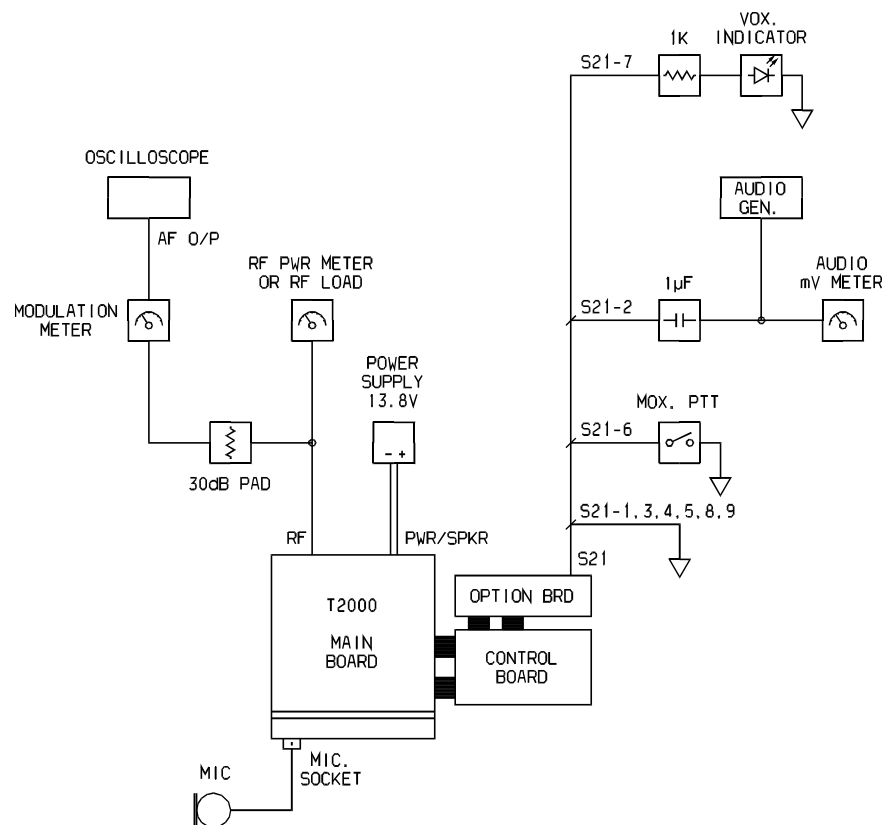


Figure 8.11.2 Test Equipment Set-Up

Test

- 1 Set up the equipment as shown in Figure 8.11.2, and set the audio generator to 1kHz at a level of 0.8mV.

Switch on the T2000 and check the increase in current with the T2000-50 fitted is less than 30mA.

- 2 Switch on the MOX (Manually Operated Transmit) PTT and check that the modulation is at approximately 60% of full system deviation. Check that no audio path is evident through the normal microphone.

Activate the PTT on the normal microphone and check that there is now an audio path through the microphone.

- 3 With no audio, adjust RV67 for 0.8V at TP5.

Remove the TCXO PCB to operate the /IN-LOCK signal and check that the DC level now goes to $6.5V \pm 0.5V$. Replace the TCXO.

- 4 Increase the audio level by 10dB.

With all PTTs off, activate the auxiliary Ω or function F_n keys (radio is in VOX mode).

Sweep the audio generator slowly from 1kHz to 100Hz and back again and check that the transmitter keys between $700Hz \pm 70Hz$ and $250Hz \pm 25Hz$.

When going from receive to transmit the radio should key instantly at these cut-offs. When going from transmit to receive check there is a delay of approximately 1.5 seconds.

Check that VOX transmit is inhibited if the channel is busy (assuming LINK4B is fitted).

- 5 Switch on the MOX PTT and set the audio generator to 1kHz at a level of -50dBm (3mV).

Monitor TP9 and check that the level on the scope is $1.2V_{p-p} \pm 0.2V$.

Increase the audio level by 10dB and check that the level on the scope is about the same.

Decrease audio level by 20dB. After observing the charging action of the compressor, the level on the scope should be $0.4V_{p-p} \pm 0.1V$.

Trunking only: The audio at TP9 should be there on an assigned channel, a non-trunked channel or in test mode. When the radio is on a control channel or hunting for a control channel, the audio should be muted.

- 6 A final system check can be done with the directional microphone and footswitch.

8.11.5 Signal Specifications

The following table describes S21 pin-outs, and relevant interface signals on S13 and S14 (T2000 logic PCB). S21 is the 9 way D-type connector mounted on the heatsink at the rear of the radio.

Pin No.	Signal	Description	Level
S21-1	GND		
S21-2	MIC	Input for directional mic. audio	
S21-3	GND		
S21-4	GND		
S21-5	GND		
S21-6	FT-SWTCH	Requests handsfree transmit.	
S21-7	VOX	Output signalling valid VOX operation.	
S21-8	GND		
S21-9	GND		
S13-6	TX-LINE-IN	Electret microphone audio switched in during handsfree transmit.	300mVp-p at 60% mod. 1kHz
S13-7	RX-GTD-AF	Used to provide VOX trunking inhibit for received speech.	110mVrms at 60% mod. 1kHz
S13-11	OPTIONS-GND	Provides the ground for the options circuitry.	
S14-1	+13.8V	Powers the +8V regulator used to supply audio circuitry	10.8V to 16V DC available current 200mA
S14-2	+5V	Used to supply power for the logic circuitry.	available current 150mA
S14-3	BUSY	Used to mute invalid audio when transmitter has been inhibited.	carrier detect 0V = busy
S14-5	/PTT-TO-OPT	Echoed to S14-6 for normal PTT request. Switches off S13-6.	5V pull-up 0V = Tx
S14-6	/PTT-FRM-OPT	Provides the signal for the radio to transmit.	5V CMOS 0V = Tx
S14-7	/IN-LOCK	Used to inhibit VOX Tx requests when the radio is out of lock.	synthesiser lock detect 0V = lock (lock-up time <20ms)
S14-11	CALL-SW	Used by trunking software to mute invalid audio.	5V CMOS 5V = mute

The following diagram shows the pin designations of S21, viewed from the rear of the radio.

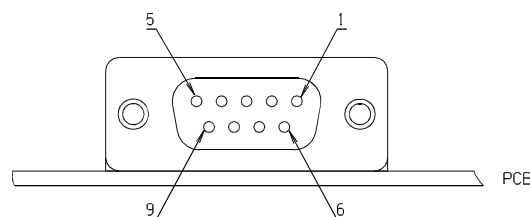


Figure 8.11.3 9 Way D-Range Connector (S21)

8.11.6 Specifications

Current	.. <30mA
Operating Temperature Range	.. -30 to +60°C ambient
Audio:	
Input For 60% Deviation	.. 1mVrms ± 0.1mV (1kHz, 600Ω)
Microphone	.. uni-directional electret
Microphone sensitivity	.. -67dB ±3db (0dB = 1V/μbar)
Distortion	.. <5%
Delay From Audio To PTT Request	.. 20ms (typical)

8.11.7 Circuit Description

Audio is fed into the preamplifier circuitry (Q1) from the electret microphone via pin 2 of the 9 way D-range (S21). The pre-amplified audio is then split and goes into the speech bandpass filter and the noise filter.

The speech bandpass filter consists of a 4th order 250Hz high pass filter (IC1) and a gain stage (IC1) with a 3kHz rolloff. Audio then goes into the compressor circuitry (IC1). When PTT is requested by the logic circuitry, IC2 switches and the audio is driven into the TX-LINE-IN at a low impedance. After the high pass filter, audio is tapped off into the speech VOX filter (IC4), which provides a low pass cutoff of 700Hz. This, combined with the previous high pass filter, gives the speech VOX filter cutoffs of 250Hz and 700Hz.

The second path of the audio after the preamplifier is to the noise filter (IC3). This consists of a 2nd order high pass filter below 100Hz.

After the gain adjusting stages (IC3 & IC4) each filter goes into a precision rectifier (IC3 & IC4), where their appropriate DC level is presented to a comparator (IC3 pins 12, 13 & 14). The negative input has a potentiometer (RV67) providing a DC offset, which is used to provide a minimum VOX threshold. This minimum threshold decreases with VOX activity to provide some hysteresis. The negative input is also held high via IC2, preventing the comparator switching until the synthesiser lock detect line (IN/LOCK) is low. The positive input has a zener diode to prevent VOX activating when both inputs are in saturation.

The switching circuitry after the comparator output has a slow decay provided by R69 and C31. IC5 will only allow a VOX PTT request if the AUX line has been taken high. Two NAND gates in IC5 allow a handsfree PTT request (VOX or MOX) to proceed unless the PTT-IN line has been taken low. A valid handsfree PTT request will mute the ordinary microphone and switch IC2, whereas a PTT-IN signal will be mirrored on the PTT line, without switching in the handsfree audio or muting the ordinary microphone.

The CALL line is used by trunking software to mute the handsfree audio when the audio path has been invalidly switched in (i.e. on a control channel). Similarly, the BUSY line is used to mute the audio if TX inhibit on busy is used.

Trunking Continuous Carrier Systems

Optional circuitry is provided by IC7 to inhibit the VOX signal from the received audio, instead of BUSY. LINK4 is removed to disable the BUSY inhibit and the RX-AUDIO inhibit is enabled by changing LINK5A to LINK5B.

Receiver gated audio is buffered by IC7 pins 12, 13 & 14 and split off to feed into the VOX noise path (IC3 pins 5, 6 & 7) and also to a precision rectifier formed around IC7, pins 1, 2 & 3. The rectified audio signal is compared by IC7 pins 5, 6 & 7, and operates the inhibit circuit, Q14.

8.11.8 PCB Information

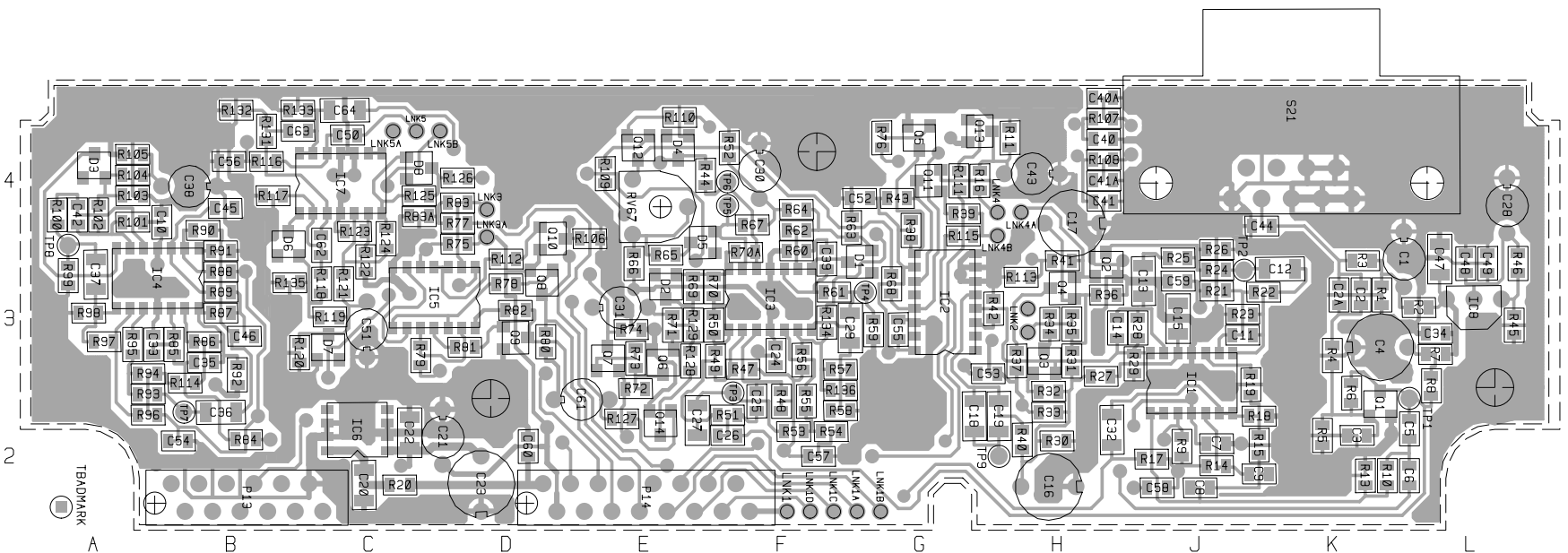
T2000-50 Parts List (IPN 220-01210-03)

Ref	IPN	Description	Ref	IPN	Description
C1	020-57470-10	CAP ELECT AI RDL 4U7 50V LO ESR	IC1	002-10003-24	(S) IC SMD 324 QUAD OP AMP SO14
C2	015-25220-08	CAP CER 0805 CHIP 22N 10% X7R 50V	IC2	002-10040-53	(S) IC 4053 SMD TRIPLE 2CH MULTI-PLEXR
C2A	015-25100-08	CAP CER 0805 CHIP 10N 10% X7R 50V	IC3	002-10003-24	(S) IC SMD 324 QUAD OP AMP SO14
C3	015-24470-08	CAP CER 0805 CHIP 4N7 10% X7R 50V			
C4	020-58470-05	CAP ELECT AI RDL 47M 16V 6.3X7MM	IC4	002-10003-24	(S) IC SMD 324 QUAD OP AMP SO14
C5	015-25150-08	CAP CER 0805 CHIP 15N 10% X7R 50V	IC5	002-74900-00	(S) IC SMD 74HC00 QUAD 2 I/P NAND
C6	015-25150-08	CAP CER 0805 CHIP 15N 10% X7R 50V	IC6	002-10078-08	(S) IC SMD 78L08 8V REG SO8
C7	015-23150-01	CAP CER 0805 CHIP 150P 5% NPO 50V	IC7	002-10003-24	(S) IC SMD 324 QUAD OP AMP SO14
C8	015-25150-08	CAP CER 0805 CHIP 15N 10% X7R 50V	IC8	002-00014-62	(S) IC 317L 100MA REG 3 TERMINAL TO-92
C9	015-25150-08	CAP CER 0805 CHIP 15N 10% X7R 50V			
C10	015-23150-01	CAP CER 0805 CHIP 150P 5% NPO 50V	P13	240-00026-26	CONN PADLE BRD 12 WAY MICRO MATCH 1-215
C11	015-23680-08	CAP CER 0805 CHIP 680P 10% X7R 50V	P13A	240-00020-51	PLUG 12 WAY 2*6 FLAT CABLE TERMN
C12	015-06100-08	CAP CER 1206 CHIP 100N 10% X7R 50V	P14	240-00026-24	CONN PADLE BRD 16 WAY MICRO MATCH 1-215
C13	015-06100-08	CAP CER 1206 CHIP 100N 10% X7R 50V	P14A	240-00020-54	PLUG 16 WAY 2X8 FLAT CABLE TERMN MICROM
C14	015-21470-01	CAP CER 0805 CHIP 4P7 +/-0.25P NPO 50V			
C15	015-06100-08	CAP CER 1206 CHIP 100N 10% X7R 50V	Q1	000-10008-48	(S) XSTR SMD BCW60/BC848B215 NPN SOT23 A
C16	020-58470-05	CAP ELECT AI RDL 47M 16V 6.3X7MM	Q2	000-10008-48	(S) XSTR SMD BCW60/BC848B215 NPN SOT23 A
C17	020-58470-05	CAP ELECT AI RDL 47M 16V 6.3X7MM	Q3	000-10008-57	(S) XSTR SMD BCW70/BC857-215 PNP SOT23 AF
C18	015-06100-08	CAP CER 1206 CHIP 100N 10% X7R 50V	Q4	000-10008-48	(S) XSTR SMD BCW60/BC848B215 NPN SOT23 A
C19	015-06100-08	CAP CER 1206 CHIP 100N 10% X7R 50V	Q5	000-10008-48	(S) XSTR SMD BCW60/BC848B215 NPN SOT23 A
C20	015-06100-08	CAP CER 1206 CHIP 100N 10% X7R 50V	Q6	000-10008-48	(S) XSTR SMD BCW60/BC848B215 NPN SOT23 A
C21	020-57470-10	CAP ELECT AI RDL 4U7 50V LO ESR	Q7	000-10008-57	(S) XSTR SMD BCW70/BC857-215 PNP SOT23 AF
C22	015-06100-08	CAP CER 1206 CHIP 100N 10% X7R 50V	Q8	000-10008-57	(S) XSTR SMD BCW70/BC857-215 PNP SOT23 AF
C23	020-58470-05	CAP ELECT AI RDL 47M 16V 6.3X7MM	Q9	000-10008-48	(S) XSTR SMD BCW60/BC848B215 NPN SOT23 A
C25	015-25150-08	CAP CER 0805 CHIP 15N 10% X7R 50V	Q10	000-10008-57	(S) XSTR SMD BCW70/BC857-215 PNP SOT23 AF
C26	015-25150-08	CAP CER 0805 CHIP 15N 10% X7R 50V	Q11	000-10008-48	(S) XSTR SMD BCW60/BC848B215 NPN SOT23 A
C27	015-06100-08	CAP CER 1206 CHIP 100N 10% X7R 50V	Q12	000-10008-48	(S) XSTR SMD BCW60/BC848B215 NPN SOT23 A
C28	020-57470-10	CAP ELECT AI RDL 4U7 50V LO ESR	Q13	000-10008-57	(S) XSTR SMD BCW70/BC857-215 PNP SOT23 AF
C29	015-06100-08	CAP CER 1206 CHIP 100N 10% X7R 50V	Q14	000-10008-48	(S) XSTR SMD BCW60/BC848B215 NPN SOT23 A
C30	020-57470-10	CAP ELECT AI RDL 4U7 50V LO ESR			
C31	020-58100-04	CAP ELECT AI RDL 10M 16V 4X7MM	R1	036-14470-00	RES M/F 0805 CHIP 4K7 5%
C32	015-06100-08	CAP CER 1206 CHIP 100N 10% X7R 50V	R2	036-14270-00	RES M/F 0805 CHIP 2K7 5%
C33	015-25150-08	CAP CER 0805 CHIP 15N 10% X7R 50V	R3	036-14100-00	RES M/F 0805 CHIP 1K 5%
C34	015-23150-01	CAP CER 0805 CHIP 150P 5% NPO 50V	R4	036-14680-00	RES M/F 0805 CHIP 6K8 5%
C35	015-25150-08	CAP CER 0805 CHIP 15N 10% X7R 50V	R5	036-14270-00	RES M/F 0805 CHIP 2K7 5%
C36	015-06100-08	CAP CER 1206 CHIP 100N 10% X7R 50V	R6	036-15100-00	RES M/F 0805 CHIP 10K 5%
C37	015-06100-08	CAP CER 1206 CHIP 100N 10% X7R 50V	R7	036-13220-00	RES M/F 0805 CHIP 220E 5%
C38	020-57470-10	CAP ELECT AI RDL 4U7 50V LO ESR	R8	036-14220-00	RES M/F 0805 CHIP 2K2 5%
C39	015-23150-01	CAP CER 0805 CHIP 150P 5% NPO 50V	R9	036-15390-00	RES M/F 0805 CHIP 39K 5%
C40	015-24100-08	CAP CER 0805 CHIP 1N 10% X7R 50V	R10	036-15330-00	RES M/F 0805 CHIP 33K 5%
C40A	015-23150-01	CAP CER 0805 CHIP 150P 5% NPO 50V	R11	036-15470-00	RES M/F 0805 CHIP 47K 5%
C41	015-24100-08	CAP CER 0805 CHIP 1N 10% X7R 50V	R13	036-15100-00	RES M/F 0805 CHIP 10K 5%
C41A	015-23150-01	CAP CER 0805 CHIP 150P 5% NPO 50V	R14	036-15820-00	RES M/F 0805 CHIP 82K 5%
C42	015-23150-01	CAP CER 0805 CHIP 150P 5% NPO 50V	R15	036-15150-00	RES M/F 0805 CHIP 15K 5%
C43	020-57470-10	CAP ELECT AI RDL 4U7 50V LO ESR	R16	036-14100-00	RES M/F 0805 CHIP 1K 5%
C44	015-24100-08	CAP CER 0805 CHIP 1N 10% X7R 50V	R17	036-16100-00	RES M/F 0805 CHIP 100K 5%
C45	015-25150-08	CAP CER 0805 CHIP 15N 10% X7R 50V	R18	036-15100-00	RES M/F 0805 CHIP 10K 5%
C46	015-25150-08	CAP CER 0805 CHIP 15N 10% X7R 50V	R19	036-15100-00	RES M/F 0805 CHIP 10K 5%
C47	015-06100-08	CAP CER 1206 CHIP 100N 10% X7R 50V	R20	036-12100-00	RES M/F 0805 CHIP 10E 5%
C48	015-24100-08	CAP CER 0805 CHIP 1N 10% X7R 50V	R21	036-15100-00	RES M/F 0805 CHIP 10K 5%
C49	015-23150-01	CAP CER 0805 CHIP 150P 5% NPO 50V	R22	036-16100-00	RES M/F 0805 CHIP 100K 5%
C50	015-25100-08	CAP CER 0805 CHIP 10N 10% X7R 50V	R23	036-15100-00	RES M/F 0805 CHIP 10K 5%
C51	020-57100-55	CAP ELECT AI RDL 1UF 50V 4X7MM	R24	036-15470-00	RES M/F 0805 CHIP 47K 5%
C52	015-23150-01	CAP CER 0805 CHIP 150P 5% NPO 50V	R25	036-15220-00	RES M/F 0805 CHIP 22K 5%
C53	015-23150-01	CAP CER 0805 CHIP 150P 5% NPO 50V	R26	036-17100-00	RES M/F 0805 CHIP 1M 5%
C54	015-23150-01	CAP CER 0805 CHIP 150P 5% NPO 50V	R27	036-17100-00	RES M/F 0805 CHIP 1M 5%
C55	015-23150-01	CAP CER 0805 CHIP 150P 5% NPO 50V	R28	036-17100-00	RES M/F 0805 CHIP 1M 5%
C56	015-23150-01	CAP CER 0805 CHIP 150P 5% NPO 50V	R29	036-15100-00	RES M/F 0805 CHIP 10K 5%
C57	015-23150-01	CAP CER 0805 CHIP 150P 5% NPO 50V	R30	036-14180-00	RES M/F 0805 CHIP 1K8 5%
C58	015-23150-01	CAP CER 0805 CHIP 150P 5% NPO 50V	R31	036-17100-00	RES M/F 0805 CHIP 1M 5%
C59	015-23150-01	CAP CER 0805 CHIP 150P 5% NPO 50V	R32	036-15100-00	RES M/F 0805 CHIP 10K 5%
C60	015-23150-01	CAP CER 0805 CHIP 150P 5% NPO 50V	R33	036-14270-00	RES M/F 0805 CHIP 2K7 5%
C61	020-57470-10	CAP ELECT AI RDL 4U7 50V LO ESR	R34	036-14470-00	RES M/F 0805 CHIP 4K7 5%
C62	015-23150-01	CAP CER 0805 CHIP 150P 5% NPO 50V	R35	036-10000-00	RES M/F 0805 CHIP ZERO OHM
C63	015-25100-08	CAP CER 0805 CHIP 10N 10% X7R 50V	R36	036-16150-00	RES M/F 0805 CHIP 150K 5%
C64	015-06100-08	CAP CER 1206 CHIP 100N 10% X7R 50V	R37	036-14100-00	RES M/F 0805 CHIP 1K 5%
D1	001-10000-99	(S) DIODE SMD BAV99 DUAL SWTCH SNGLE SO	R38	036-16100-00	RES M/F 0805 CHIP 100K 5%
D2	001-10000-99	(S) DIODE SMD BAV99 DUAL SWTCH SNGLE SO	R39	036-16220-00	RES M/F 0805 CHIP 220K 5%
D3	001-10000-99	(S) DIODE SMD BAV99 DUAL SWTCH SNGLE SO	R40	036-17100-00	RES M/F 0805 CHIP 1M 5%
D4	001-10084-51	(S) DIODE ZENER SMD BZX84C5V1 SOT23	R41	036-14100-00	RES M/F 0805 CHIP 1K 5%
D5	001-10000-99	(S) DIODE SMD BAV99 DUAL SWTCH SNGLE SO	R42	036-15100-00	RES M/F 0805 CHIP 10K 5%
D6	001-10000-99	(S) DIODE SMD BAV99 DUAL SWTCH SNGLE SO	R43	036-16100-00	RES M/F 0805 CHIP 100K 5%
D7	001-10084-36	(S) DIODE ZENER SMD BZX84C3V6 SOT23	R44	036-15470-00	RES M/F 0805 CHIP 47K 5%
D8	001-10000-99	(S) DIODE SMD BAV99 DUAL SWTCH SNGLE SO	R45	036-14100-00	RES M/F 0805 CHIP 1K 5%
			R46	036-13470-00	RES M/F 0805 CHIP 470E 5%

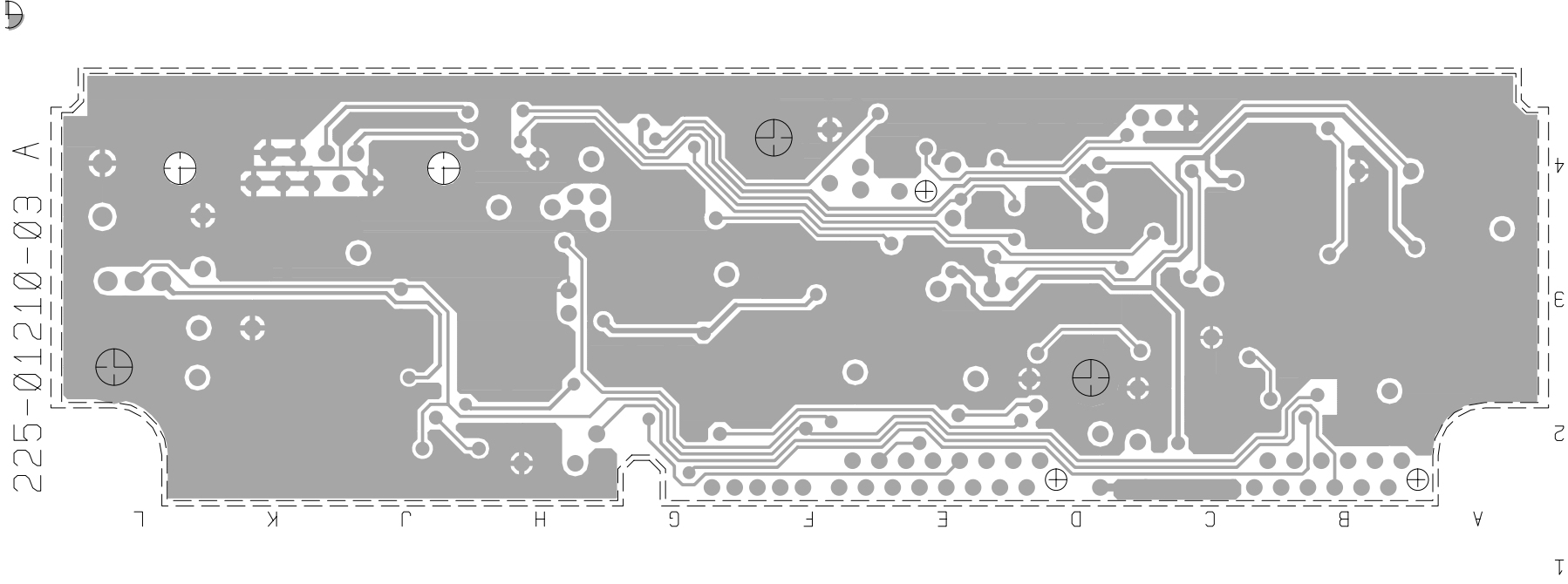
T2000-50 Grid Reference Index (IPN 220-01210-03)

Device	PCB	Circuit	Device	PCB	Circuit	Device	PCB	Circuit	Device	PCB	Circuit
C1	1:L3	1-B9				Q7	1:E3	1-K5	R74	1:E3	1-K4
C2	1:K3	1-B8	IC1	1:J3	1-Q0	Q8	1:D3	1-P5	R75	1:D4	1-L5
C2A	1:K3	1-B8			1-E7	Q9	1:D3	1-Q5	R76	1:G4	1-M7
C3	1:K2	1-C7			1-F7	Q10	1:D4	1-K3	R77	1:D4	1-N2
C4	1:K3	1-B8			1-H8	Q11	1:G4	1-G6	R78	1:D3	1-N5
C5	1:L2	1-C8			1-K8	Q12	1:E4	1-C3	R79	1:C3	1-R5
C6	1:L2	1-D8	IC2	1:G3	1-P0	Q13	1:G4	1-R4	R80	1:D3	1-P4
C7	1:J2	1-C9			1-M9	Q14	1:E2	1-J3	R81	1:D3	1-Q5
C8	1:J2	1-E8			1-F6	R1	1:K3	1-A9	R82	1:D3	1-Q5
C9	1:K2	1-F8			1-E6	R2	1:L3	1-C9	R83	1:D4	1-L3
C10	1:B4	1-R1	IC3	1:F3	1-R0	R3	1:K3	1-B8	R83A	1:C4	1-L2
C11	1:J3	1-H8			1-B5	R4	1:K3	1-B8	R84	1:B2	1-K1
C12	1:K3	1-H8			1-C5	R5	1:K2	1-B7	R85	1:B3	1-K1
C13	1:J3	1-J8			1-E4	R6	1:K3	1-C8	R86	1:B3	1-J0
C14	1:H3	1-K9			1-G5	R7	1:L3	1-C9	R87	1:B3	1-H0
C15	1:J3	1-J7	IC4	1:B3	1-R0	R8	1:L3	1-C8	R88	1:B3	1-H1
C16	1:H2	1-K7			1-D0	R9	1:J2	1-D7	R89	1:B3	1-H0
C17	1:H4	1-K7			1-F1	R10	1:K2	1-E9	R90	1:B4	1-G1
C18	1:G2	1-N9			1-H1	R11	1:H4	1-P3	R91	1:B4	1-G0
C19	1:H2	1-N9			1-J0	R13	1:K2	1-E7	R92	1:B3	1-J0
C20	1:C2	1-L0	IC5	1:D3	1-S0	R14	1:J2	1-F7	R93	1:A3	1-F1
C21	1:D2	1-P5			1-L5	R15	1:K2	1-F9	R94	1:A3	1-F1
C22	1:C2	1-M0			1-M4	R16	1:G4	1-P4	R95	1:A3	1-F1
C23	1:D2	1-M0		1-N5		R17	1:J2	1-K2	R96	1:A2	1-F2
C24	1:F3	1-G6			1-P5	R18	1:K2	1-F7	R97	1:A3	1-E1
C25	1:F2	1-B6	IC6	1:C2	1-L0	R19	1:J3	1-G9	R98	1:A3	1-E0
C26	1:F2	1-B6	IC7	1:C4	1-Q0	R20	1:C2	1-L0	R99	1:A3	1-E0
C27	1:E2	1-C5			1-Q7	R21	1:J3	1-G7	R100	1:A4	1-D0
C28	1:L4	1-N1			1-N6	R22	1:K3	1-H8	R101	1:A4	1-D0
C29	1:G3	1-D5			1-P8	R23	1:J3	1-H7	R102	1:A4	1-C0
C30	1:F4	1-F4			1-N0	R24	1:J3	1-J8	R103	1:A4	1-C0
C31	1:E3	1-H4	IC8	1:L3	1-M2	R25	1:J3	1-J8	R104	1:A4	1-C0
C32	1:H2	1-K4	LNK1	1:F2	1-Q2	R26	1:J4	1-J7	R105	1:A4	1-B0
C33	1:A3	1-K0	LNK1A	1:G2	1-P2	R27	1:H3	1-K8	R106	1:E4	1-K2
C34	1:L3	1-L1	LNK1B	1:G2	1-Q2	R28	1:J3	1-K9	R107	1:H5	1-B2
C35	1:B3	1-H1	LNK1C	1:F2	1-Q2	R29	1:J3	1-K8	R108	1:H4	1-B3
C36	1:B2	1-G1	LNK1D	1:F2	1-Q2	R30	1:H2	1-K7	R109	1:E4	1-C3
C37	1:A3	1-E0	LNK2	1:H3	1-L7	R31	1:H3	1-K7	R110	1:E5	1-D3
C38	1:B4	1-B0	LNK2A	1:H3	1-L7	R32	1:H3	1-L8	R111	1:G4	1-R4
C39	1:F3	1-E5	LNK3	1:D4	1-M4	R33	1:H2	1-L9	R112	1:D3	1-L3
C40	1:H4	1-B2	LNK3A	1:D4	1-M4	R34	1:H3	1-L7	R113	1:H3	1-M3
C40A	1:H5	1-A2	LNK4	1:H4	1-N4	R35	1:H3	1-L7	R114	1:B3	1-J1
C41	1:H4	1-B3	LNK4A	1:H4	1-N4	R36	1:H3	1-L7	R115	1:G4	1-R4
C41A	1:H4	1-A3	LNK4B	1:H4	1-N4	R37	1:H3	1-M7	R116	1:B4	1-Q9
C42	1:A4	1-D0	LNK5	1:C4	1-Q8	R38	1:G4	1-M8	R117	1:B4	1-R6
C43	1:H4	1-P3	LNK5A	1:C4	1-Q8	R39	1:G4	1-H6	R118	1:C3	1-Q6
C44	1:K4	1-A8	LNK5B	1:D4	1-R8	R40	1:H2	1-M9	R119	1:C3	1-P7
C45	1:B4	1-H0	P13	1:B2	1-R9	R41	1:H3	1-M3	R120	1:C3	1-P6
C46	1:B3	1-G0			1-R8	R42	1:H3	1-M8	R121	1:C3	1-N7
C47	1:L3	1-L1			1-R8	R43	1:G4	1-G6	R122	1:C3	1-N6
C48	1:L3	1-M1			1-R9	R44	1:E4	1-G3	R123	1:C4	1-N7
C49	1:L3	1-N1			1-R7	R45	1:L3	1-M1	R124	1:C4	1-N7
C50	1:C4	1-Q8			1-R7	R46	1:L3	1-M2	R125	1:C4	1-M6
C51	1:C3	1-P6			1-R6	R47	1:F3	1-A6	R126	1:D4	1-K4
C52	1:G4	1-P7			1-R9	R48	1:F2	1-B6	R127	1:E2	1-J3
C53	1:H3	1-L8			1-R7	R49	1:F3	1-B4	R128	1:E3	1-J4
C54	1:B2	1-G1			1-R7	R50	1:F3	1-B4	R129	1:E3	1-H5
C55	1:G3	1-P0			1-R8	R51	1:F2	1-B5	R131	1:B4	1-R7
C56	1:B4	1-B6			1-R8	R52	1:F4	1-F4	R132	1:B5	1-Q7
C57	1:F2	1-C6	P14	1:D2	1-R6	R53	1:F2	1-C5	R133	1:C5	1-N8
C58	1:J2	1-H6			1-R6	R54	1:F2	1-C5	R134	1:F3	1-D6
C59	1:J3	1-Q9			1-R5	R55	1:F2	1-C5	R135	1:B3	1-P6
C60	1:D2	1-R6			1-R2	R56	1:F3	1-C6	R136	1:F3	1-D5
C61	1:E2	1-K3			1-R3	R57	1:F3	1-D5	S21	1:J4	1-A3
C62	1:C4	1-R7			1-R2	R58	1:F2	1-D4			1-A4
C63	1:C4	1-Q8			1-R5	R59	1:G3	1-E4			1-A2
C64	1:C5	1-N8			1-R3	R60	1:F4	1-E4			1-A9
					1-R3	R61	1:F3	1-E5			1-A7
D1	1:G3	1-F5			1-R2	R62	1:F4	1-E4			1-A2
		1-F5			1-R2	R63	1:G4	1-F4			1-A4
D2	1:E3	1-H5			1-R3	R64	1:F4	1-F5			1-A8
		1-H5			1-R4	R65	1:E4	1-D4			1-A2
D3	1:A4	1-C0			1-R4	R66	1:E3	1-C4	TP1	1:L2	1-C7
		1-C1			1-R5	R67	1:F4	1-G5	TP2	1:J3	1-J9
D4	1:E4	1-A0			1-R5	RV67	1:E4	1-C3	TP3	1:F3	1-C5
D5	1:E4	1-F4				R68	1:G3	1-D3	TP4	1:G3	1-D4
		1-E4	Q1	1:K2	1-C8	R69	1:E3	1-H5	TP5	1:F4	1-G4
D6	1:B4	1-Q7	Q2	1:H3	1-J8	R70	1:F3	1-H4	TP6	1:F4	1-G3
		1-Q7	Q3	1:H3	1-L8	R70A	1:F4	1-G4	TP7	1:B2	1-F0
D7	1:C3	1-P6	Q4	1:H3	1-M7	R71	1:E3	1-J5	TP8	1:A4	1-D1
D8	1:C4	1-N6	Q5	1:G4	1-M8	R72	1:E3	1-J5	TP9	1:H2	1-P9
		1-M6	Q6	1:E3	1-J5	R73	1:E3	1-K5			

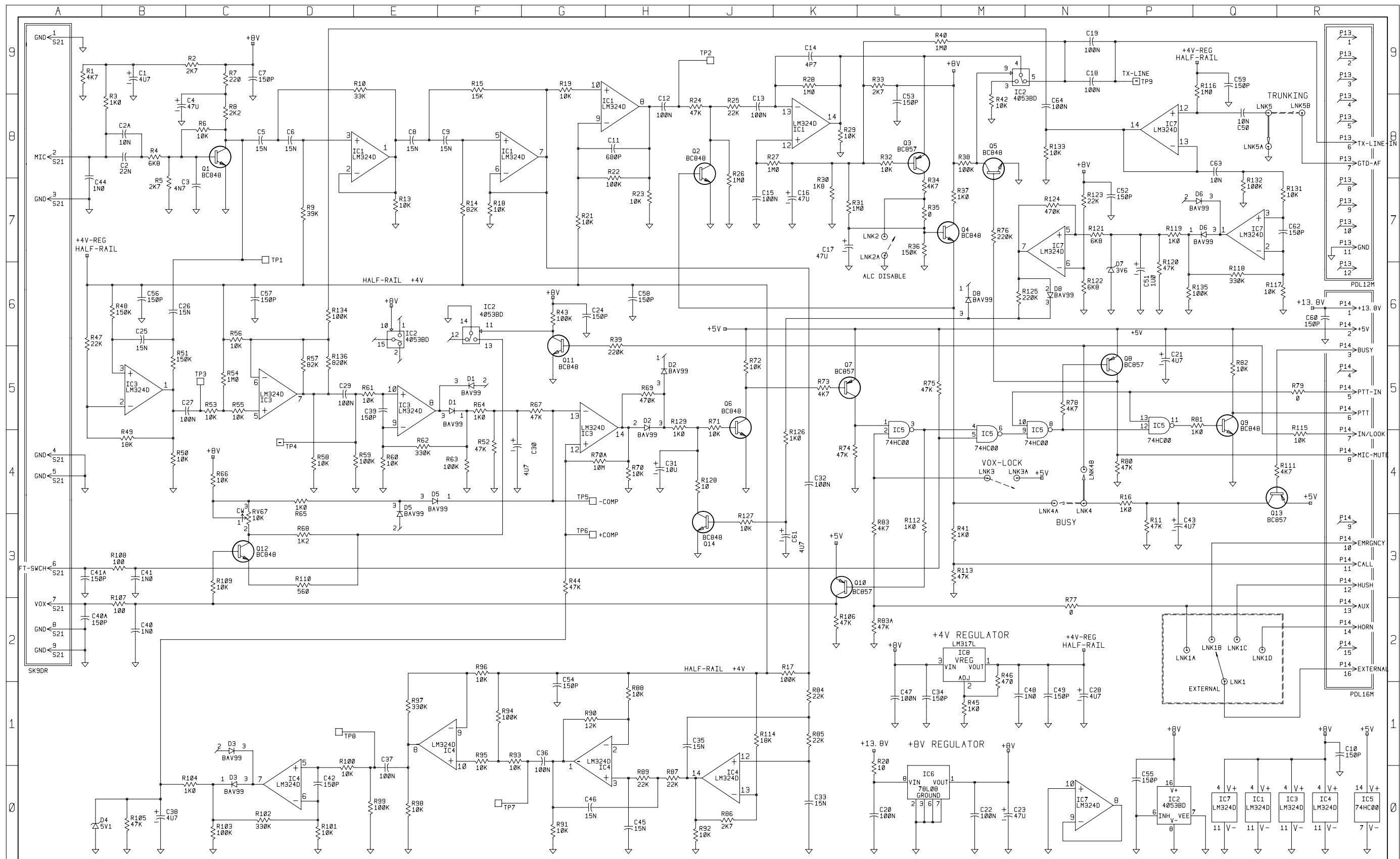
225-012110-03 A



T2000-50 Handsfree PCB (IPN 220-012110-03) - Top Side



T2000-50 Handsfree PCB (IPN 220-01210-03) - Bottom Side



3B	ADDED LINK-TABLE & SHEET-2	J. F.	J. F.	S. HEALD	12/5/93
3A	ADDED +4V REGULATOR (IC6). Q14 & IC7 ETC.	J. F.	J. F.	S. HEALD	29/3/93
2A	VARIOUS MODS	J. F.	J. F.		3/2/93
1B		J. F.	J. F.		7/9/92
1A		J. F.	J. F.		7/5/92
P2	ORIGINAL	J. F.	J. F.		9/3/92
REV/ISS	AMENDMENTS	DRAWN	CHKD	D. O.	APVD
					DATE

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 HANDSFREE
 T2000-VOX
 IPN: 225-01210-03 ISSUE: 2, SC.1
 PROJECT: T2000 DESIGNER: J. FONE FILE NAME: 2KHFL3B FILE DATE: 12/5/93 NO. SHEETS: 2

	A	B	C	D	E	F	G	H	J	K	L	M
9												9
8												8
7												7
6												6
5												5
4												4
3												3
2												2
1												1
0												0

LINK NO	1	2	3	4	5
FUNCTION	EXTERNAL *	ALC-CONTROL	VOX-CONTROL	BUSY-CONTROL	RX-AUDIO INHIBIT
POSITION A	AUXILLARY	DISABLED	LOCKED ON	VOX-MUTED	DISABLED
B	EMERGENCY	—	—	VOX-INHIBIT	ENABLED
C	HUSH	—	—	—	—
D	HORN	—	—	—	—
NO LINK	DISABLED	ENABLED	AUX-CONTROL	DISABLED	—

* SIGNAL TO POWER-CONNECTOR P3/PIN-1 (ON MAIN RF PCB).

3B ADDED LINK-TABLE. SHEET-2						J. F.	J. F.	S. HEALD	12/5/93
REV/ISS	AMENDMENTS				DRAWN	CHKD	D. O.	APVD	DATE

© TAIT ELECTRONICS					
T2000 HANDSFREE PCB LINK-TABLE					
IPN:	225-01210-03	ISSUE:	B	ID:	2. SC.2
PROJECT:	T2000	DESIGNER:	JOE	FILE NAME:	2K0HFL3B
		FILE DATE:	12/5/93	NO. SHEETS:	2

