

# Tait Orca Vehicle Kit

The Tait Orca vehicle kit provides a secure environment for a Tait Orca handportable used in a vehicle. The vehicle kit allows the radio to be connected to the vehicle's external antenna and also acts as a fast charger for the radio's NiCd battery.

Note that NiMH batteries are not charged by the vehicle kit, and that the desktop fast charger should still be used to short condition NiCd batteries each week.

This section outlines the vehicle kit operation, specifications and servicing. A detailed circuit and interface description is also provided, to allow customised modification of the vehicle kit.

## Product Codes

Table F-3 gives the product codes of available vehicle kit options and accessories.

The vehicle kits in Group A include selected mounting options and accessories. These accessories and other installation options are available separately as items in Group B.

Table F-3: Vehicle kit product codes

Product code	Description
TOPA-VK-002	Vehicle kit, no installation accessories
TOPA-VK-006	Vehicle kit with mobile microphone & mounting hardware
TOPA-VK-007	Vehicle kit with mobile microphone, speaker & mounting hardware
TOPA-VK-008	Vehicle kit with heavy duty mobile microphone & mounting hardware
TOPA-VK-009	Vehicle kit with heavy duty mobile microphone, speaker & mounting hardware
TOPA-VK-011	Vehicle kit with heavy duty microphone & speaker (no additional mounting hardware)

Group A

Product code	Description
TOPA-VK-010	Vehicle kit mounting adaptor
TOPA-VK-020	Vehicle kit single height U bracket
TOPA-VK-030	Vehicle kit double height U bracket
TOPA-VK-040	Vehicle kit triple height U bracket
TOPA-VK-050	Vehicle kit mounting plate
TOPA-VK-060	Vehicle kit charger disable kit
TOPA-VK-100	Vehicle kit mobile microphone
TOPA-VK-200	Vehicle kit external speaker
TOPA-VK-300	Vehicle kit visor microphone
TOPA-VK-400	Vehicle kit remote PTT
TOPA-VK-500	Vehicle kit heavy duty mobile mic.

Group B

## Installing a Vehicle Kit

Detailed installation instructions are provided in the *Tait Orca vehicle kit installation guide* (IPN 429-40000-xx). This guide is included with each vehicle kit.

## Vehicle Kit Operation

### Inserting the Radio

Remove the accessory connector cover from the radio.

Ensure the vehicle kit release button is down and insert the radio into the radio cavity.

Push the radio firmly into place against the locating pegs and radio interface. You should hear the radio snap into place and the release button will pop up.

### Locking a Radio in the Vehicle Kit

You can use the supplied key to lock the radio into the vehicle kit when you leave the vehicle unattended.

To lock the radio in the vehicle kit, insert the supplied key in the lock and turn it clockwise.

To unlock the radio from the vehicle kit, turn the key counterclockwise.

### Removing the Radio

To remove the radio from the vehicle kit, push the release button down. The radio can now be removed from the radio cavity.

### Charging the Battery

Once the radio is inserted into the radio cavity, the charger status LED will glow amber for three seconds, then red. When the LED glows green, the battery is charged to a minimum of 70% capacity.

If the battery is too hot or too cold, the LED will glow amber until the battery temperature is within the safe range for recharging (0°C to 50°C). If the indicator remains amber, consider turning on your air conditioning. Optimum battery charging performance is obtained between 15°C and 25°C.

Charge times when the radio is turned off are:

- up to 1½ hours for the 1100 mAh NiCd battery; and
- up to 2 hours for the 1500 mAh NiCd. battery.

You can still use the radio while the battery is being charged, but the charge times will vary, depending on how much the radio is being used.

The vehicle charger functional indicators are summarised in Table F-4.

Table F-4: Charger status LED indicators

Indicator	Meaning
steady green	battery charging
steady green	battery charged to a minimum of 70% capacity
steady amber	charge suspended until battery temperature is within correct range
flashing red	battery not seated properly in the charger, contacts dirty, battery faulty or NiMH battery inserted

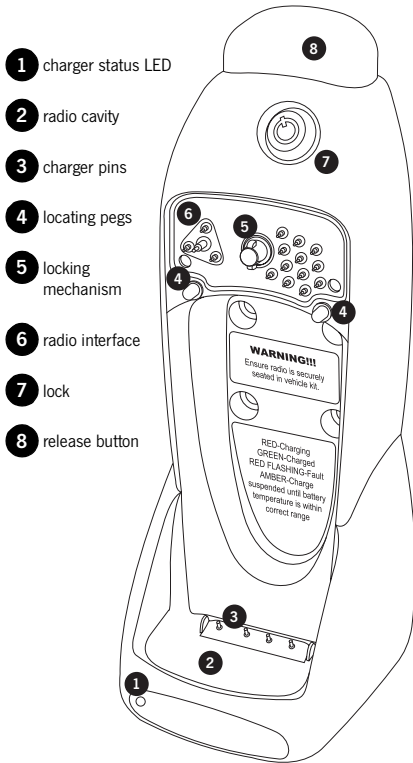


Figure F-7: Vehicle kit assembly

### Using the Radio while in the Vehicle Kit

While the radio is seated in the vehicle kit, operation remains the same, except:

- the radio's microphone will be inoperative and an external microphone such as a mobile microphone must be used; and
- the radio's speaker will be inoperative when an external speaker has been installed. Volume can be adjusted from the radio's volume control.

The standard installation results in the charger and external speaker being turned off when the ignition is off.

If the vehicle kit determines that the vehicle's battery is too low (less than 11 V), the vehicle kit will turn off.

**WARNING:** The vehicle kit uses less than 30 mA from the vehicle's battery when the ignition is off. For this reason, if you are leaving your vehicle unattended for an extended period of time (for example, more than one month), the positive fuse should be removed.

### Basic Care and Safety

- It is essential to short condition your battery weekly using the desktop fast charger.
- Wipe the radio contacts and accessory interface with a dry, lint-free cloth to remove any dirt, oil or grease.
- Do not allow the vehicle kit to come into contact with detergents, alcohols, aerosol sprays or petroleum-based products, as they may permanently damage the case.

## Vehicle Kit Specifications

The following table outlines the vehicle kit specifications. Details of test methods can be obtained from Tait Electronics Ltd.

Table F-5: General specifications

Supply voltage	13.8 VDC (nominal)
range	11 to 16 V range
protection	3 A fuses in power lead
Ambient temperature range	-10 to +60°C
Battery charger temperature range	0 to +50°C
Weight	375 g
Size W x H x D	80 mm x 230 mm x 95 mm (2 in x 5.8 in x 2.4 in)
Product supported	<ul style="list-style-type: none"> <li>• all Tait Orca handportables (frequency bands up to 530 MHz supported)</li> <li>• all Tait Orca belt clips</li> <li>• all Tait Orca NiCd batteries</li> </ul>
Note that NiMH batteries are not charged.	
Technical compliance	complies with FCC part 15, CISPR 14 and CISPR 14-2
Fast charger charge current	0.8 A
Charger control	the charger uses voltage, temperature and temperature change to safely charge and maintain battery capacity

## Servicing the Vehicle Kit

The vehicle kit contains four PCBs, and the following servicing instructions outline the disassembly of the vehicle kit to allow replacement of these PCBs.

### Servicing Warnings: Screw Head Types

There are four different types of Torx screws used in the vehicle kit: KC22x6, KC25x6, KC30x8 and KC30x10. All these screws require a Torx head screwdriver. When tightening any screws, be careful not to strip the threads in the plastic mouldings by exerting too much force.

The following table explains the torque settings required for the different Torx screw types.

Figure F-8: Vehicle kit torque specifications

Screw Type	IPN	Quantity	Torque (in.lb)
KC22x6	346-10022-06	2	2
KC25x6	346-10025-06	3	2
KC30x8	346-10030-08	2	6
KC30x10	346-10030-10	4	6

### Removing the Vehicle Kit Back Cover

The back cover is held to the front moulding by two plastic clips at the base of the unit. Insert the tip of a round screwdriver into the two holes at the bottom of the rear panel. Lever the tip upwards towards the top of the unit.

Hold the unit in such a way that your forefinger and thumb exert a slight pressure to separate the rear panel away from the front moulding, while you lever the clips with the screwdriver.

### Replacing the Accessory Probe PCB

Remove the back cover and unplug the accessory loom at the top of the options PCB. Unscrew the two KC30x10 screws holding the trigger assembly together. The trigger assembly can now be lifted out.

Note that the trigger assembly must be pressed

**downwards** while undoing these screws, as there are springs underneath.

Unplug the loom from the accessory probe PCB. Carefully use narrow nose pliers to unplug the MCX connector from the accessory probe PCB. Now remove the two KC22x6 screws on the front of the vehicle kit holding the accessory probe PCB into the front moulding. The accessory probe PCB can now be tilted upwards and removed from the moulding.

Fit the seal onto the new accessory probe PCB and reassemble the vehicle kit. Read the assembly instructions for more information.

### Replacing the Charger Probe PCB

Remove the back cover and unplug the accessory loom at the top of the options PCB. Lift the options/charger PCB assembly out of the front moulding, until the charger loom is accessible.

Unplug the charger loom and remove both PCBs from the front moulding. Note that these PCBs are still attached via the RF cable.

Unscrew the two KC30x8 screws holding the charger probe moulding into the front moulding, and slide out the probe moulding. Unscrew the three KC25x6 screws holding the probe PCB to the probe moulding. Fit the seal onto the new charger probe PCB and reassemble the vehicle kit.

### Removing the Options or Charger PCBs

Remove the two DB25 fasteners holding the back panel to the accessory/options connector. Remove the two KC30x10 screws holding the back plate to the audio PA. Unclip the backplate from the options PCB. The PCBs can now be unplugged and replaced.

When putting the options/charger assembly back into the front moulding, make sure that the charger PCB is running in its tracks. Be careful that you do not bump the LED at the bottom of the charger PCB; the PCB does not require any force to insert.

## Reassembling the Vehicle Kit

To assemble the vehicle kit, reverse the disassembly process.

Note that when doing up the KC30x10 screws the threads in the plastic PA moulding must **not** be stripped. It is important that the audio PA is held firmly against the backplate, as the backplate serves as a heatsink.

## Trigger Reassembly

When reassembling the trigger assembly, insert the peg moulding into the front panel. Insert the quarter turn moulding and rotate it until the peg moulding prevents it from turning. Drop the two springs into the peg moulding. While pressing in the trigger cap, replace the trigger assembly.

While holding the trigger assembly cover together (before doing up the screws) check that the locking mechanism works correctly. To do this, press in the locating pegs and check that the trigger cap pops up. Press the trigger cap down and check that the locating pegs pop out. If the trigger assembly does not work correctly, check that the quarter turn moulding is in the correct position and repeat the assembly process.

Tighten the two KC30x10 trigger assembly screws, while holding the trigger assembly in place.

## Rear Cover Reassembly

Locate the top of the rear cover into the back of the trigger assembly. Press the bottom of the rear cover to click/lock the cover into the front moulding.

## Spares Kits

The following table shows a list of spares kits which are currently available for servicing Tait Orca vehicle kits. These can be ordered from you local Tait dealer.

Table F-6: Vehicle kit spares kits

Product code	Description
TOPA-SP-301	Vehicle kit spares kit
TOPA-SP-302	Vehicle kit reskinning kit

The contents of these kits are shown in Tables F-6 and F-7.

Note that the 'IPN' column is the ten digit 'internal part number' which uniquely identifies any component used in a Tait product.

The numbers in the 'Legend' column refer to Figure numbers in which the spares item is shown. The numbers in brackets refer to the numbered legend within the figure, where appropriate.

Table F-7: Vehicle kit spares kit (TOPA-SP-301)

IPN	Description	Quantity supplied	Legend
OPA-VK-010	TOP vehicle kit charger PCB	1	F-13
OPA-VK-020	TOP vehicle kit options PCB	1	F-14
OPA-VK-030	TOP vehicle kit accessory probe PCB	5	F-11
OPA-VK-040	TOP vehicle kit charger probe PCB	10	F-12
219-02665-00	Cable - RF (MCX to BNC connectors)	5	F-10
219-02666-00	Cable - charger to charger probe PCBs	5	F-10
219-02667-00	Cable - options to accessory PCBs	5	F-10
240-04021-74	Mobile microphone socket (6-way vertical phone jack)	5	F-9 (3)
240-04021-82	External speaker & remote PTT sockets (3. 5 mm DC jack)	10	F-9 (4), F-9 (5)
240-04021-83	Visor microphone socket (2.5 mm DC jack)	5	F-9 (6)
240-04021-85	Power/ignition sense socket (4-way right angle PCB mounting)	5	F-9 (7)
303-11204-00	Chassis moulding	10	—
305-00007-00	Trigger moulding	10	—
305-00008-00	Quarter turn moulding	10	F-7 (5)
305-00009-00	Peg moulding	10	F-7 (4)
305-00010-00	Trigger cap moulding	10	F-7 (8)
305-00021-00	Trigger spring	10	—
305-00022-00	Peg spring	20	—
305-00023-00	Lock	5	F-7 (7)
353-05006-00	Washer 7/16 beryllium	1	—
365-00011-54	Label R1556/2 90 x 24mm	19	—
399-00010-69	Plastic bag 75 x 100mm	6	—
399-00010-53	Plastic bag 150 x 250mm	8	—
399-00010-86	Static shielding bag 127 x 203mm	2	—
365-00011-38	Yellow static warning label	2	—
937-00000-79	Label 60 x 25.4mm	0	—
410-01153-00	Packaging - unprinted carton	1	—

Table F-8: Vehicle kit reskinning kit (TOPA-SP-302)

IPN	Description	Quantity supplied	Legend
305-00003-00	Lens	4	—
305-00004-00	Front moulding	4	—
305-00005-00	Rear moulding	4	—
305-00006-00	Probe moulding	4	—
305-00012-00	Auxiliary seal	4	—
305-00013-00	Probe seal moulding	4	—
305-00015-00	Back plate	4	—
305-00023-00	Lock	4	F-7 (7)
353-05006-00	Washer 7/16 beryllium	1	—
365-01610-00	Front warning label	5	—
365-01611-00	Front operation label	5	—
365-01612-00	Rear type approval label	5	—
365-00011-54	White label R1556/2 90 x 24mm	11	—
399-00010-53	Plastic bag 150 x 250mm	1	—
399-00010-69	Mini grip plastic bag 75 x 100mm	10	—
410-01153-00	Pkg Carton SII unprinted	1	—
937-00000-79	Blazer label 60 x 25.4mm	0	—

## Custom Modifications

The following information is provided to enable modifications to be made to the standard vehicle kit installation:

- signal descriptions and specifications for the vehicle kit external connectors;
- block diagrams of the vehicle kit PCBs; and
- circuit descriptions for each vehicle kit PCB.

Detailed circuit diagrams and component location information for the vehicle kit PCBs may be obtained from the Customer Services Division. Contact your Tait dealer for more information.

### Using External Function Buttons

It is possible to interface to the radio's external function buttons through any of the vehicle kit's external PTT connections:

- the accessory data connector (SK3);
- the mobile microphone socket (SKT1); or
- the remote PTT socket (EXT-PTT).

A resistor and a switch is needed for each external function button. See "BUTTON-1 and BUTTON-2" on page F-7 for more details.

For example, it is possible to modify a standard TOP speaker microphone (e.g. TOPA-AA-001) to allow the use of external function buttons. To do this, add two resistors inside the microphone, disconnect the speaker, and crimp a 6-way phone plug onto the cable.

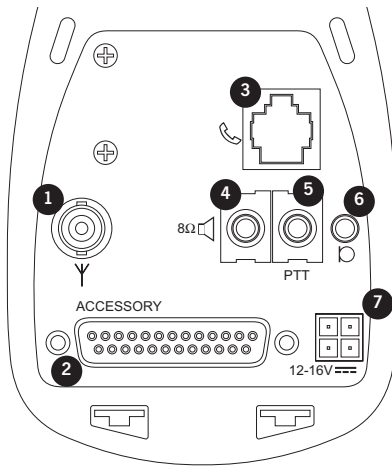
### Setting up 'Hookswitch' Functionality for a Trunked Radio

'Hook switch' functionality can be achieved by programming external function BUTTON-1 to **Clear**. As long as the microphone clip is grounded, then whenever the mobile microphone is on-hook, the call will be cleared down. You must unclip the microphone before a call can be initiated.

Note that you do not need to add any resistors,

as the mobile microphone already has an internal 12 k $\Omega$  resistor wired correctly.

Figure F-9: Vehicle kit - rear view showing external connectors



- 1 Antenna BNC connector
- 2 Accessory/data connector
- 3 Mobile microphone socket
- 4 External speaker connector
- 5 Remote PTT connector
- 6 Visor microphone connector
- 7 Power/ignition sense connector

### Vehicle Kit External Connectors

The tables on page F-19 document the signals available on all of the vehicle kit's external connectors.

Note that the 25-way accessory/data connector provides access to all of the radio's accessory signals, as well as a few vehicle kit specific signals.

See "Tait Orca 5000 Accessory Connector" on page F-3 for further details about handportable accessory signals.



Table F-9: Vehicle kit power connector  
(SK1 on the charger PCB)

Pin	Signal	Description
1	N/C	-
2	GND	Main ground connection
3	IGN	Switched accessory power - connect to permanent power to disable ignition sense
4	+13V8	Main connection to +13.8 V (vehicle battery). Use 3 A fuses.

Table F-10: Vehicle kit mobile microphone connector  
(SKT1 on the options PCB)

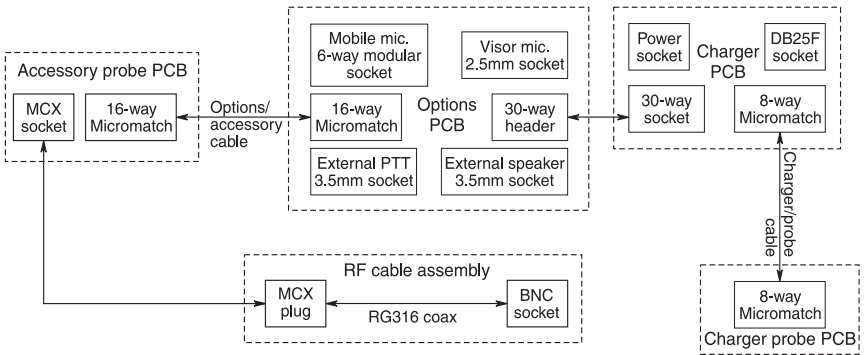
Pin	Signal	Description
1	+13V8LIM	Power out Zout = 10 $\Omega$ ; 100 mA maximum
2	N/C	-
3	EXT-PTT	External PTT and function buttons*
4	MOB-MIC	Dynamic microphone input impedance = 600 $\Omega$
5	GND	Ground
6	N/C	-

\* EXT-PTT is pulled high inside the radio by 27 k $\Omega$ . Function buttons are implemented by pull-downs to ground. For BUTTON-1, R = 12 k $\Omega$ ; for BUTTON-2, R = 27 k $\Omega$ .

Table F-11: Vehicle kit accessory/data connector  
(SK3 on the charger PCB)

Pin	Signal	Description
1	GND	Signal ground
2	RX-IN	RS-232 Receive data to radio
3	TX-OUT	RS-232 Transmit data from radio
4	N/C	-
5	BUSY	Radio receiving low = busy (including beeps)
6	AUDIO-D25	Single ended audio. Zout = 3 k $\Omega$ ; AC coupled
7	GND	Signal ground
8	EXT-MIC-D25	Microphone input Zin = 1 k $\Omega$
9	MOD-AUDIO	To modulator
10	EXT-PTT	PTT and function buttons low = PTT
11	SPKR-OFF	Turns radio and external speaker off low = off
12	RX-DET-AF	Detected receive audio (unmuted)
13	GND	Signal ground
14	+5V	5 V power 25 mA maximum
15	+7V5-ACC	7.5 V from radio 25 mA maximum
16	SENSE-0-ACC	Radio internal speaker control low = off
17	SENSE-1-ACC	-
18	SPKR+	Balanced output from audio PA
19	SPKR-	Balanced output from audio PA
20	N/C	-
21	N/C	-
22	N/C	-
23	N/C	-
24	LVSD	Low voltage shut down - turns off vehicle kit
25	+13V8FILT	13.8V power 500 mA maximum

Figure F-10: Vehicle kit interconnection diagram



### Vehicle Kit Circuit Descriptions

This section provides an outline of the design and describes the modular assembly of the vehicle kit. The vehicle kit contains four PCBs:

- the accessory probe and charger probe PCBs, interfacing to the radio and battery; and
- the charger and options PCBs, containing the electronic circuitry.

A block diagram showing how the four PCBs interconnect and naming the connectors on each PCB is shown in Figure F-10.

The following subsections and their associated diagrams expand on the functionality of each vehicle kit PCB.

### Vehicle Kit Accessory Probe PCB (IPN 220-01506-xx)

This PCB provides the interface to the handportable accessory connector. The audio/control signals connect to the options PCB via a 16-way Micromatch ribbon cable. The RF signal is routed via an MCX connector and coaxial cable to a BNC connector on the rear of the vehicle kit. A block diagram of this PCB is shown in Figure F-11.

Figure F-11: Vehicle kit accessory probe PCB block diagram

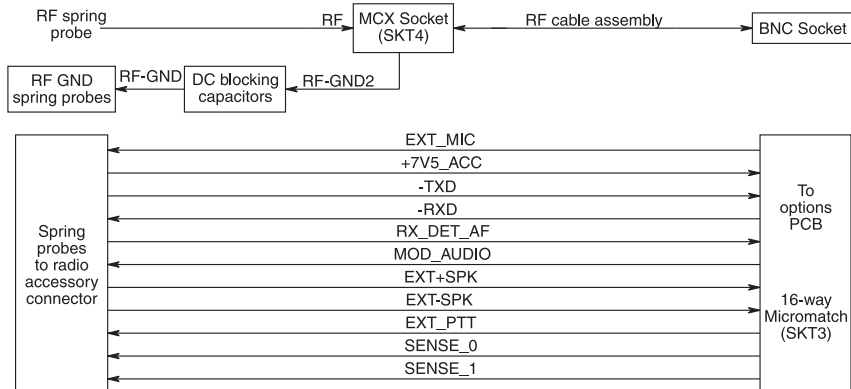
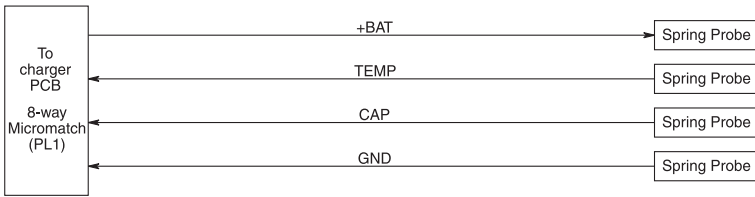


Figure F-12: Vehicle kit charger probe PCB block diagram



### Vehicle Kit Charger Probe PCB (IPN 220-01564-xx)

This PCB provides the interface to the radio battery for charging and is connected to the charger PCB via an 8-way Micromatch ribbon cable. A block diagram of this PCB is shown in Figure F-12.

### Vehicle Kit Charger PCB (IPN 220-01504-xx)

This PCB contains the fast charger circuit module, the majority of the power supply module and about half of the power save module. A block diagram of this board is shown in Figure F-13.

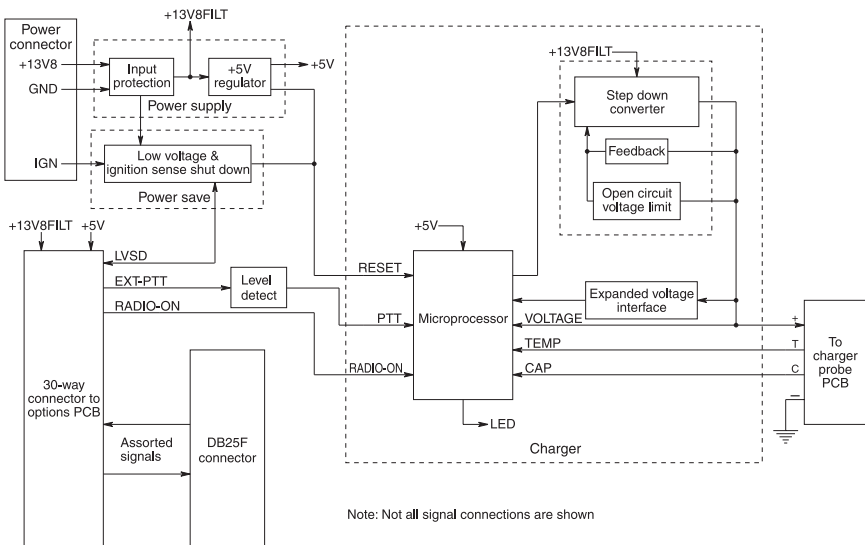
#### Current Source

The switch mode current source is based around a Maxim MAX1627 100% duty cycle,

high efficiency, step down DC-DC controller (IC4). The core of the current source is a Buck converter consisting of Q9, L2, C46, C47 and D5. The feedback for the controller (IC4) is via current sense resistors (R58, R59) and a differential amplifier (IC5:B).

In steady state, approximately 0.8 A flows through R58 and R59, generating a voltage which is amplified by the differential amplifier, IC5:B. The output of this is fed into pin 2 of IC4 (FB). The threshold of the feedback input (IC4 pin 2) is 1.3 V, relative to VGND. When the feedback signal on pin 2 is above 1.3 V, the controller (IC4) turns off Q9. Similarly, when the feedback signal is below 1.3 V, the controller turns on Q9.

Figure F-13: Vehicle kit charger PCB block diagram



D4 and R46 create a virtual ground (VGND) and protect the MAX1627 from over voltages. Conducted noise is filtered by C42, C43 and L5. The blocking diode, D6, stops the radio battery from powering the vehicle kit when the current source is off.

The radio is protected from over voltages at the battery terminal by IC5:C, IC5:D and their associated circuitry. If the voltage at the output (BAT1) reaches approximately 10.3 V, then Q3 is turned on by the Schmitt trigger IC5:D. This changes the feedback from current controlled (via IC5:B) to voltage controlled (via IC5:C). The non inverting amplifier of IC5:C is configured such that it overrides the output of IC5:B and sets the output voltage to approximately 10.6 V.

The current source is normally controlled by the micro controller (IC3). When pin 20 goes low, the current source is turned on.

#### Fast Charger Micro Controller

IC3 is a 68HC05 based micro controller, which runs custom charger software to control the current source and intelligently monitor the charge state of the battery. Note that this software behaves differently from the desktop fast charger software. When working correctly the microcontroller will always make the LED glow orange for 3 seconds whenever power is reapplied.

The line into IC3 pin 1 (RESET) is used by the 5 V regulator (IC1) to control the startup of IC3. RESET is only released by IC1, once power has stabilised and the circuits are powered up. The RESET line is also controlled by the power save circuitry, so that the fast charger can be turned off.

The control line for the current source is IC3 pin 20, with low being on and high impedance being off. This line controls the current source, via Q7.

The coarse voltage input used for general voltage measurements is IC3 pin 16. The expanded voltage input used for fine voltage

measurements is IC3 pin 17. Battery temperature is measured via IC3 pin 18. This pin is pulled to ground via a 10 k $\Omega$  (nominal) thermistor inside the battery case. The battery capacity input used to tell the charger whether the battery is NiCd or NiMH is IC3 pin 19.

The line to IC3 pin 7 is an input which tells the micro controller when the vehicle kit PTT is activated. The line to IC3 pin 9 is an input which tells the micro controller when the radio is on.

#### Vehicle Kit Power Supply Input Protection

Power to the circuit (13.8 V nominal) is provided through a Mini Fit Molex connector. Protection circuitry consists of a 22 V transient suppressor (D1) and a 2.5 A polyswitch (PS1). C11 and C12 provide some filtering of the input power.

Over voltage protection is also provided by D1. Short transient over voltage (>22 V) pulses will be clamped by D1, preventing harm to the circuit. Longer sustained over voltage conditions, such as incorrect connection to a 24 V vehicle supply, will cause D1 to conduct and eventually fail to a short circuit state. This will result in a power lead fuse blowing or PS1 tripping, if the fuses are of the incorrect rating (> 3A) or not fitted (i.e. the line is shorted).

#### Vehicle Kit Power Supply 5 Volt Regulator

IC1, an L4949, is the 5 V regulator for the vehicle kit and produces the +5 V rail. It also controls the RESET line of the micro controller under startup and will reset the micro controller if there are any voltage dips. C13 is fitted to improve output noise and transient response. C14 sets the reset delay time. The tantalum capacitor C15 maintains the stability of the output voltage. The maximum current available from the +5 V rail is 100mA.

#### Vehicle Kit Power Supply Power Save

The low voltage shut down (LVSD) circuitry on the charger PCB is used to power down sections of the vehicle kit under various condi-

tions. If the vehicle battery gets below 11 V, the Schmitt trigger built around IC2:A will go high, turning on Q1 and pulling the RESET line low. This will turn off the fast charger to conserve the vehicle battery. The output of IC2:A is also fed to the options PCB and the base of Q6. This puts the audio power amplifier (IC4) into standby to conserve the vehicle battery.

The ignition sense input to the charger PCB (IGN on pin 3 of the power connector) can be used to turn off the vehicle kit when the vehicle ignition is off. If IGN is wired to permanent power, then this feature is disabled. If IGN is wired to switched accessory power, then when the ignition is off the fast charger and the audio power amplifier are turned off via IC2:A.

LK4 is not fitted. It can be used to disable ignition sense for bench testing.

The diode (D2) in the feedback path of IC2:A is used to increase the hysteresis of the Schmitt trigger. Thus when low vehicle battery voltage triggers IC2:A, the vehicle battery must recover by approximately 1 V above the threshold before the vehicle kit will be powered up.

Note that to adjust the LVSD threshold, voltage

divider R22, R24, R25 and R26 must be changed.

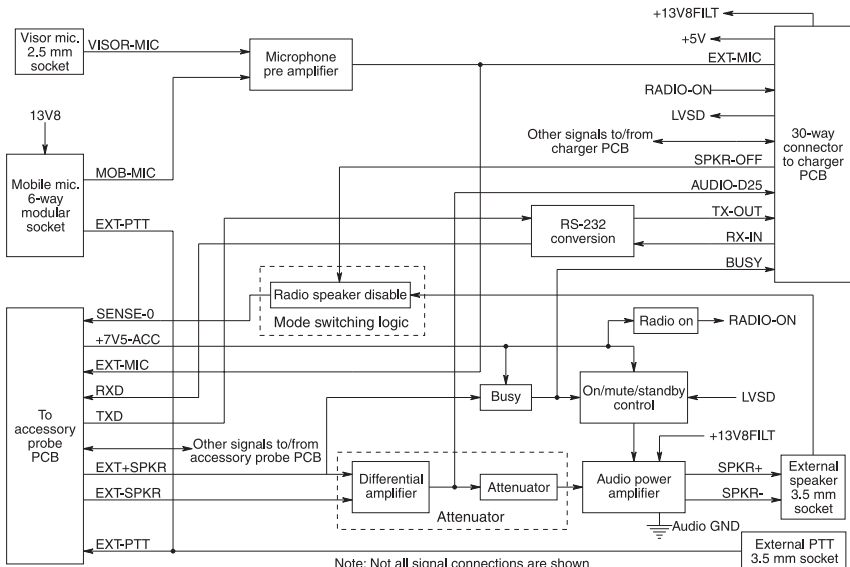
### Vehicle Kit Options PCB (IPN 220-01505-xx)

This PCB contains the mode switching logic, the microphone pre-amp, the RS-232 conversion module, the audio power amplifier with its associated input circuitry and the mute/standby module. A block diagram of this board is shown in Figure F-14.

#### Audio Power Amplifier and Associated Circuitry

The audio power amplifier takes the differential audio available at the radio accessory pins and amplifies it to drive an external speaker. The first stage is a differential amplifier (IC2:B) with a gain of -6 dB (0.5). This produces a single ended audio signal at pin 7 which is tapped off along two paths. The first path is via the voltage divider R69 and R68 which attenuate the signal by a factor of 100 (-40 dB). This signal is then AC coupled into IC4 which is configured for Bridge Tied Load (BTL) operation and has a fixed gain of 46 dB (200). IC4 is a Philips TDA1519A car audio power amplifier chip.

Figure F-14: Vehicle kit options PCB block diagram



Note that the recommended method for changing the gain of the audio power amplifier is to adjust the ratio of the voltage divider formed by R69 and R68.

The second path for the single ended audio signal present at pin 7 of IC2:B is via R78 and C52, to become the AUDIO-D25 signal. This signal has its output at pin 6 on the D25 connector on the charger PCB. The minimum input impedance of a circuit that connects to AUDIO-D25 is 6k $\Omega$ . The recommended input impedance would be 47k  $\Omega$ .

The audio PA has three modes of operation (standby, mute and on) which are set by the voltage at pin 8. A pull-up for the on mode is provided by R75, while Q3 controls the mute mode, by switching in R73 to form a voltage divider with R75. Q4 pulls IC4 pin 8 low to control the standby mode. The following table summarises the PA operation.

Table F-12: Vehicle kit option PCB - audio PA operation

Mode	Voltage Level	Controlled By
On	> 8.5 V	Q3: off Q4: off R75: Pull up
Mute	3.3 V - 6.4 V	Q3: on Q4: off R75/R73: divider
Standby	< 2 V	Q4: on

When the audio PA is in either the mute or on mode, its outputs (pins 4 & 6) are biased with a DC level of approximately 6.5 V.

A BUSY signal is created by looking at the DC bias on the EXT+SPKR signal. IC2:A is configured as a Schmitt trigger and is used to produce the BUSY signal (pin 1). R67 and C27 provide filtering of the audio signal so that IC2:A is not falsely triggered by large audio peaks. The reference signal is produced from +7V5-ACC via the voltage divider of R65 and R66.

The 7V5-ACC signal is accessory power from the radio and indicates if the radio is switched on. If there is no 7V5-ACC signal then the

audio PA is held in its standby mode via Q7 and Q4. When the DC bias is absent from EXT+SPKR, BUSY is high and the audio PA is held in its mute mode via Q3. The audio PA can also be put into standby mode via the SPK-CUT control signal being high. Q4 will always override Q3.

Putting the audio PA into standby is part of the power save feature of the vehicle kit. LVSD is a control line from the charger PCB which goes high when the vehicle battery is too low (<11V). If LVSD is high then the audio PA is put into standby mode via Q6, Q7 and Q4.

A 3.5mm stereo phono socket is used to connect the external speaker. When the mono plug of an external speaker is attached, the middle connection of the stereo socket (SPKSENSE) is shorted to one of the audio PA output signals. When the audio PA is operating there is a DC bias of approximately 6.5 V (half rail) on both of its outputs. This bias is used to turn on Q5, which pulls SENSE-0-ACC low, disabling the radio's internal speaker.

The D25 connector has a control line called SPKR-OFF on pin 2. If the accessory connected to the D25 connector has a speaker, then by pulling SPKR-OFF low all other speakers can be disabled. The SPKR-OFF signal is inverted by Q9 to produce SPK-CUT. If SPK-CUT is high, then the audio PA will be placed in standby mode via Q4 (which turns off an external speaker if it is connected). SENSE-0-ACC is pulled low to disable the radio's internal speaker.

#### Microphone Pre-Amp

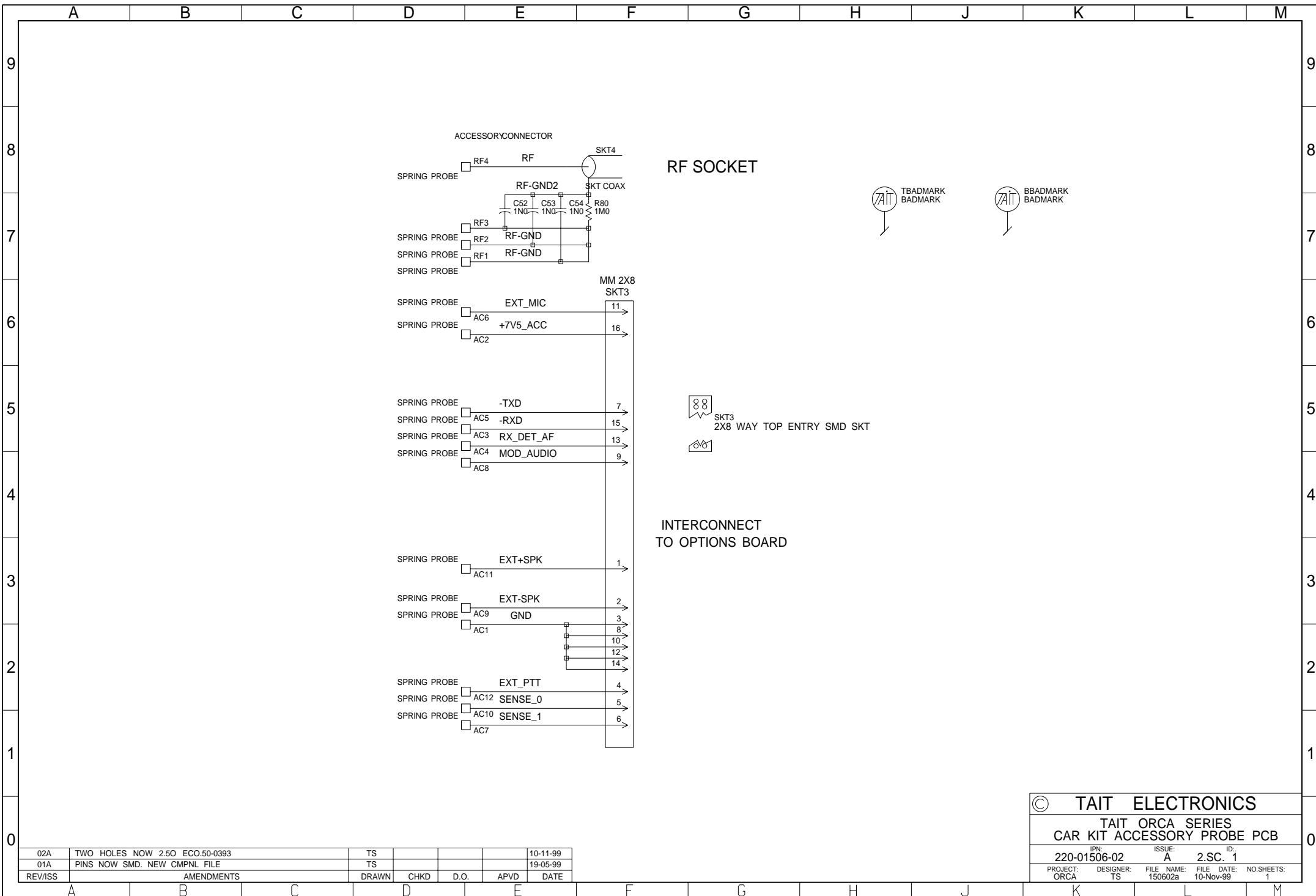
A capacitor multiplier formed by Q2, R2 and C19 is used to filter the +5 V supply producing +5V-FIL which is used to provide DC bias for the microphones via R3 and R22.

The internal microphone in the radio is disabled by an impedance to ground, which is typically the electret microphone of a speaker microphone. In the vehicle kit this is accomplished by R28, which is connected to the EXT-MIC-D25 line. Thus whenever the radio is in

the vehicle kit the internal microphone is disabled.

#### RS-232 Conversion

An RS-232 level 3 wire serial port is provided at the DB25 connector (TX-OUT, RX-IN, GND), for use by devices such as data terminals. The radio provides CMOS level serial communications via the RXD and TXD signals. These signals are converted to full RS-232 voltage levels (i.e. +10 V for a logic 0, and -10 V for a logic 1) by IC3.

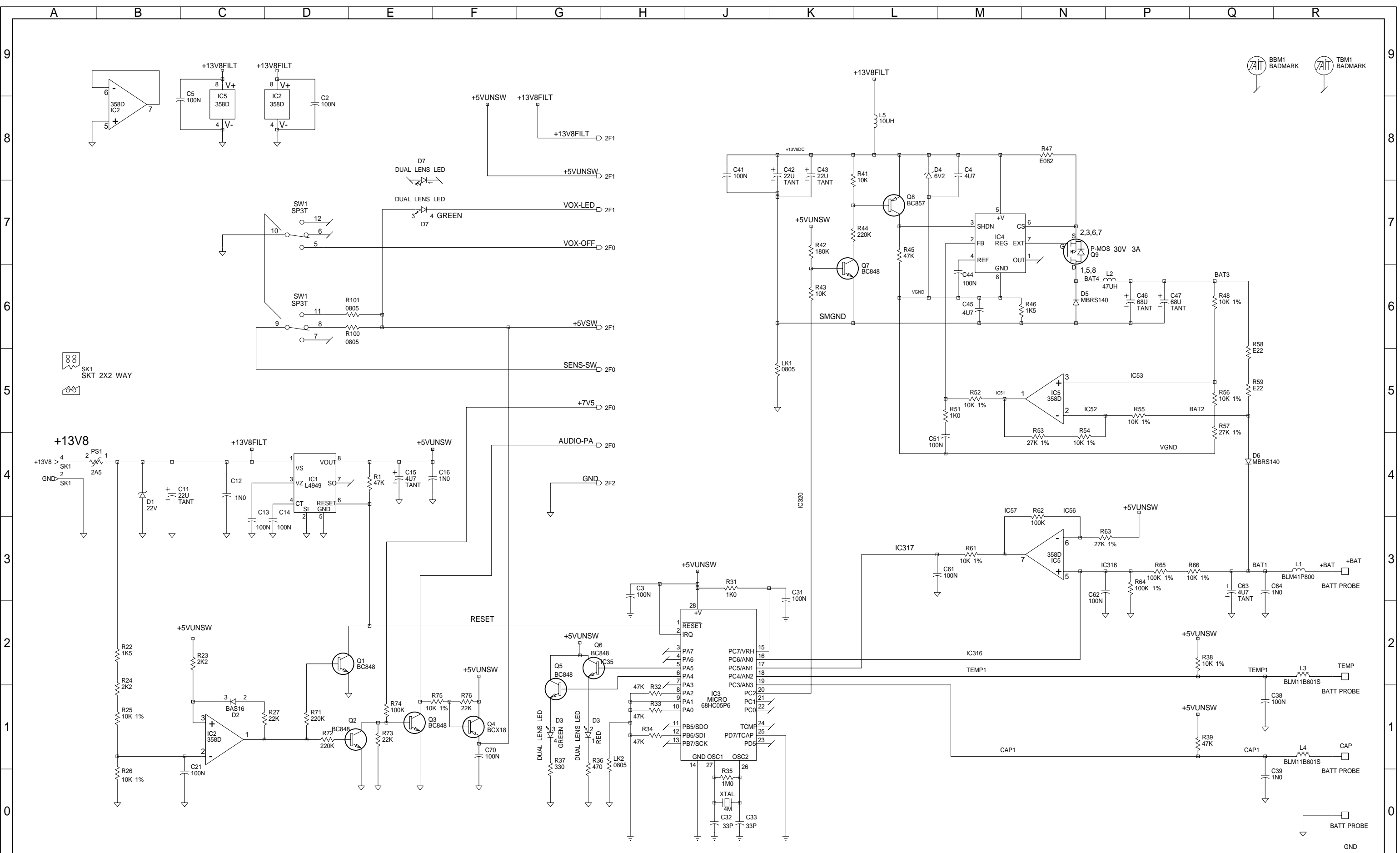


02A	TWO HOLES NOW 2.50 ECO.50-0393	TS				10-11-99
01A	PINS NOW SMD. NEW CMPNL FILE	TS				19-05-99
REV/ISS	AMENDMENTS	DRAWN	CHKD	D.O.	APVD	DATE

© TAIT ELECTRONICS  
 TAIT ORCA SERIES  
 CAR KIT ACCESSORY PROBE PCB

IPN:	ISSUE:	ID:
220-01506-02	A	2.SC. 1
PROJECT: ORCA	DESIGNER: TS	FILE NAME: 150602a
		FILE DATE: 10-Nov-99
		NO.SHEETS: 1



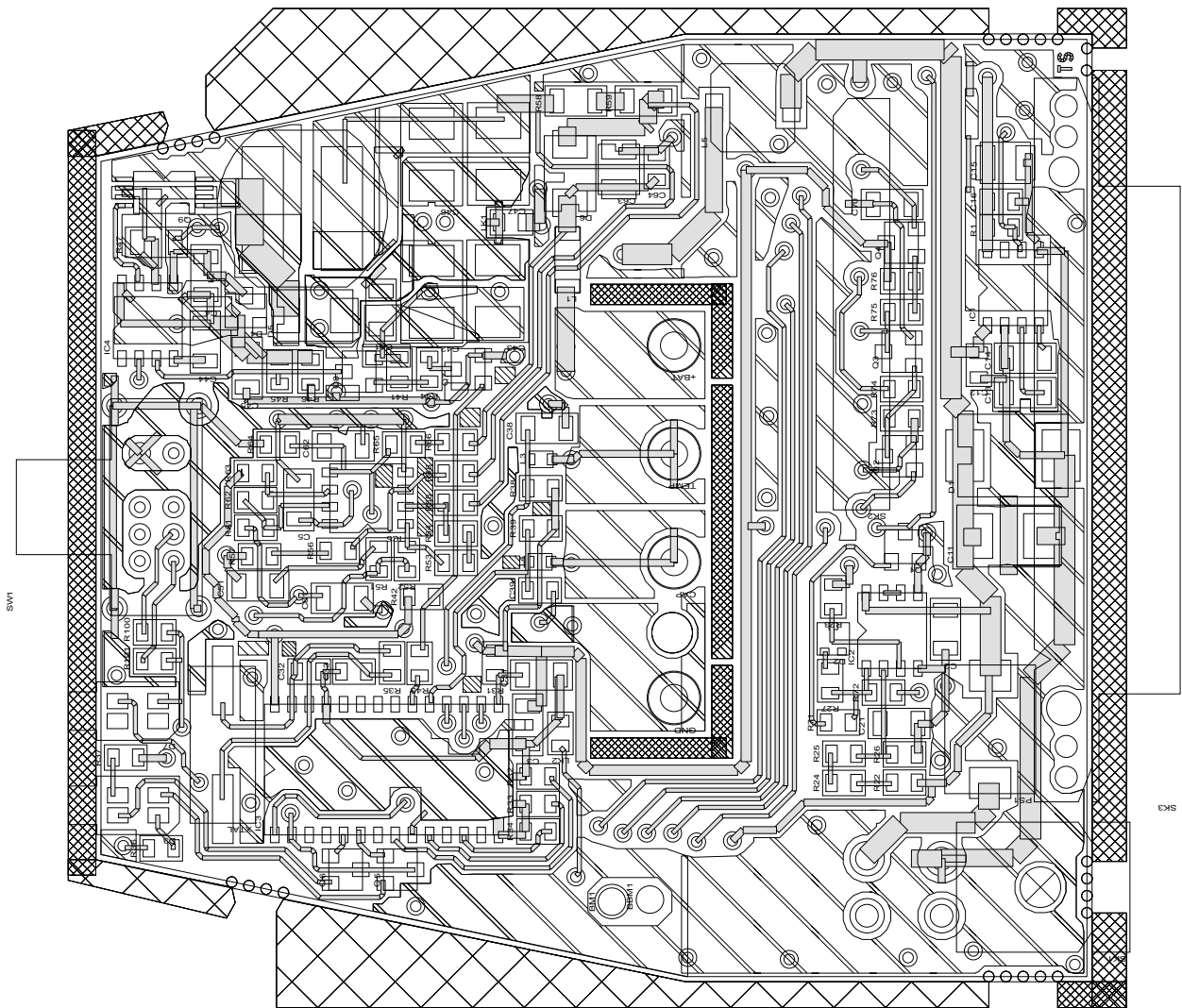


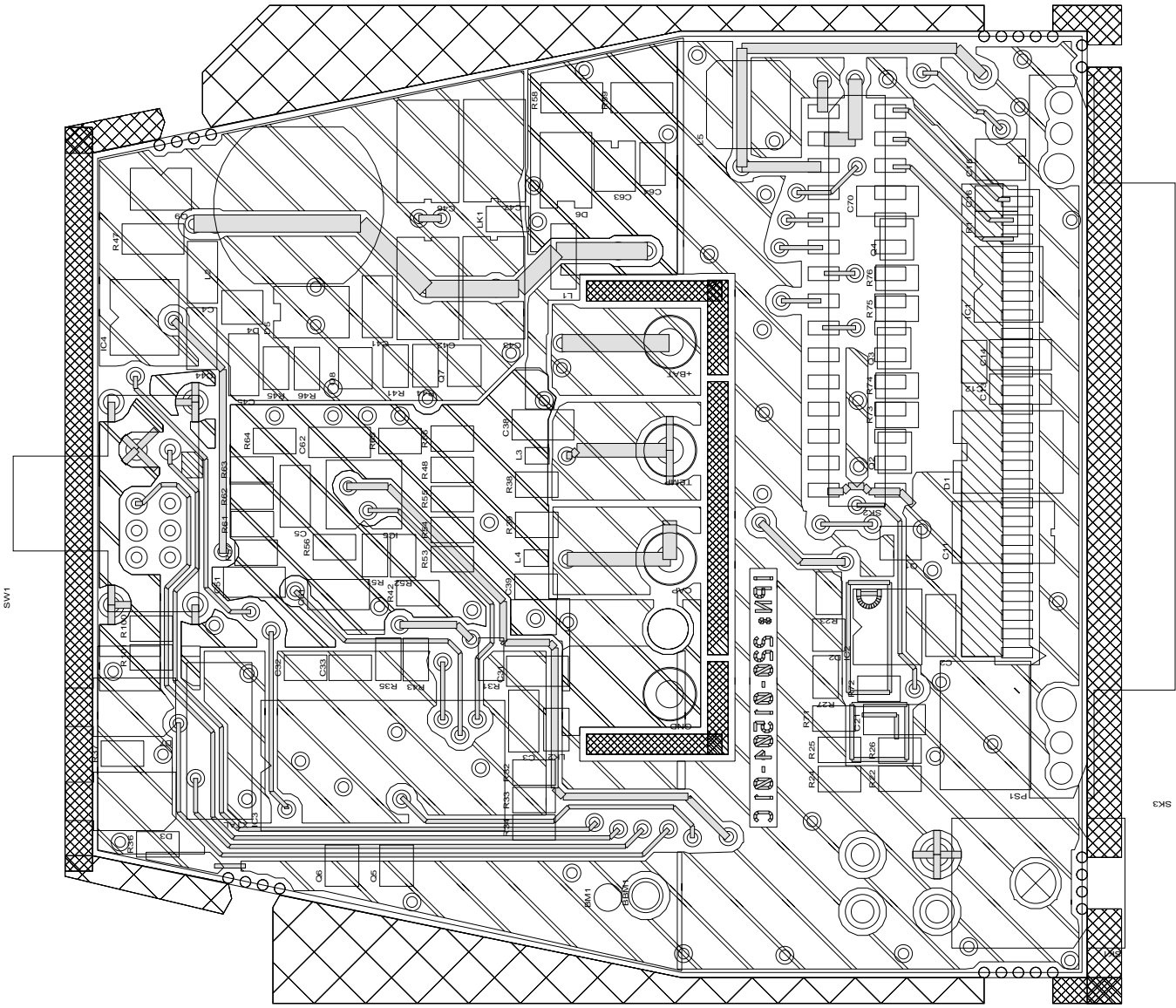
© TAIT ELECTRONICS

TAIT ORCA SERIES  
CAR KIT MAIN PCB

IPN: 220-01504-00	ISSUE: 00	ID: 2.S.C. 1
PROJECT: ORCA	DESIGNER: TONY.S	FILE NAME: CAR-KIT
FILE DATE: 21-04-98	NO SHEETS: 2	

REV/ISS	AMENDMENTS	DRAWN	CHKD	D.O.	APVD	DATE

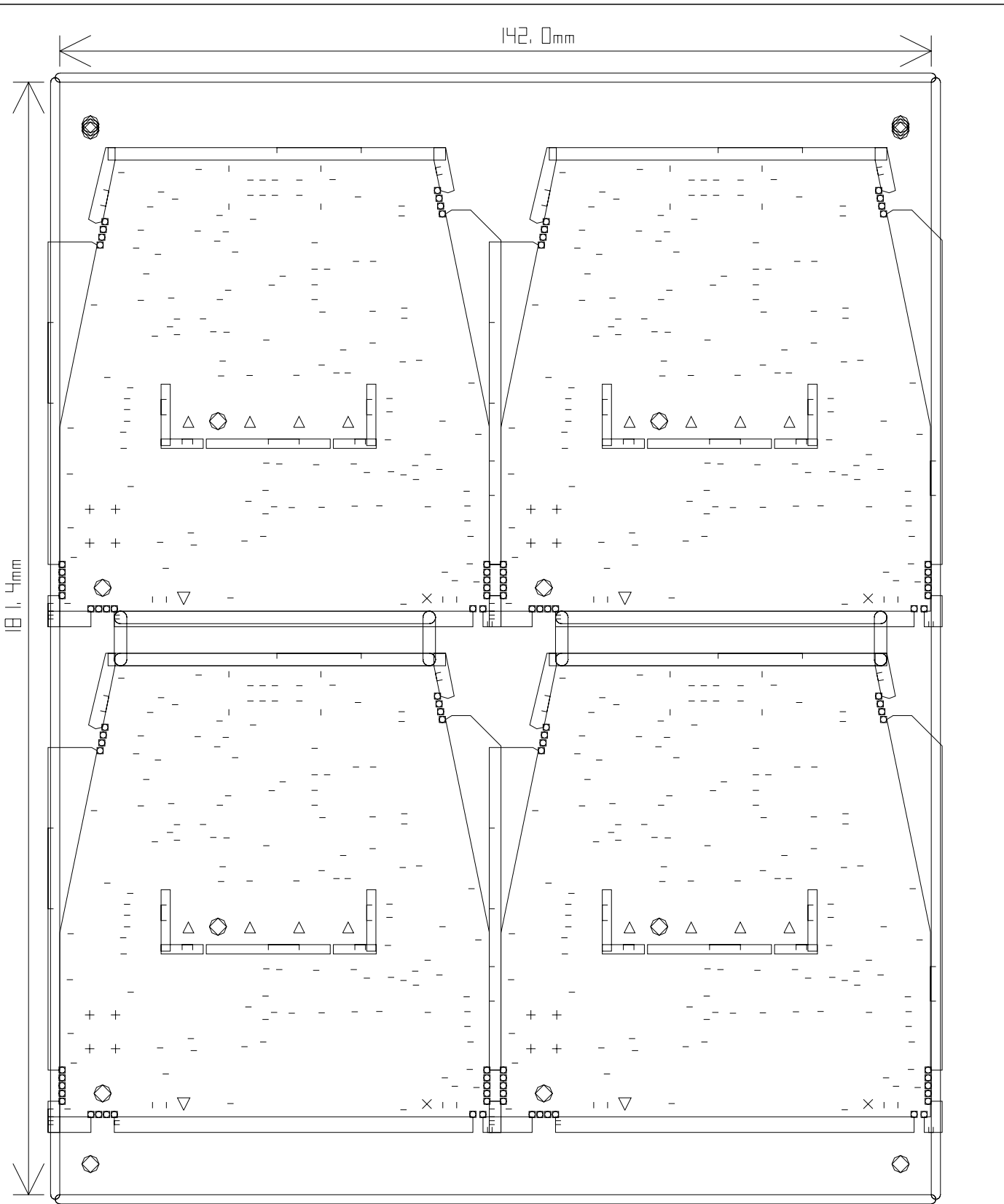




SIW1

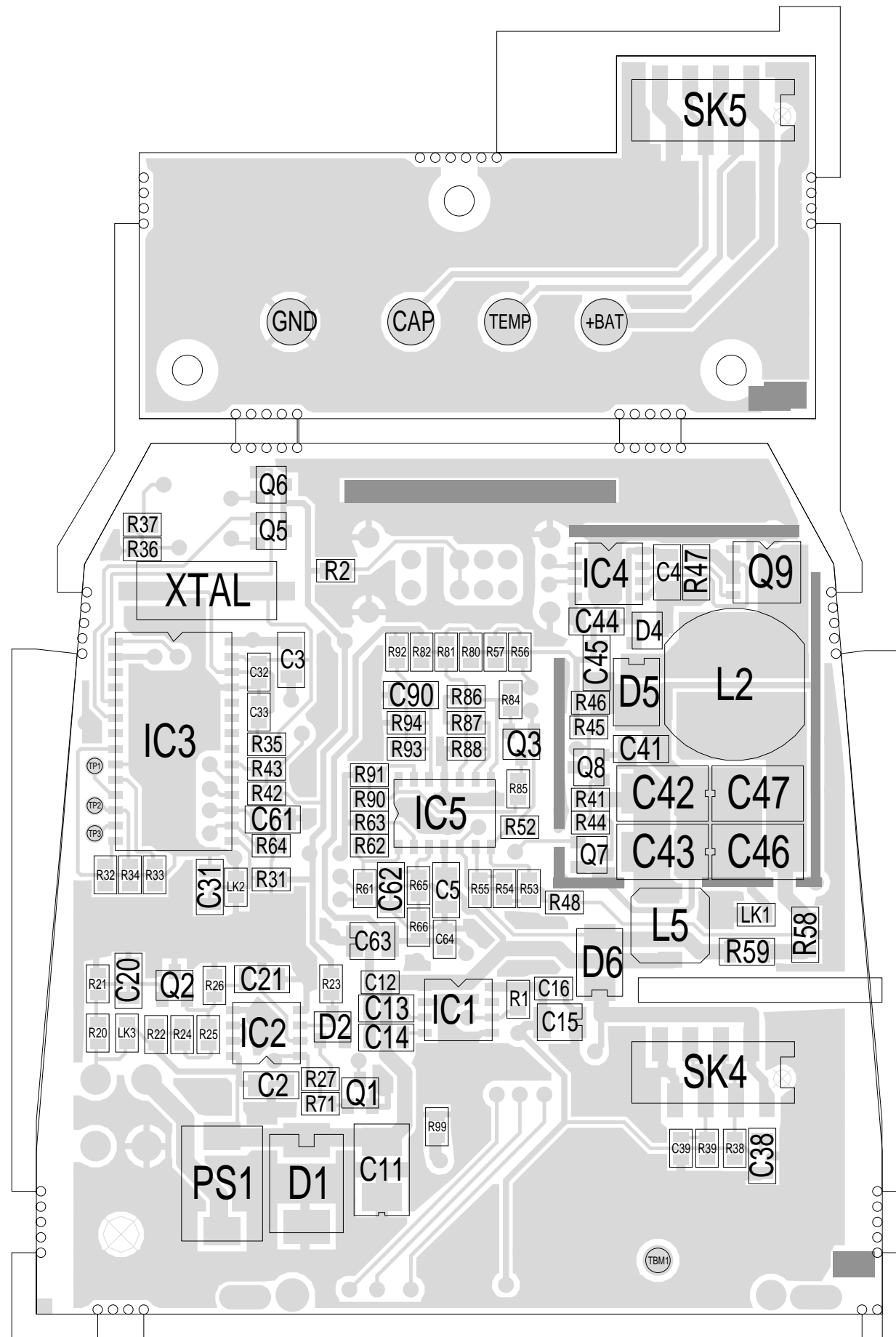
1M: S50-0124-01C  
 310-0210-03S

SK3



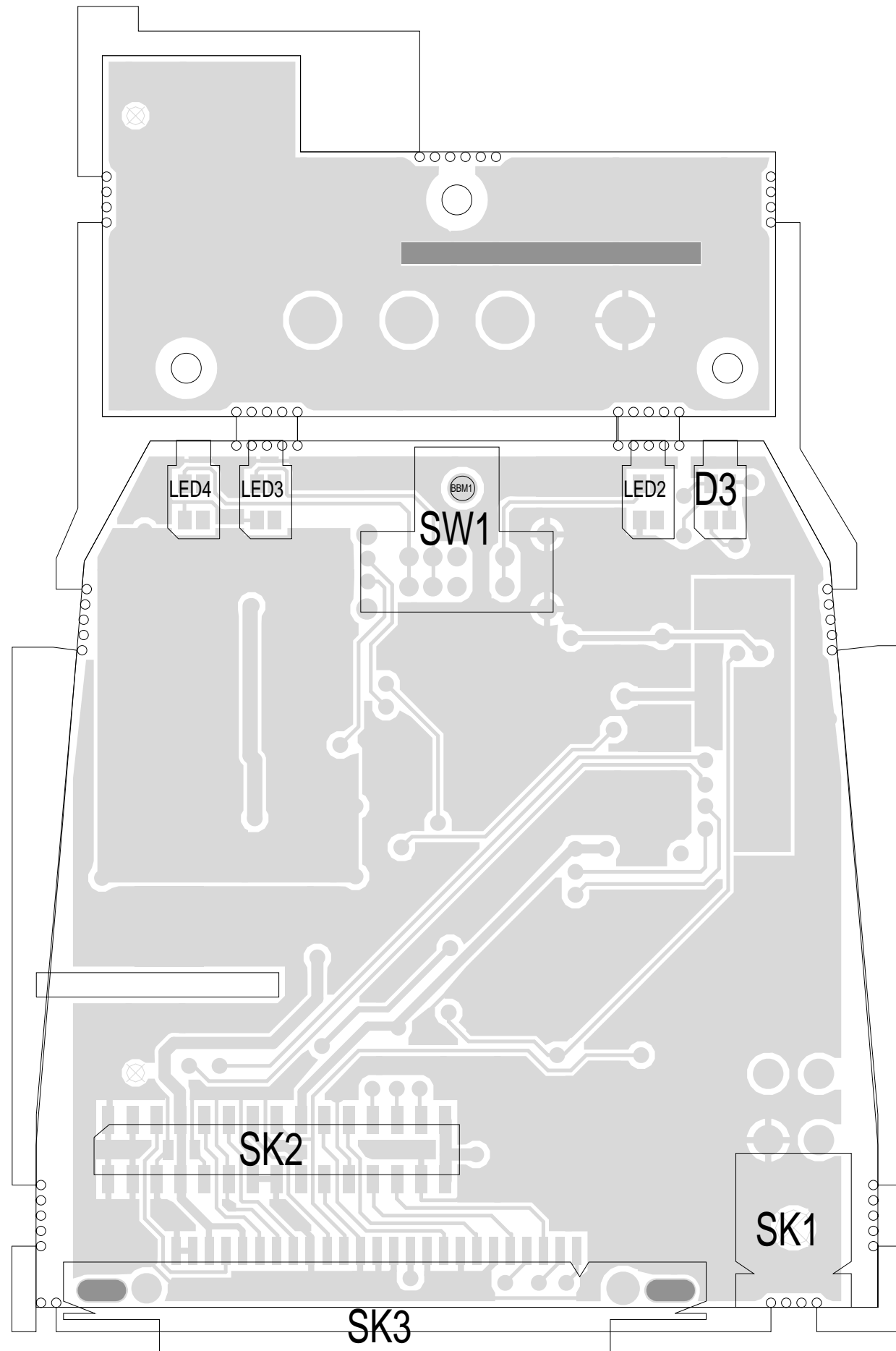
CHARGER 220-01504-01		ISS:C		1998/05/18
SYMBOL	SIZE	QTY	TYP	COMMENTS
-	31	476	P	0.8mm/0.031
	47	32	P	1.2mm/0.047
+	66	16	P	1.7mm/0.066
x	67	4	P	1.7mm/0.067
△	79	16	P	2.0mm/0.079
▽	83	4	P	2.1mm/0.083
□	31	96	U-P	0.8mm/0.031
◇	118	16	U-P	3.0mm/0.118



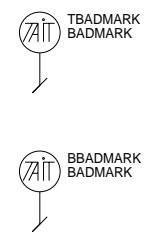
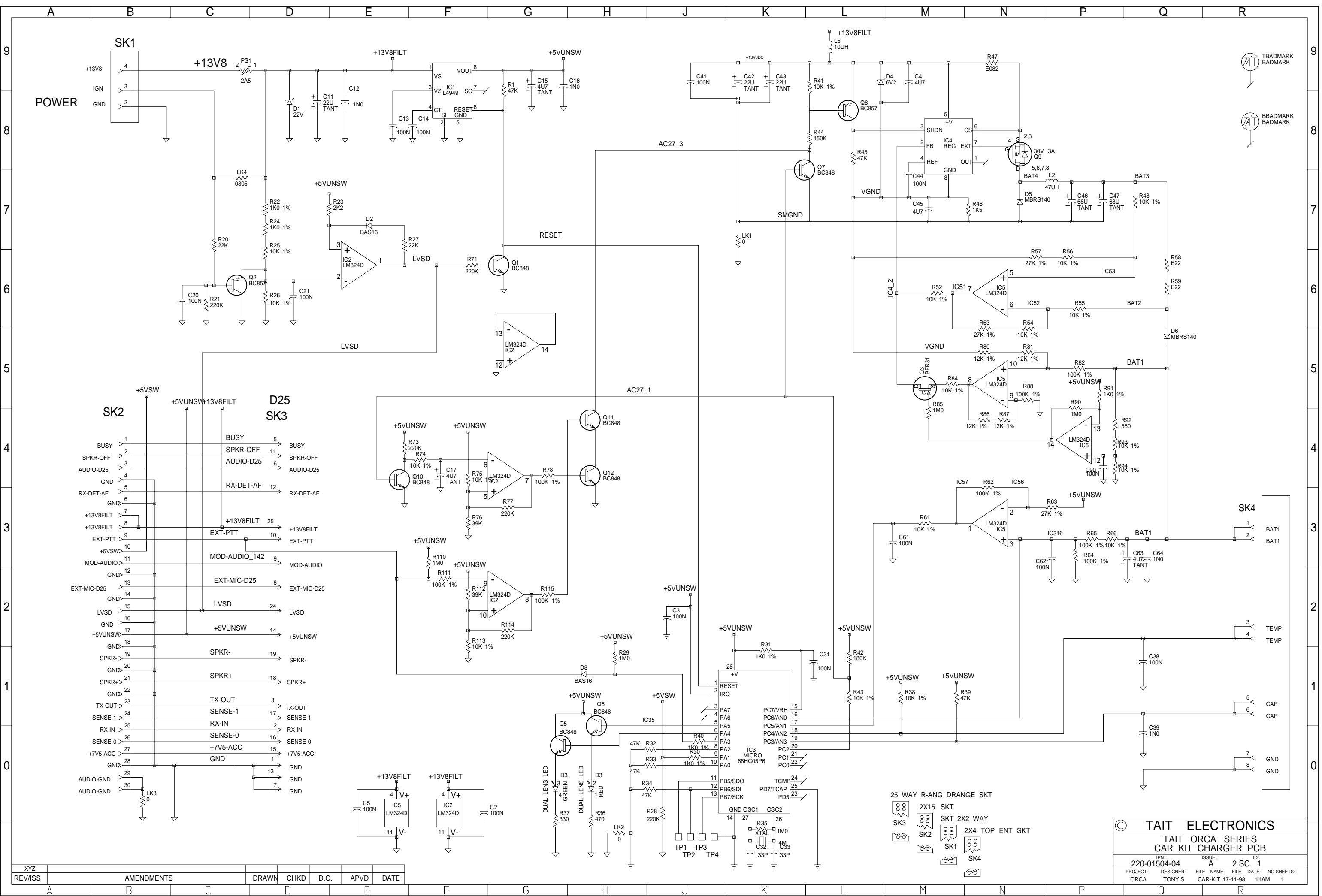


TAIT ELECTRONICS	IPN: 220-01504-03	ISS: A	ID: 1.TA	DATE: 28 Sep 1998
CHARGER PCB LAYOUT - TOP SIDE				

Scale: 2.2:1 ; Rotation: 0 degrees



TAIT ELECTRONICS	IPN: 220-01504-03	ISS: A	ID: 2.BA	DATE: 28 Sep 1998
CHARGER PCB LAYOUT - BOTTOM SIDE				



- 25 WAY R-ANG DRANGE SKT
- 2X15 SKT
- SK3 SKT 2X2 WAY
- SK2 SKT 2X4 TOP ENT SKT
- SK1
- SK4

**TAIT ELECTRONICS**

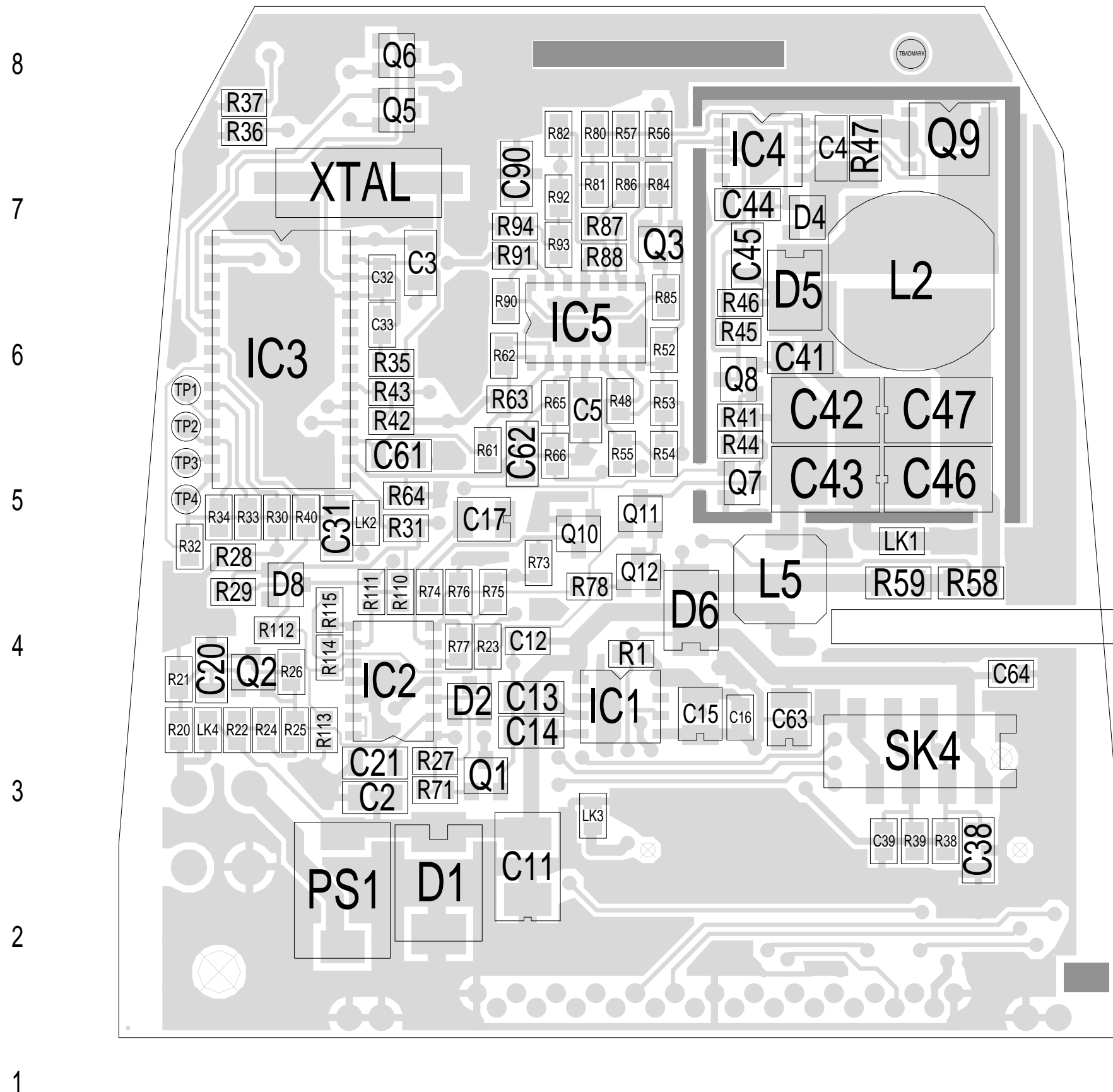
**TAIT ORCA SERIES**  
**CAR KIT CHARGER PCB**

IPN: 220-01504-04      ISSUE: A      ID: 2.SC. 1

PROJECT: ORCA      DESIGNER: TONY.S      FILE NAME: CAR-KIT      DATE: 17-11-98      NO.SHEETS: 11AM      1

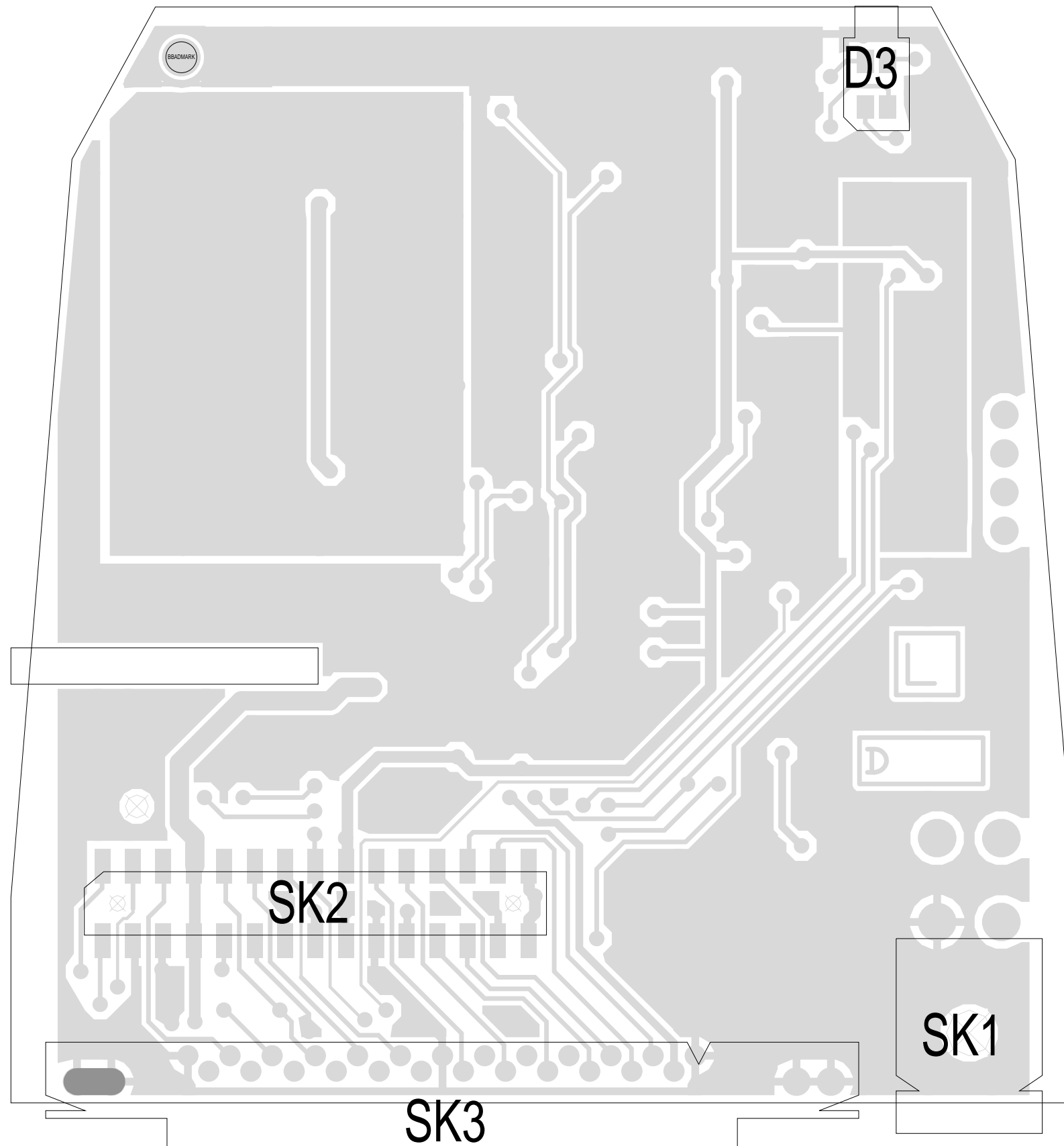
XYZ	REV/ISS	AMENDMENTS	DRAWN	CHKD	D.O.	APVD	DATE
A							





A	TAIT ELECTRONICS	IPN: 220-01504-04	ISS: A	ID: 1.TA	DATE: 20 Nov 1998	G	H
CHARGER PCB LAYOUT - TOP SIDE							

Scale: 3:1 ; Rotation: 0 degrees

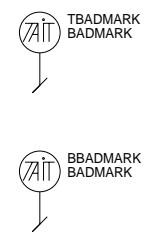
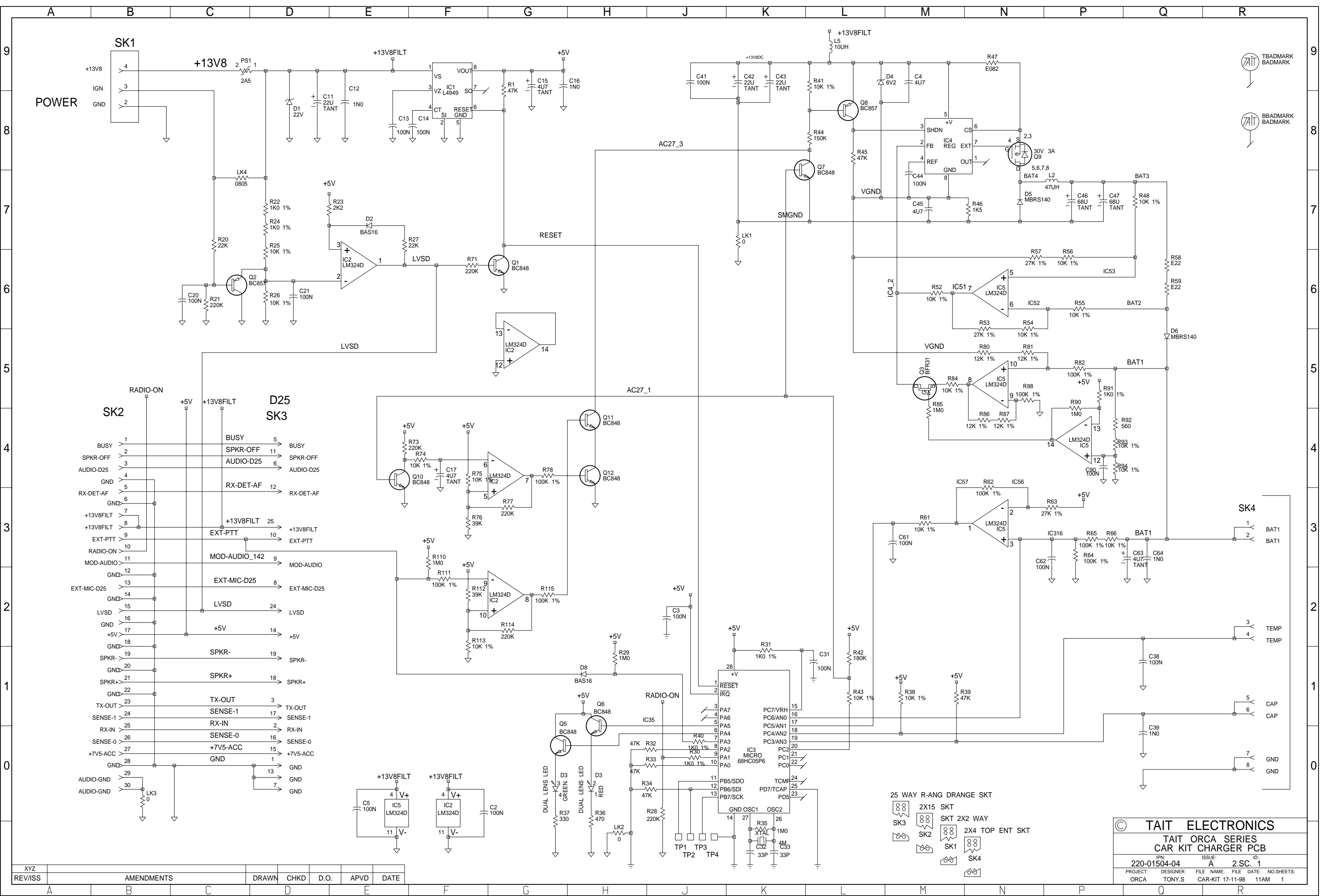


8  
7  
6  
5  
4  
3  
2  
1

H G TAIT ELECTRONICS IPN: 220-01504-04 ISS: A ID: 2.BA DATE: 20 Nov 1998 F E D C B A

CHARGER PCB LAYOUT - BOTTOM SIDE

Scale:3:1 ; Rotation: 0 degrees

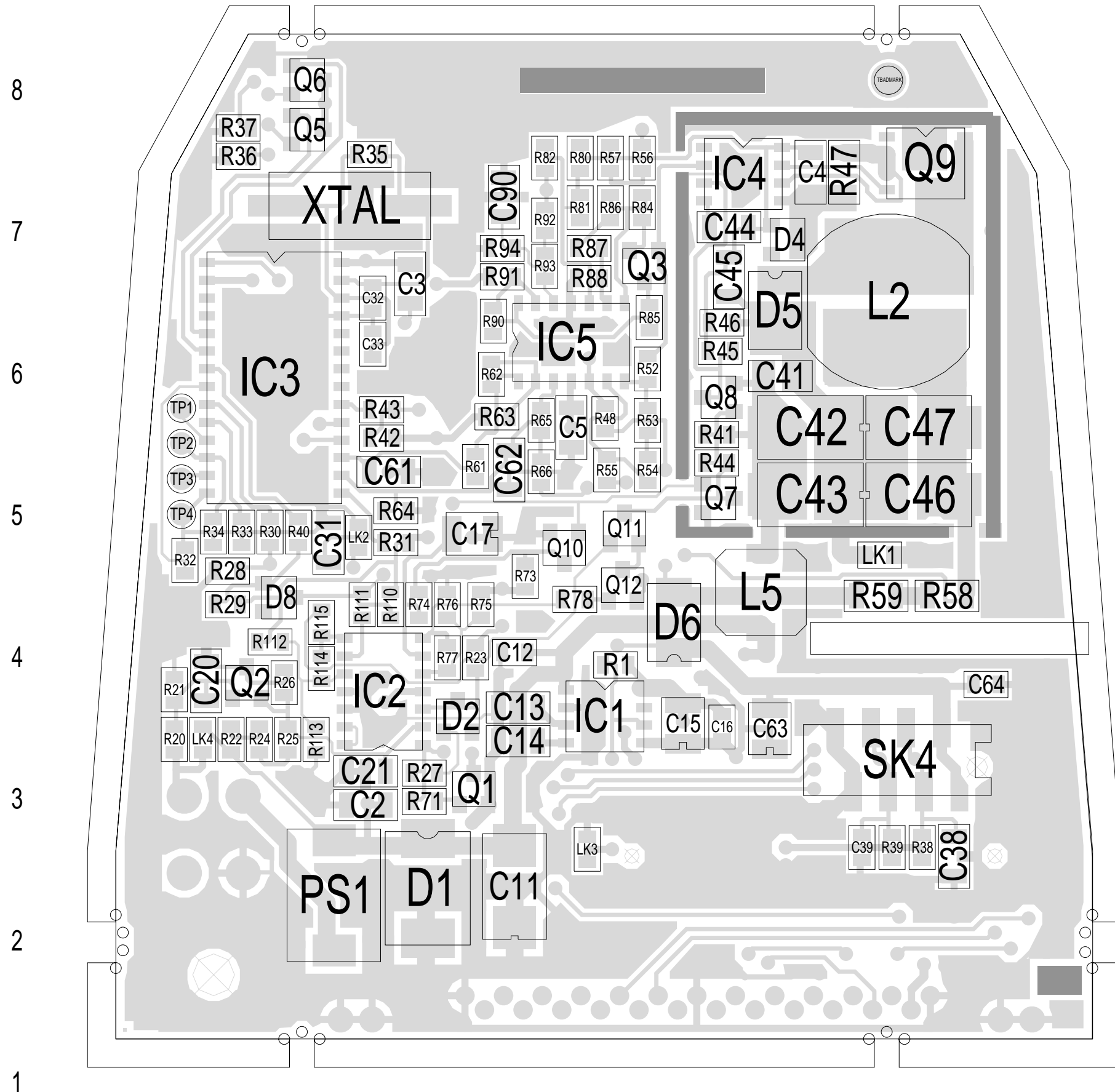


- 25 WAY R-ANG DRANGE SKT
- 2X15 SKT
- SK3 SKT 2X2 WAY
- SK2 SKT 2X4 TOP ENT SKT
- SK1
- SK4

**TAIT ELECTRONICS**  
**TAIT ORCA SERIES**  
**CAR KIT CHARGER PCB**

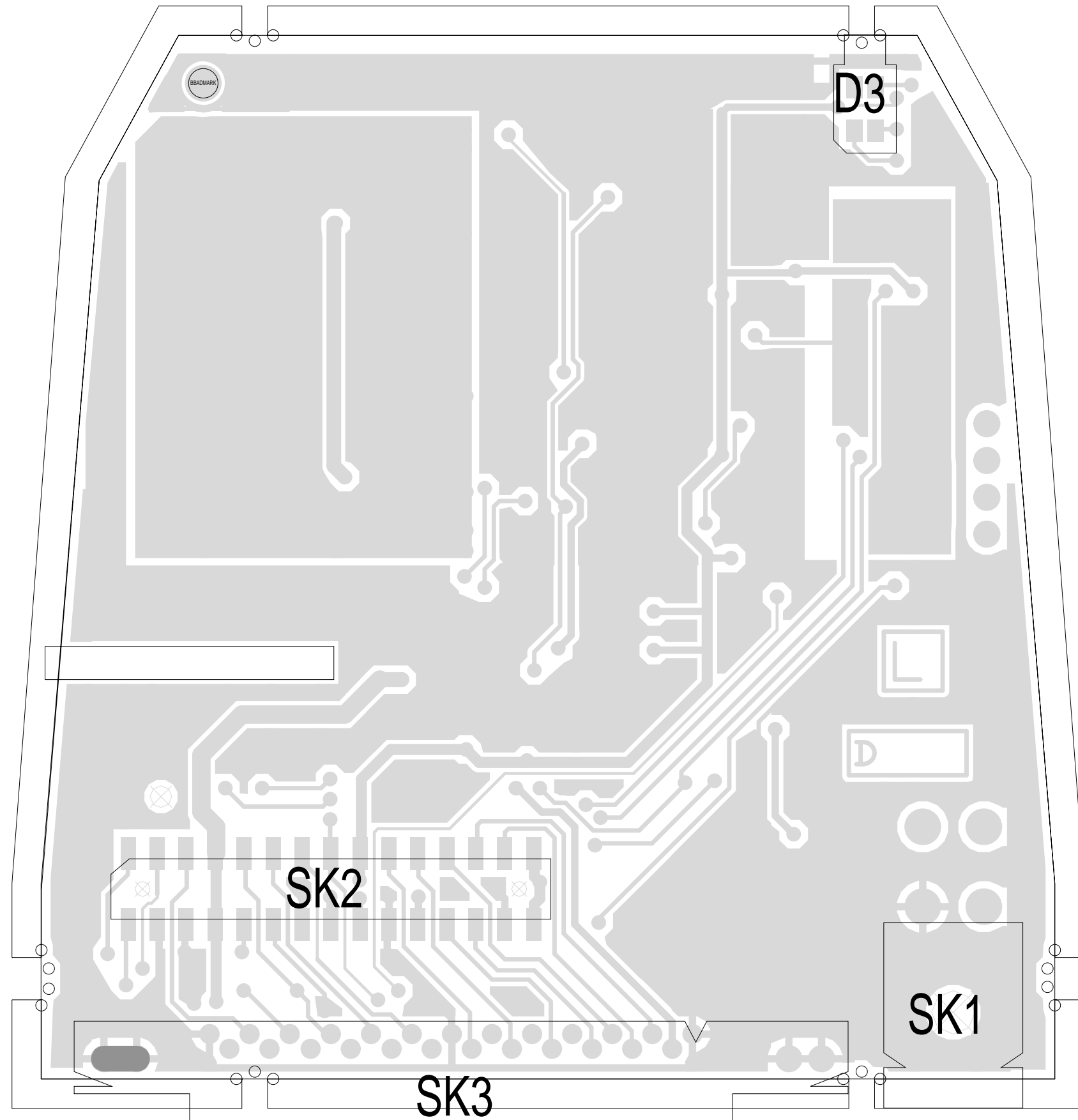
IPN: 220-01504-04      ISSUE: A      2.SC. 1  
 PROJECT: ORCA      DESIGNER: TONY.S      FILE NAME: CAR-KIT      DATE: 17-11-98      NO.SHEETS: 11AM      1

XYZ	REV/ISS	AMENDMENTS	DRAWN	CHKD	D.O.	APVD	DATE
A							



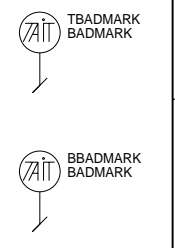
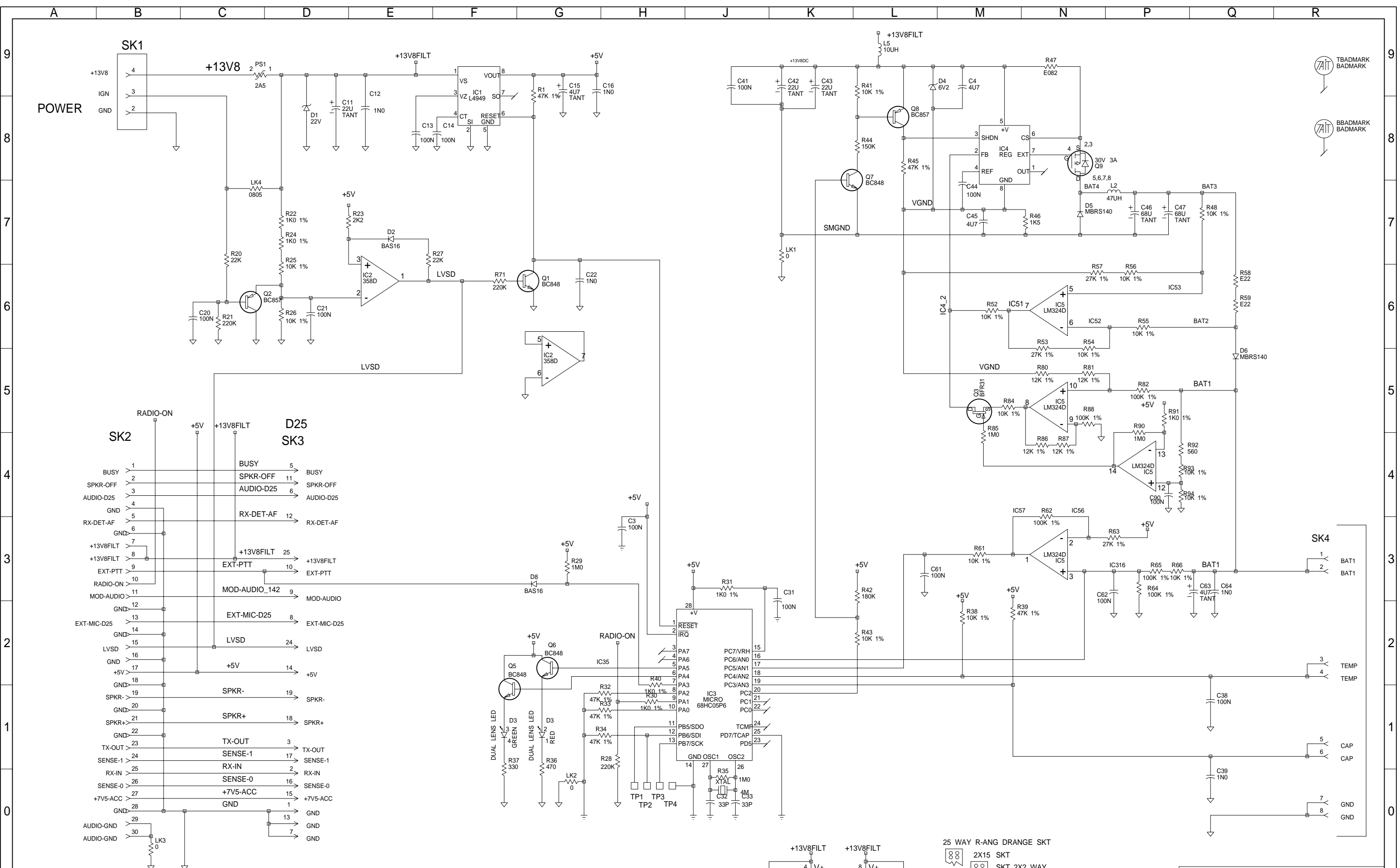
TAIT ELECTRONICS	IPN: 220-01504-05	ISS: A	ID: 1.TA	DATE: 22 Jan 1999
CHARGER PCB LAYOUT - TOP SIDE				

Scale: 3:1 ; Rotation: 0 degrees



8  
7  
6  
5  
4  
3  
2  
1

H G TAIT ELECTRONICS IPN: 220-01504-05 ISS: A ID: 2.BA DATE: 22 Jan 1999 F CHARGER PCB LAYOUT - BOTTOM SIDE C B A



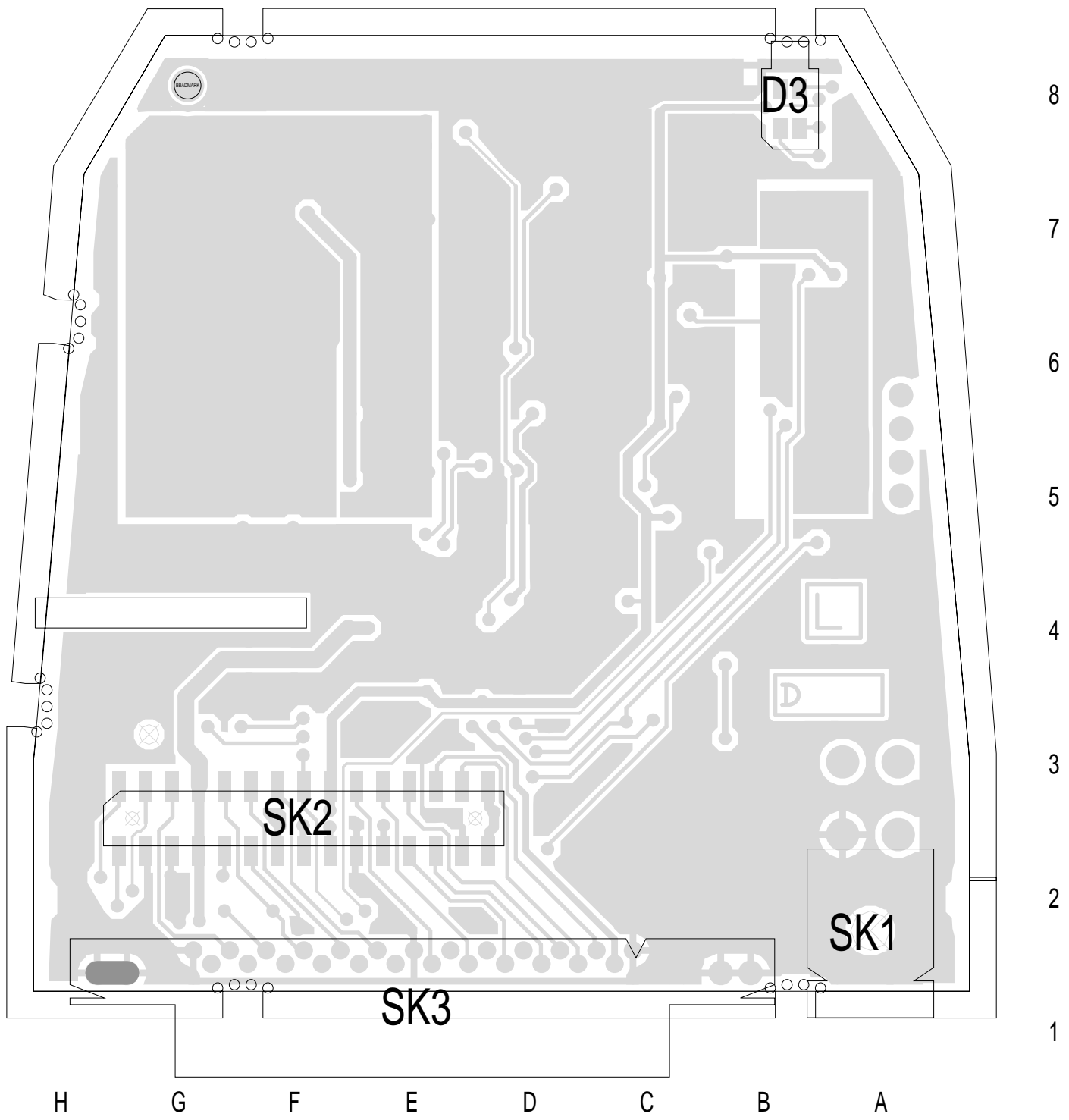
XYZ						
REV/ISS	AMENDMENTS	DRAWN	CHKD	D.O.	APVD	DATE

- 25 WAY R-ANG DRANGE SKT
- 2X15 SKT
  - SK3 SKT 2X2 WAY
  - SK2 SKT 2X4 TOP ENT SKT
  - SK1
  - SK4

© TAIT ELECTRONICS  
 TAIT ORCA SERIES  
 CAR KIT CHARGER PCB

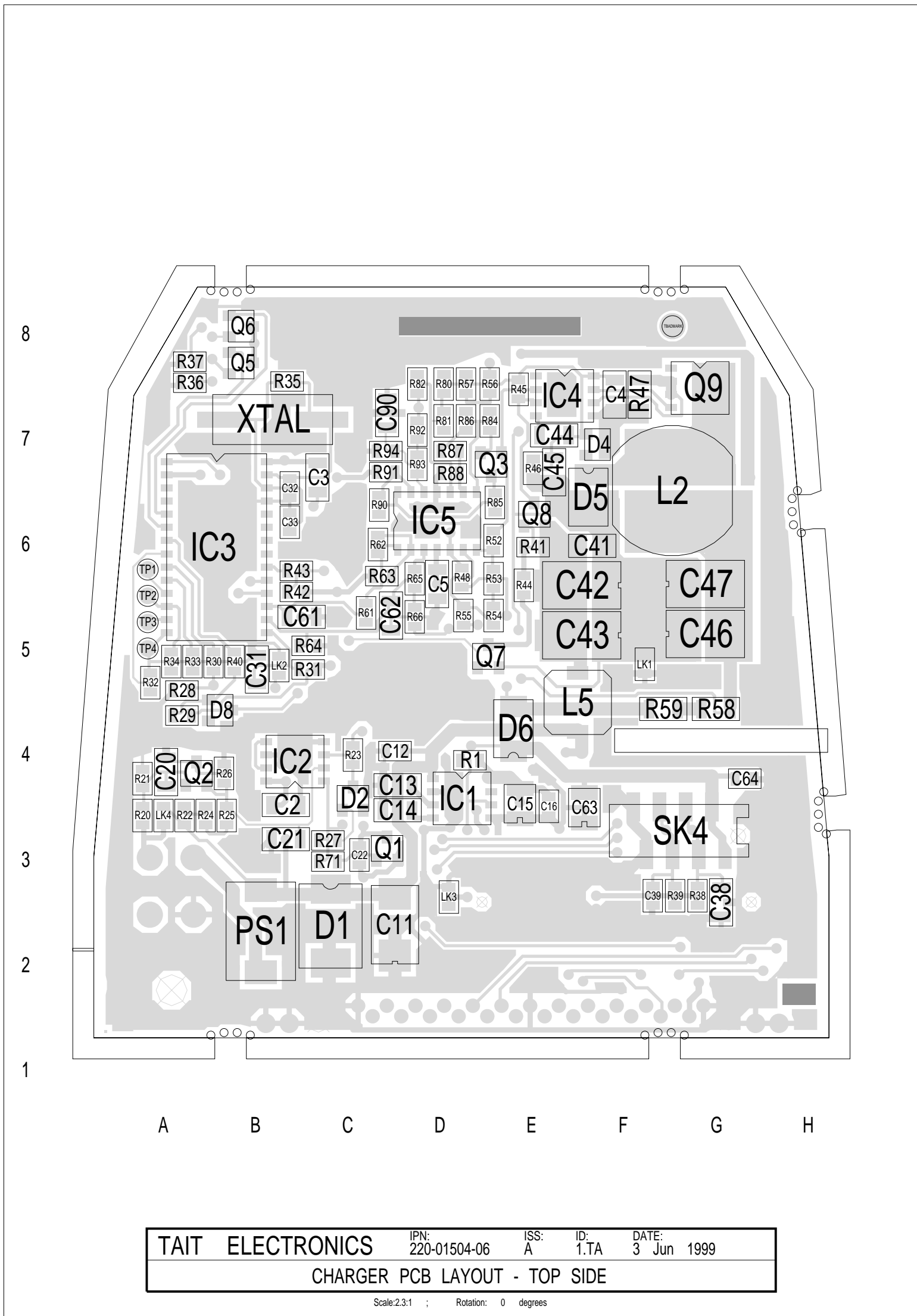
IPN: 220-01504-06  
 ISSUE: A  
 ID: 2.SC. 1

PROJECT: ORCA  
 DESIGNER: TONY.S  
 FILE NAME: 150406A  
 FILE DATE: 25-05-99  
 NO.SHEETS: 1

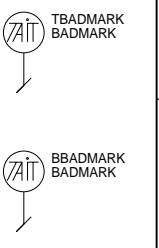
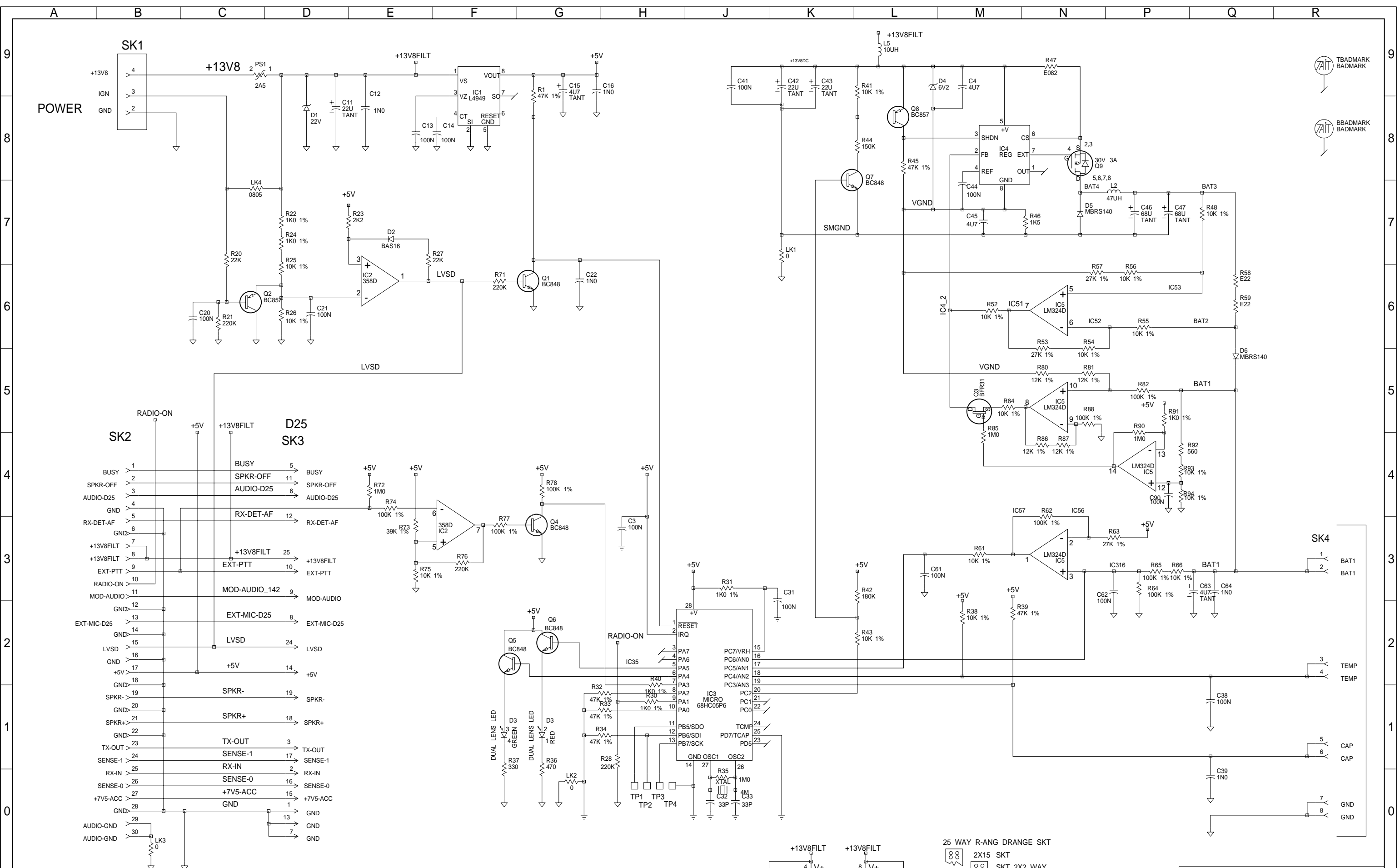


<b>TAIT ELECTRONICS</b>	IPN:	ISS:	ID:	DATE:
	220-01504-06	A	2.BA	3 Jun 1999
<b>CHARGER PCB LAYOUT - BOTTOM SIDE</b>				

Scale: 2.3:1 ; Rotation: 0 degrees







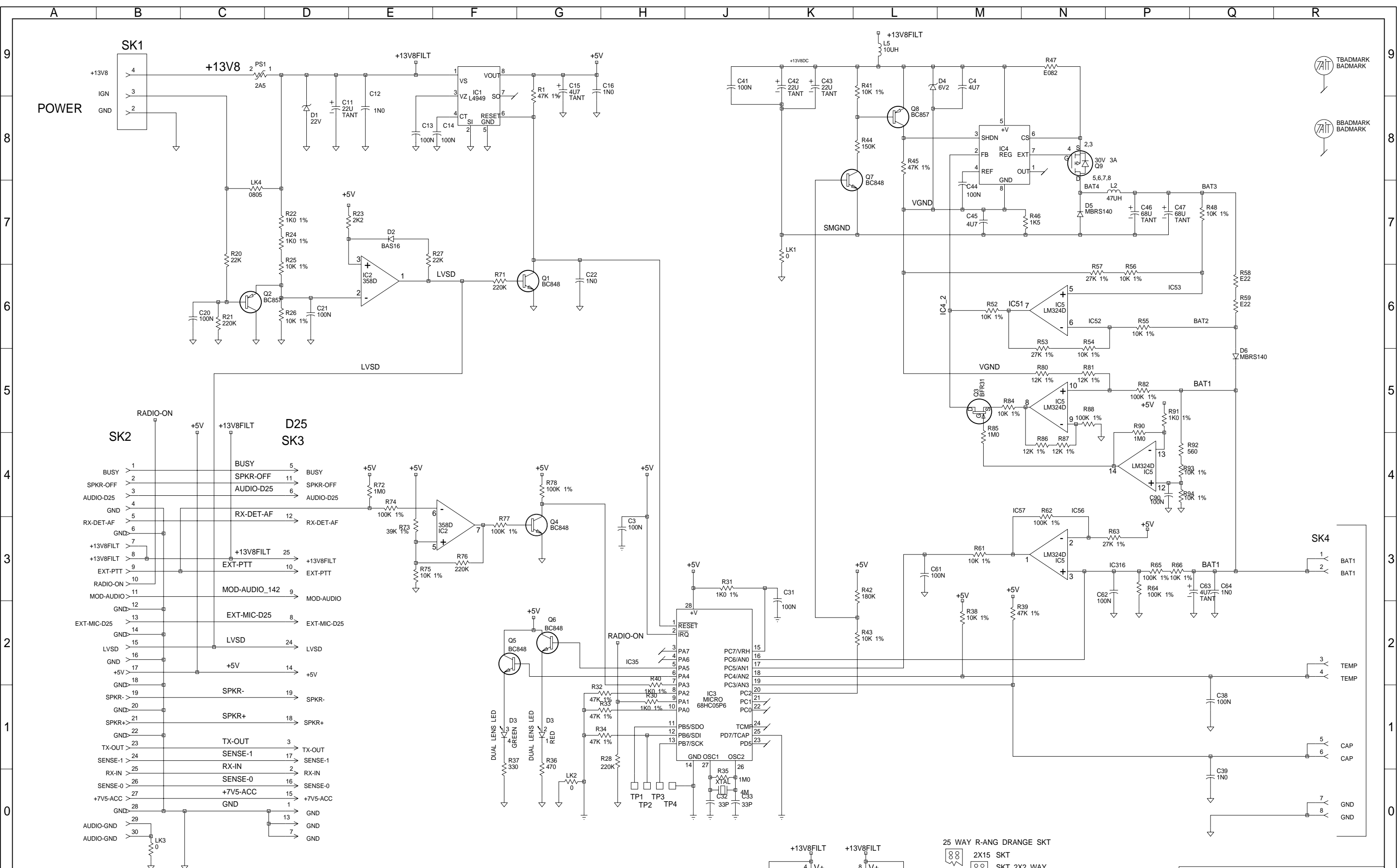
07A	USE LM358:B + 8 COMPONENTS	TONY.S				
REV/ISS	AMENDMENTS	DRAWN	CHKD	D.O.	APVD	DATE

- 25 WAY R-ANG DRANGE SKT
- 2X15 SKT
- SK3 SKT 2X2 WAY
- SK2 SKT 2X4 TOP ENT SKT
- SK1
- SK4

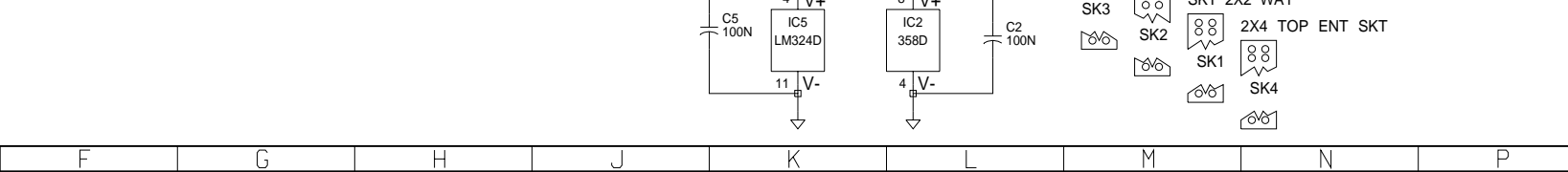
© TAIT ELECTRONICS  
 TAIT ORCA SERIES  
 CAR KIT CHARGER PCB

IPN: 220-01504-07  
 ISSUE: A  
 ID: 2.SC. 1

PROJECT: ORCA  
 DESIGNER: TONY.S  
 FILE NAME: 150407A  
 FILE DATE: 18-06-99  
 NO.SHEETS: 1



08A	FIX BREAK SMGND BCU ECN50-0319	TONY.S			12-07-99	
07A	USE LM358:B + 8 COMPONENTS	TONY.S				
REV/ISS	AMENDMENTS	DRAWN	CHKD	D.O.	APVD	DATE

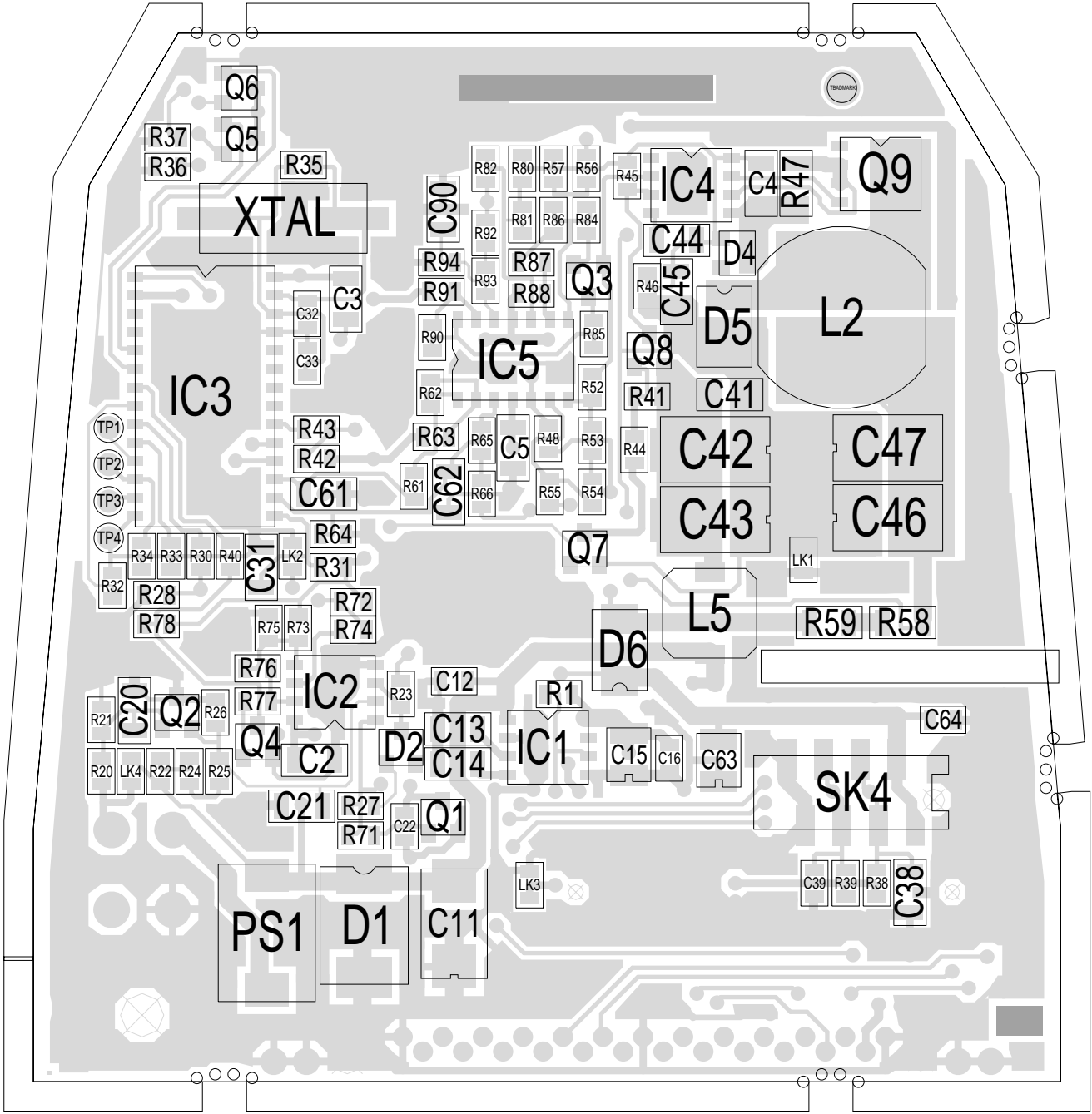


© TAIT ELECTRONICS  
 TAIT ORCA SERIES  
 CAR KIT CHARGER PCB

IPN:	ISSUE:	ID:
220-01504-08	A	2.SC. 1
PROJECT:	DESIGNER:	FILE NAME:
ORCA	TONY.S	150408A
		FILE DATE:
		12-07-99
		NO.SHEETS:
		1

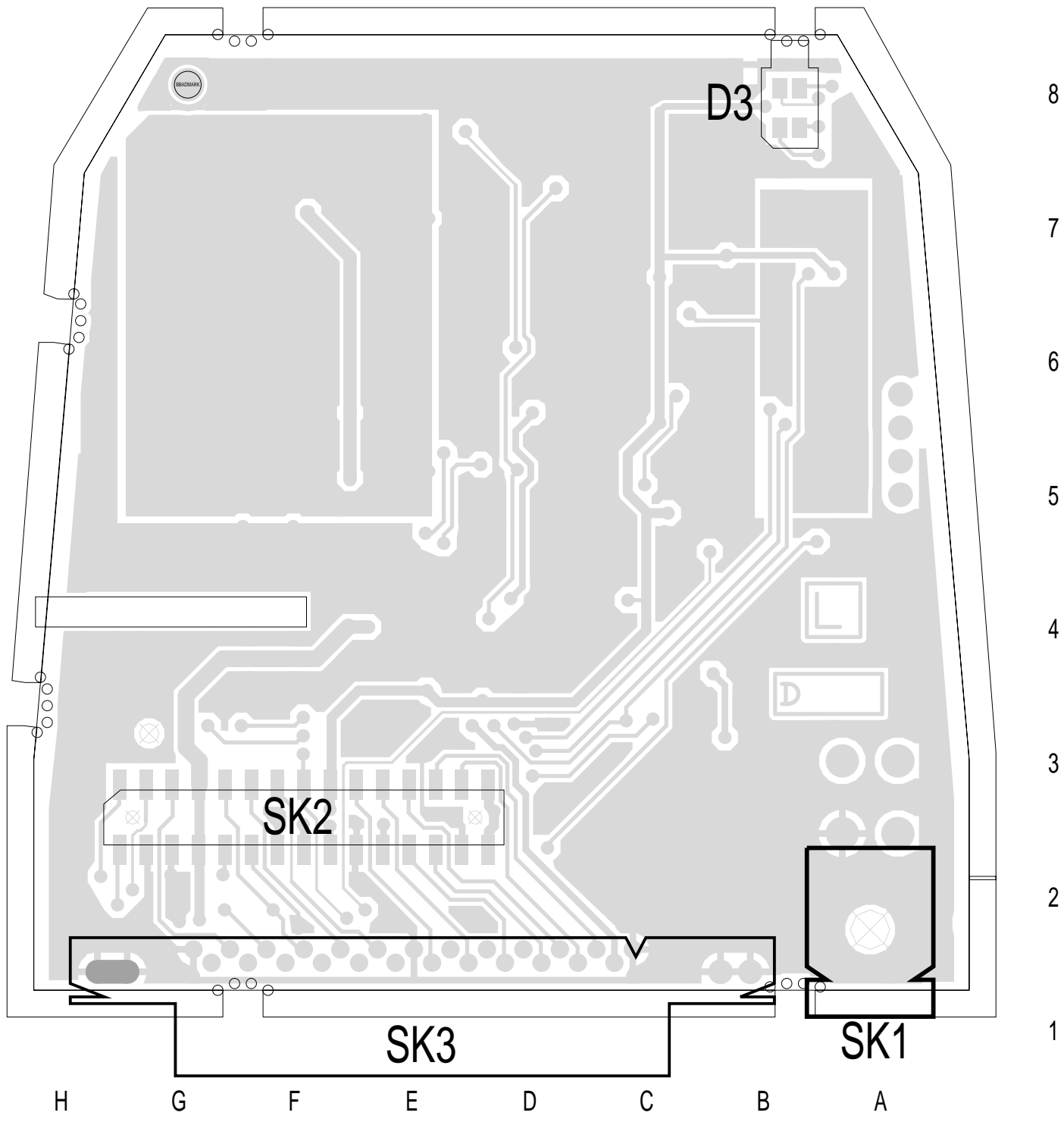
8  
7  
6  
5  
4  
3  
2  
1

A B C D E F G H



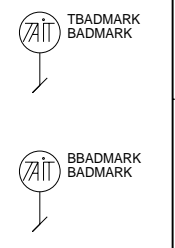
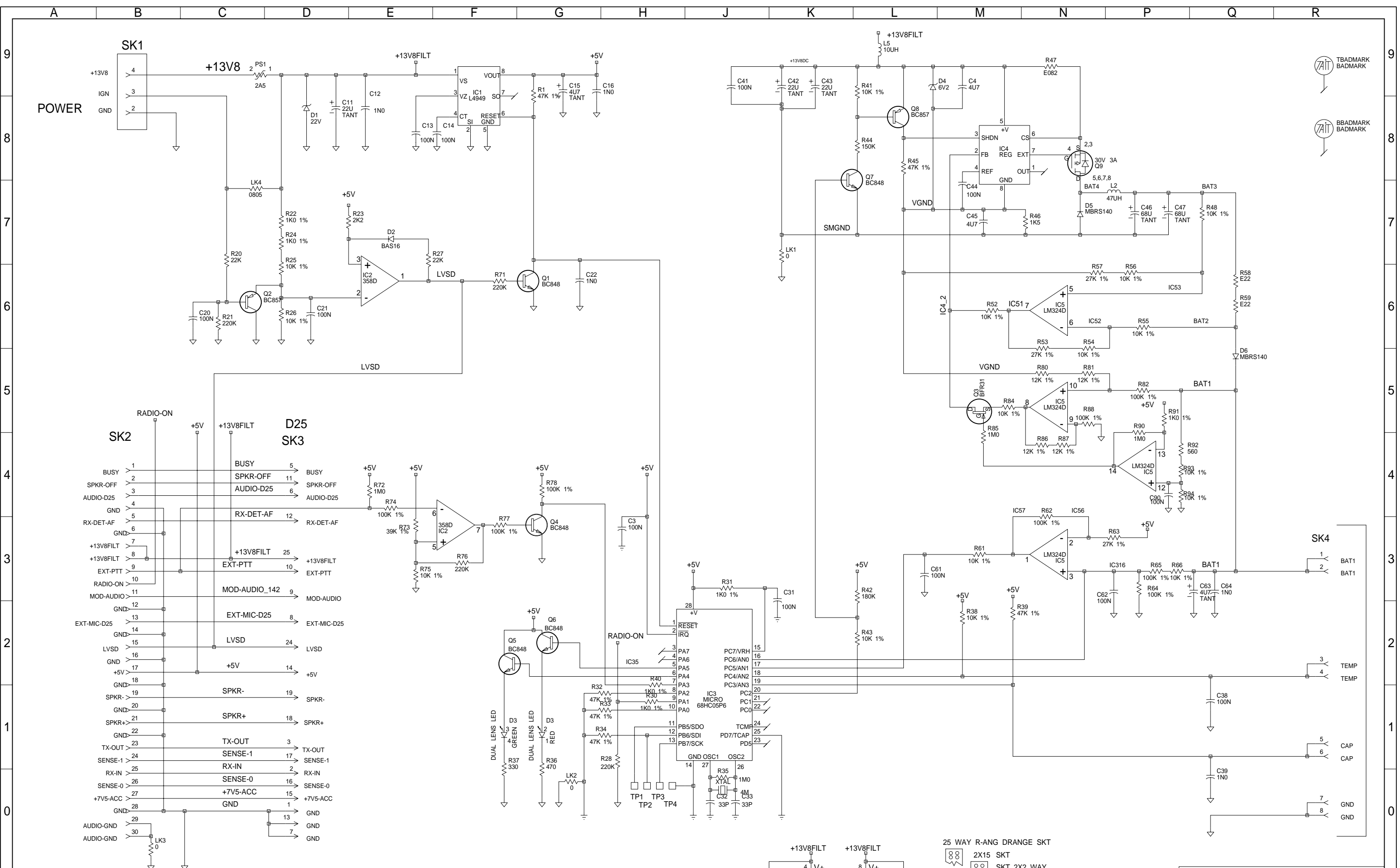
TAIT ELECTRONICS	IPN:	ISS:	ID:	DATE:
	220-01504-08	07	1.TA	12 Jul 1999
TOVK CHARGER PCB LAYOUT - TOP SIDE				

Scale:2.3:1 ; Rotation: 0 degrees

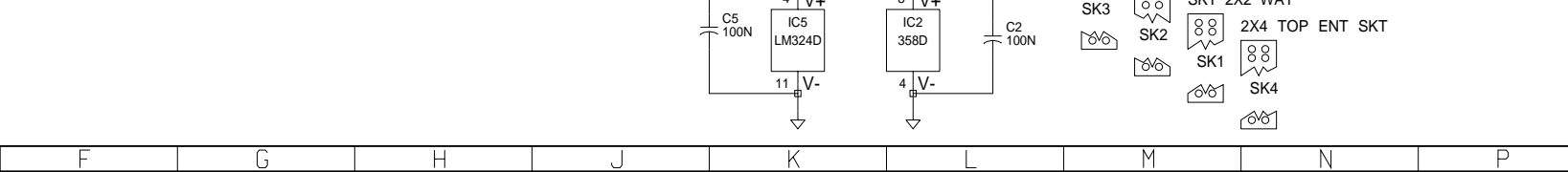


<b>TAIT ELECTRONICS</b>	IPN:	ISS:	ID:	DATE:
	220-01504-08	07	2.BA	12 Jul 1999
<b>TOVK CHARGER PCB LAYOUT - BOTTOM SIDE</b>				

Scale:2.3:1 ; Rotation: 0 degrees

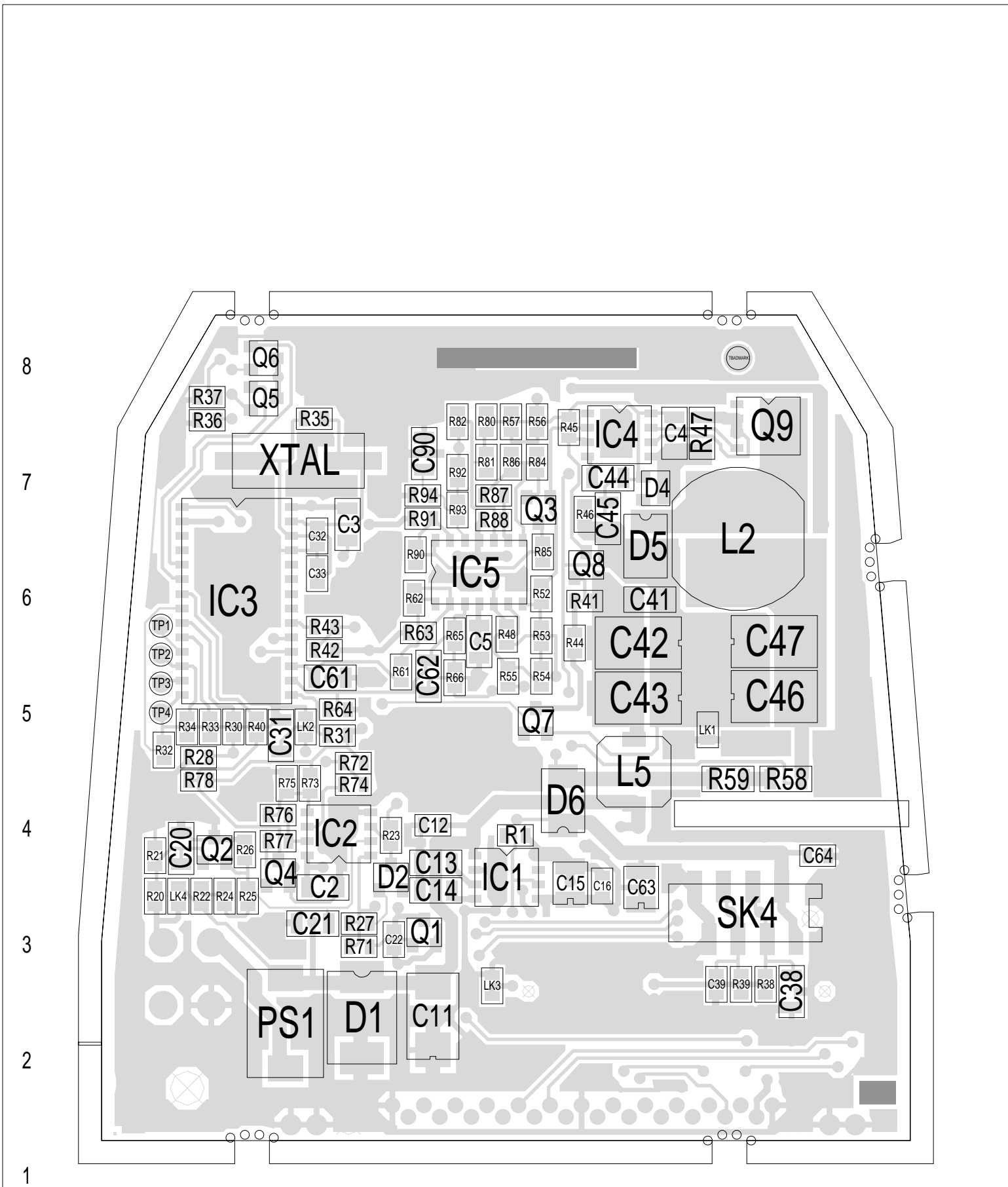


08A	FIX BREAK SMGND BCU ECN50-0319	TONY.S			12-07-99
07A	USE LM358:B + 8 COMPONENTS	TONY.S			
REV/ISS	AMENDMENTS	DRAWN	CHKD	D.O.	APVD DATE



© TAIT ELECTRONICS  
 TAIT ORCA SERIES  
 CAR KIT CHARGER PCB

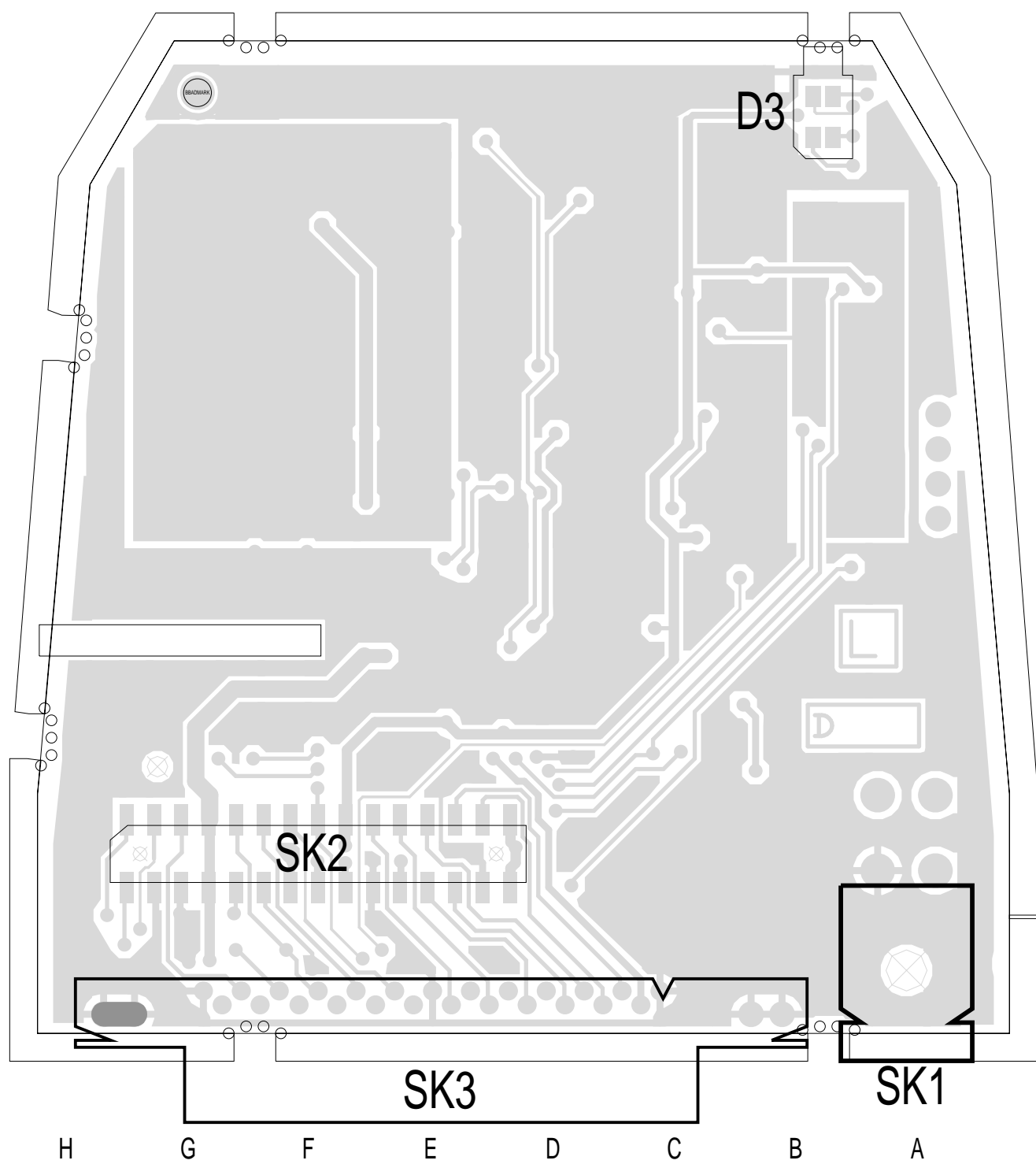
IPN:	ISSUE:	ID:
220-01504-08	A	2.SC. 1
PROJECT:	DESIGNER:	FILE NAME:
ORCA	TONY.S	150408A
		FILE DATE:
		12-07-99
		NO.SHEETS:
		1



A B C D E F G H

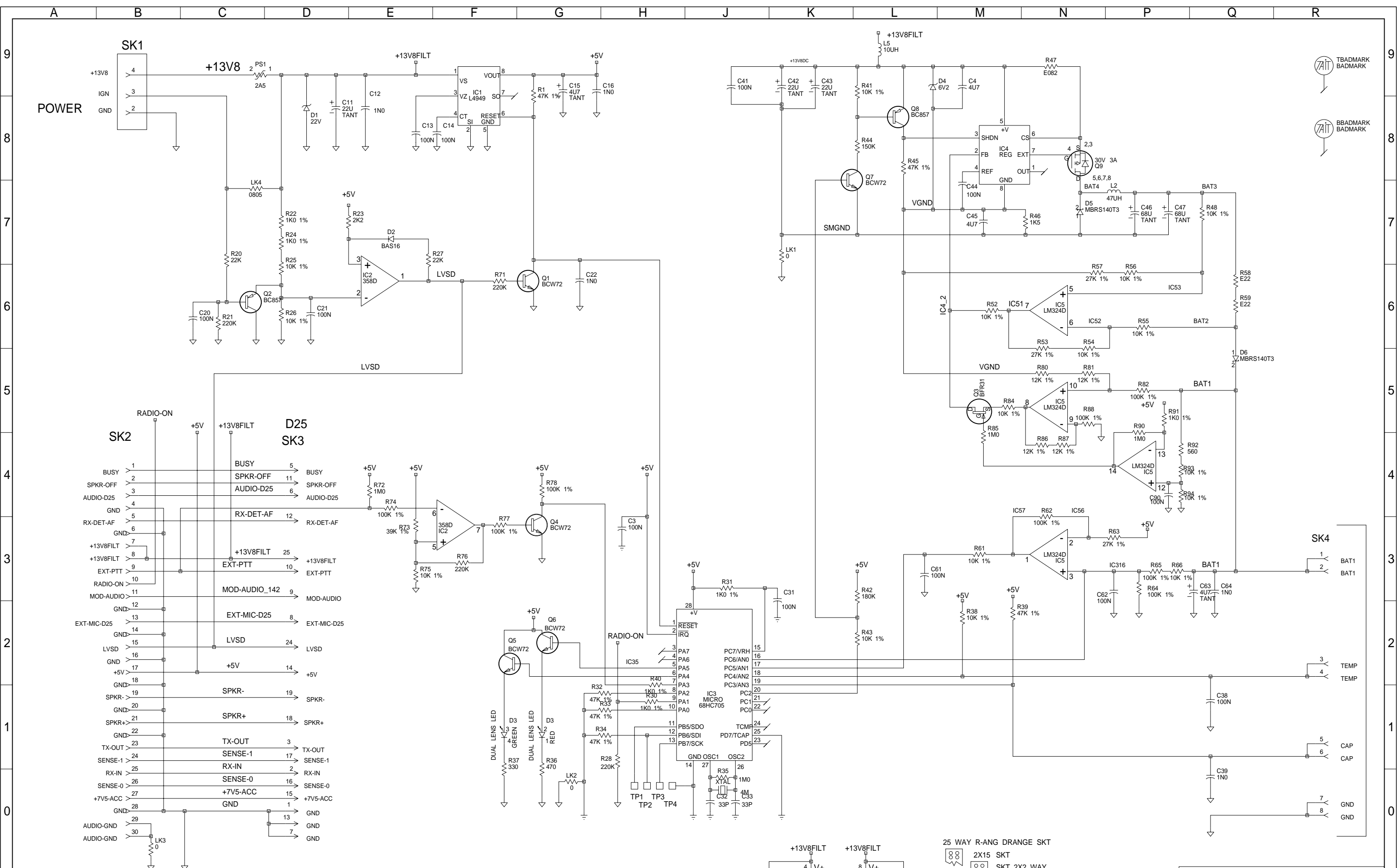
TAIT ELECTRONICS	IPN:	ISS:	ID:	DATE:
	220-01504-08	07	1.TA	12 Jul 1999
TOVK CHARGER PCB LAYOUT - TOP SIDE				

Scale:2.3:1 ; Rotation: 0 degrees

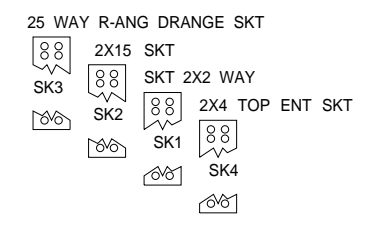


TAIT ELECTRONICS	IPN:	ISS:	ID:	DATE:
	220-01504-08	07	2.BA	12 Jul 1999
TOVK CHARGER PCB LAYOUT - BOTTOM SIDE				

Scale: 2.3:1 ; Rotation: 0 degrees



09A	ECO NO. 500645 LED LINES	BRD		03-03-00
	FIX BREAK SMGND BCU ECN50-0319	TONY.S		12-07-99
	USE LM358:B + 8 COMPONENTS	TONY.S		
REV/ISS	AMENDMENTS	DRAWN	CHKD	D.O.
		APVD		DATE

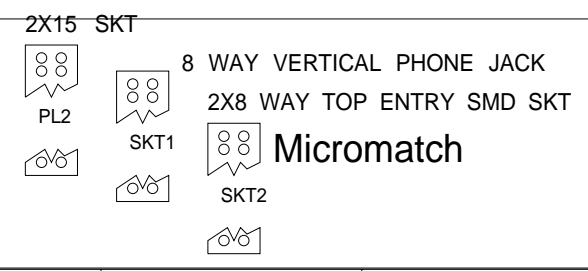
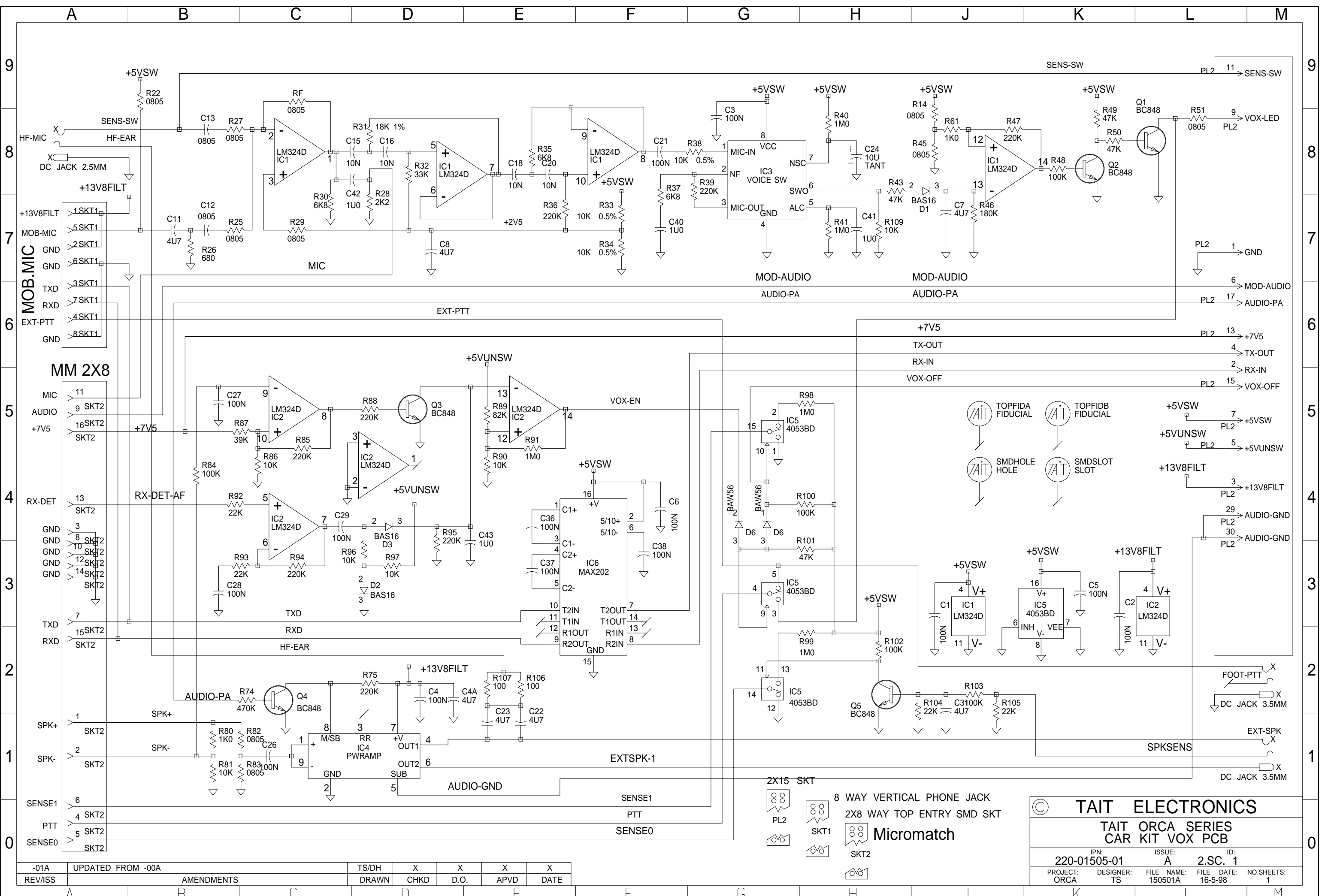


© TAIT ELECTRONICS  
 TAIT ORCA SERIES  
 CAR KIT CHARGER PCB

IPN: 220-01504-09  
 ISSUE: A  
 ID: 2.SC. 1

PROJECT: ORCA  
 DESIGNER: BRD  
 FILE NAME: 150409a  
 DATE: 3-Mar-00  
 NO.SHEETS: 1





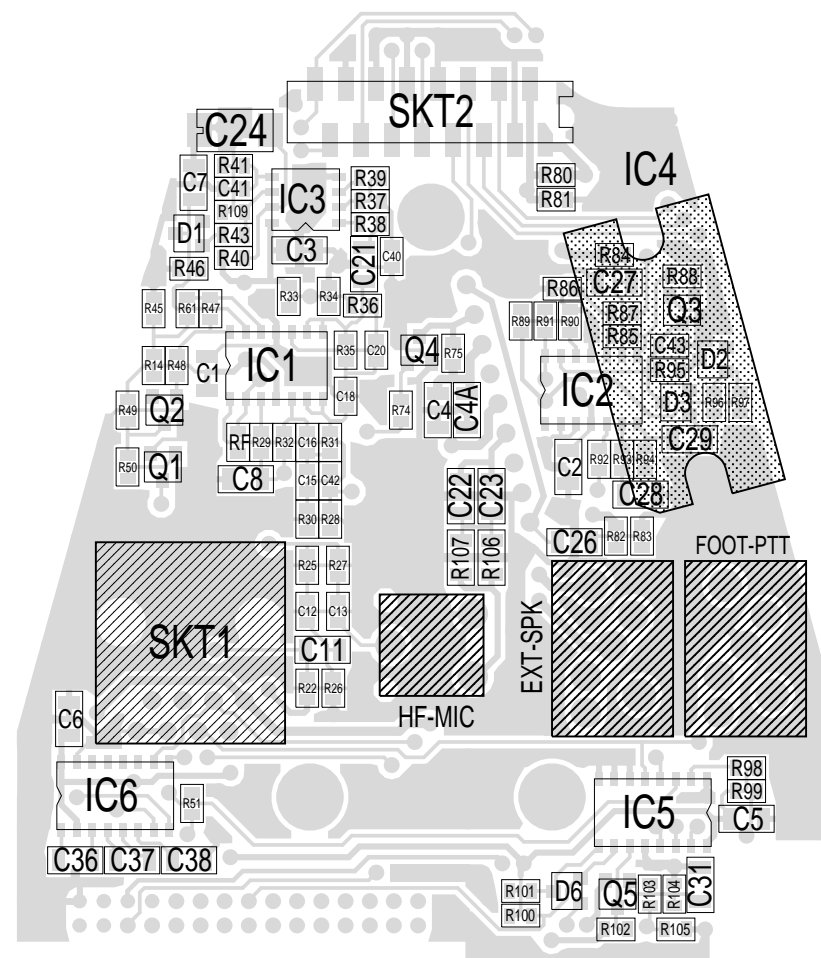
© TAIT ELECTRONICS

TAIT ORCA SERIES  
CAR KIT VOX PCB

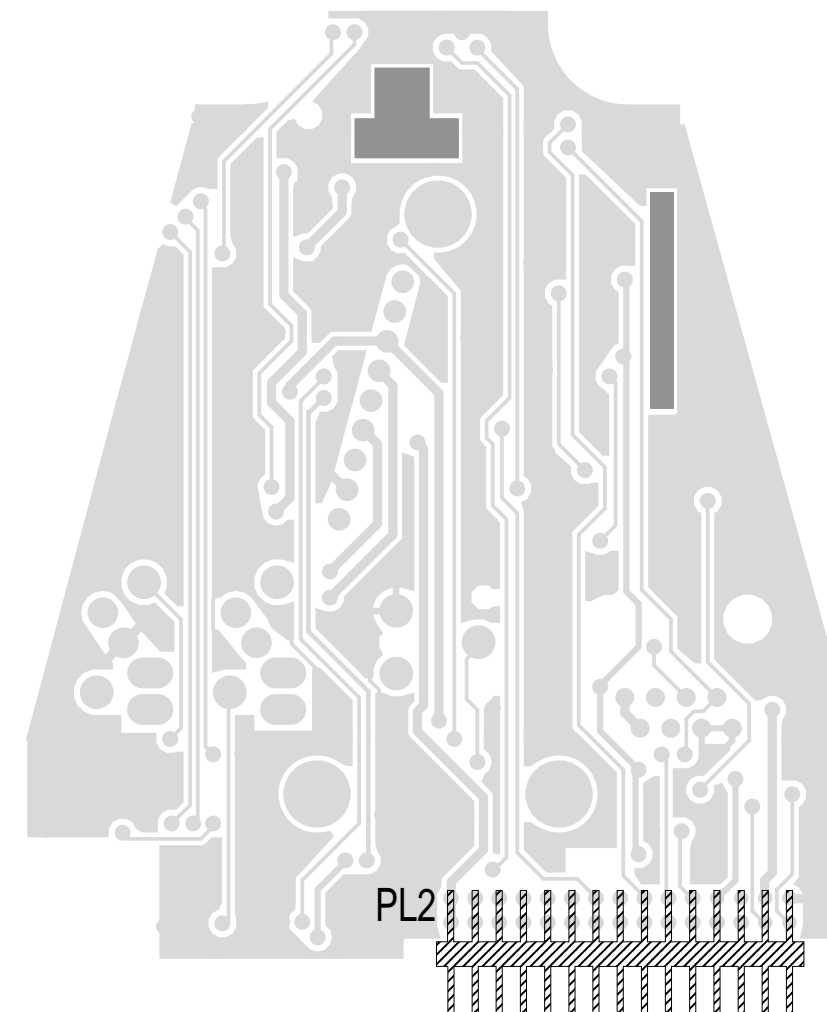
IPN: 220-01505-01    ISSUE: A    ID: 2.SC. 1

PROJECT: ORCA    DESIGNER: TS    FILE NAME: 150501A    FILE DATE: 16-5-98    NO.SHEETS: 1

-01A	UPDATED FROM -00A	TS/DH	X	X	X	X
REV/ISS	AMENDMENTS	DRAWN	CHKD	D.O.	APVD	DATE

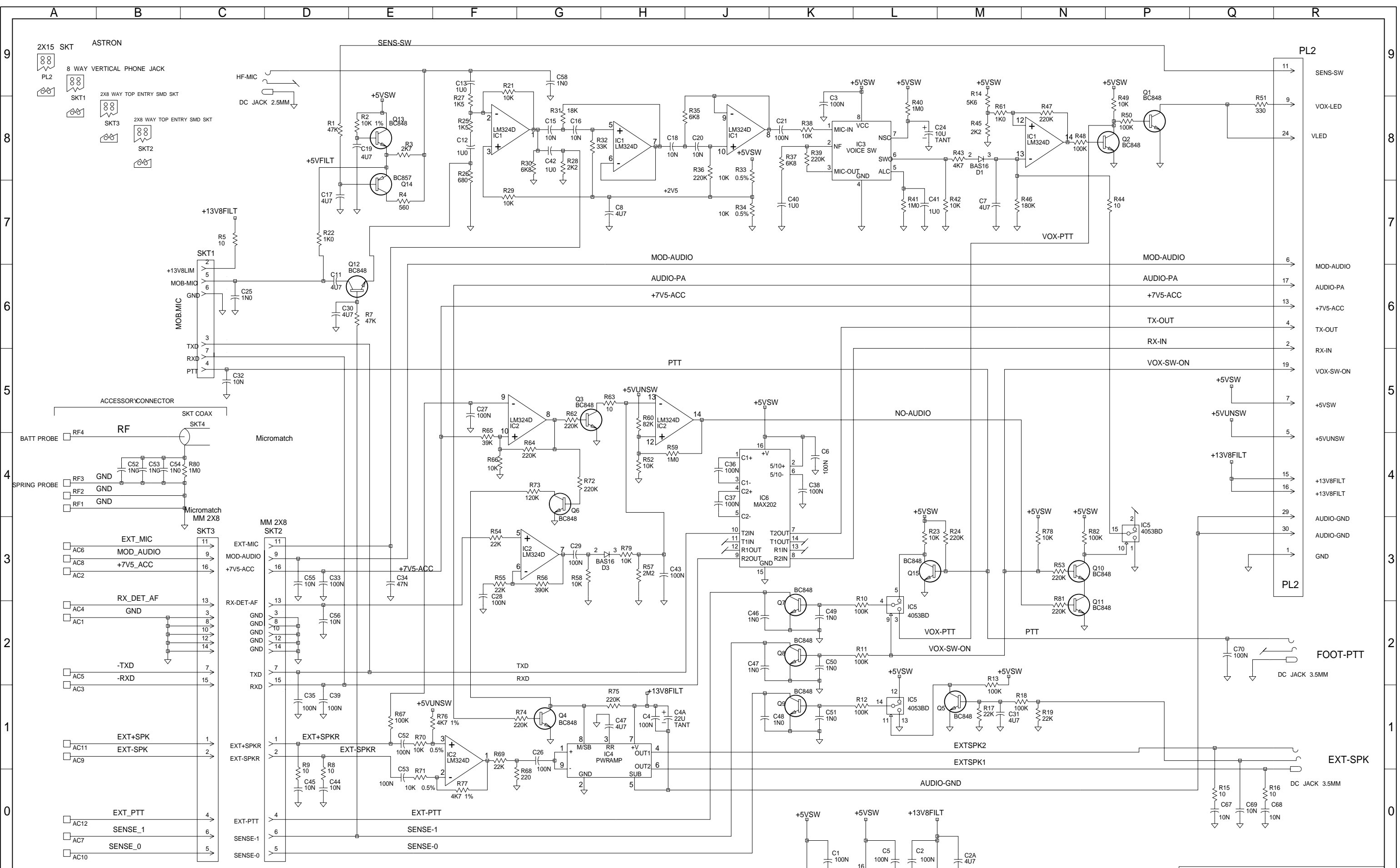


TAIT ELECTRONICS	IPN: 220-01505-01	ISS: A	ID: 1.TA	DATE: 17 May 1998
VOX BOARD PCB LAYOUT - TOP SIDE				



TAIT ELECTRONICS	IPN:	ISS:	ID:	DATE:
	220-01505-01	A	2.BA	17 May 1998
VOX BOARD PCB LAYOUT - BOTTOM SIDE				

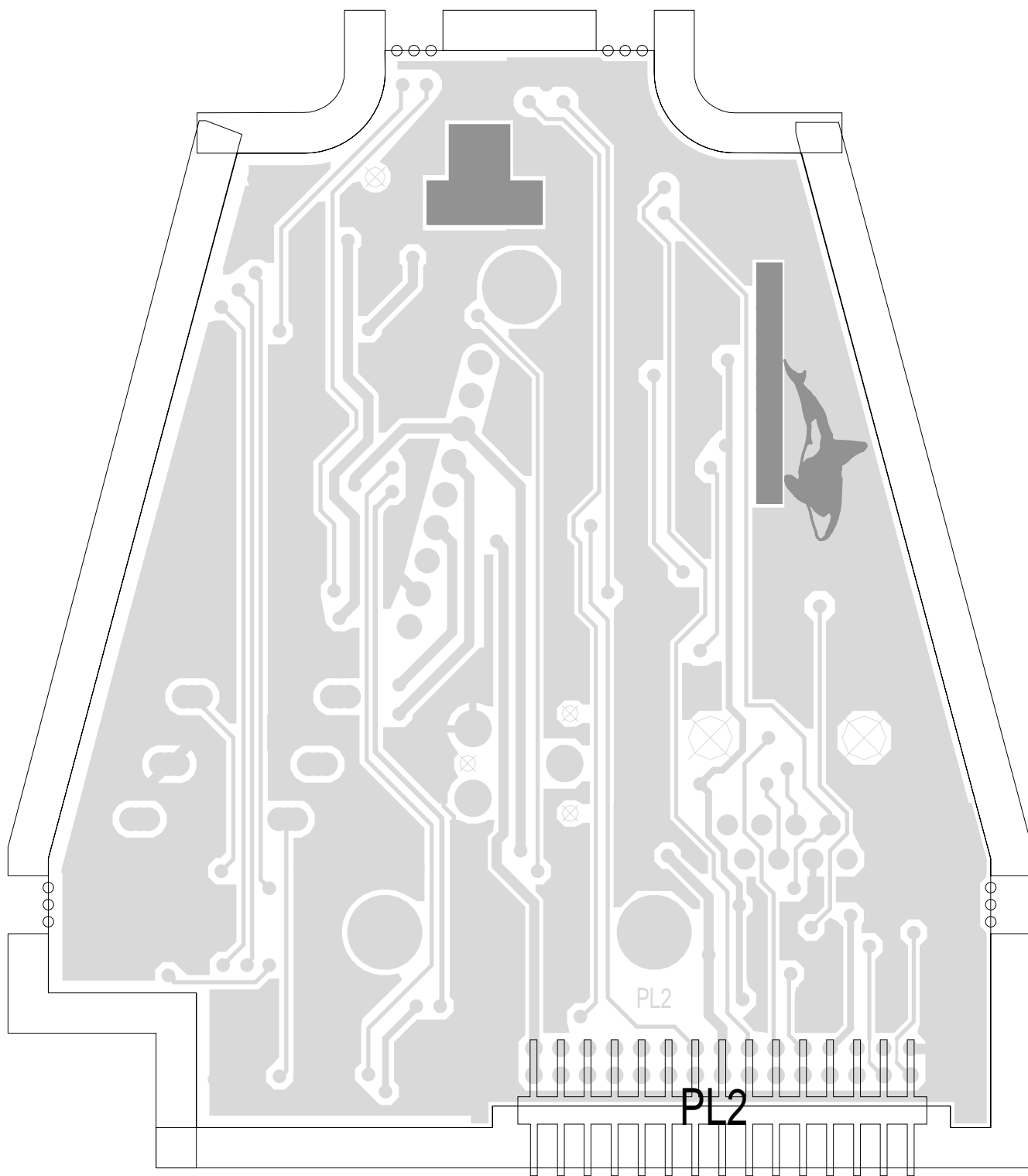
Scale: 1.6:1 ; Rotation: 0 degrees



© TAIT ELECTRONICS  
 TAIT ORCA SERIES  
 CAR KIT VOX PCB

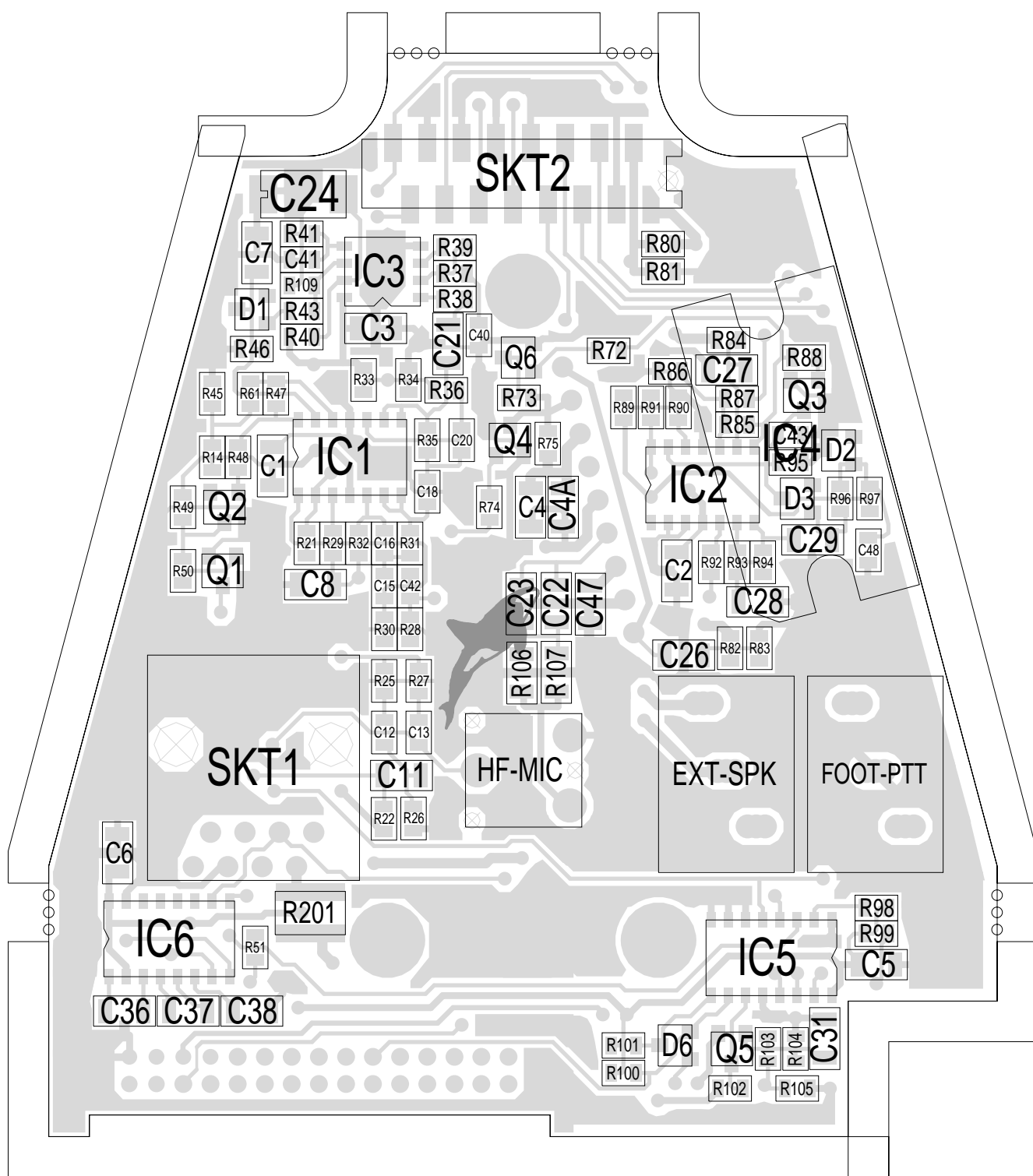
IPN: 220-01505-02	ISSUE: A	ID: 2.S.C. 1
PROJECT: ORCA	DESIGNER: TS	FILE NAME: 150502A
FILE DATE: 14-7-98	NO.SHEETS: 0815	1

-01A	UPDATED FROM -00A	TS/DH			
REV/ISS	AMENDMENTS	DRAWN	CHKD	D.O.	APVD
A		B		C	



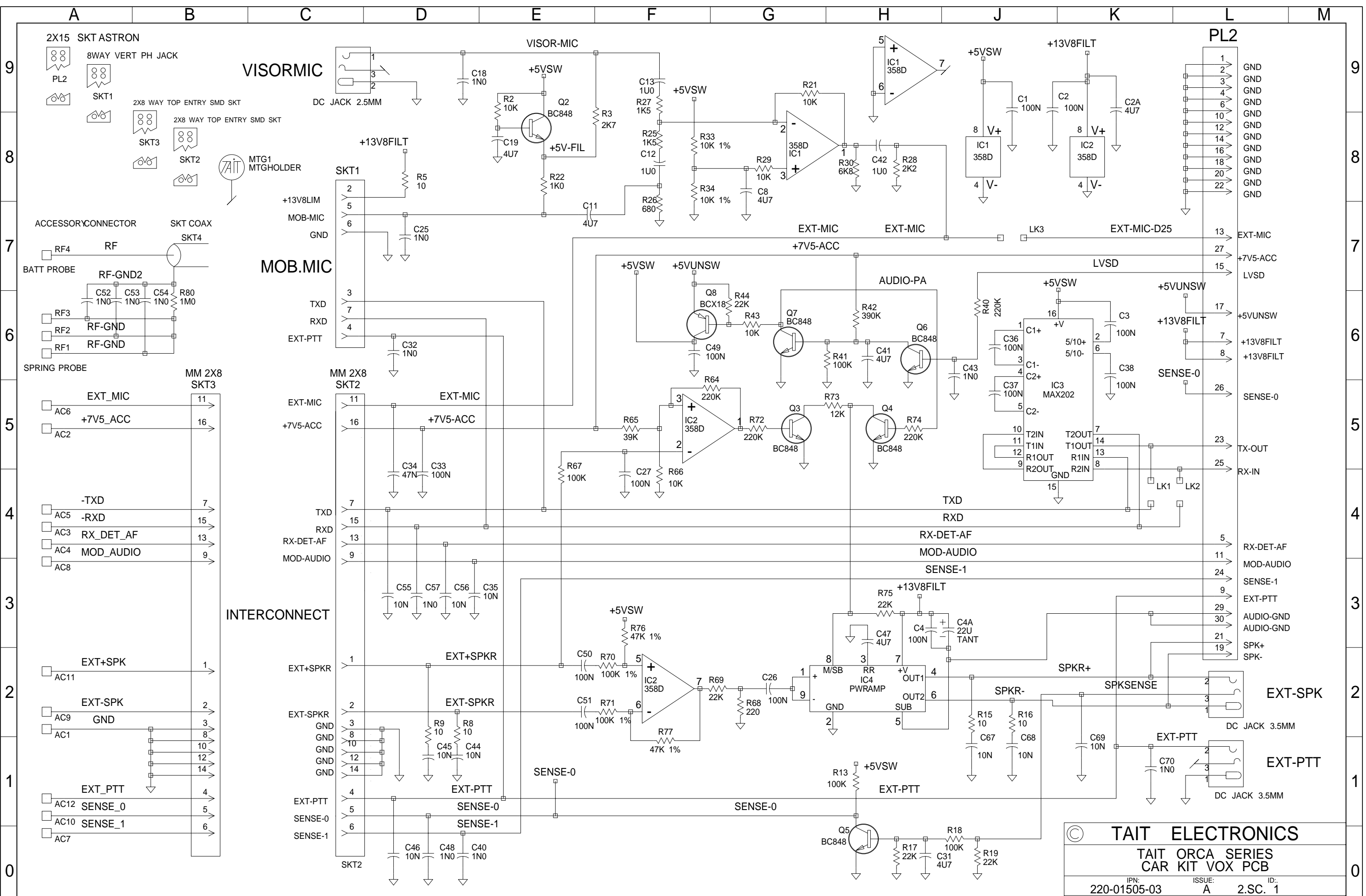
<b>TAIT ELECTRONICS</b>	IPN:	ISS:	ID:	DATE:
	220-01505-01	A	2.BA	14 Jan 1999
<b>VOX BOARD PCB LAYOUT - BOTTOM SIDE</b>				

Scale: 2.3:1 ; Rotation: 0 degrees



TAIT ELECTRONICS	IPN: 220-01505-01	ISS: A	ID: 1.TA	DATE: 14 Jan 1999
VOX BOARD PCB LAYOUT - TOP SIDE				

Scale: 2.3:1 ; Rotation: 0 degrees

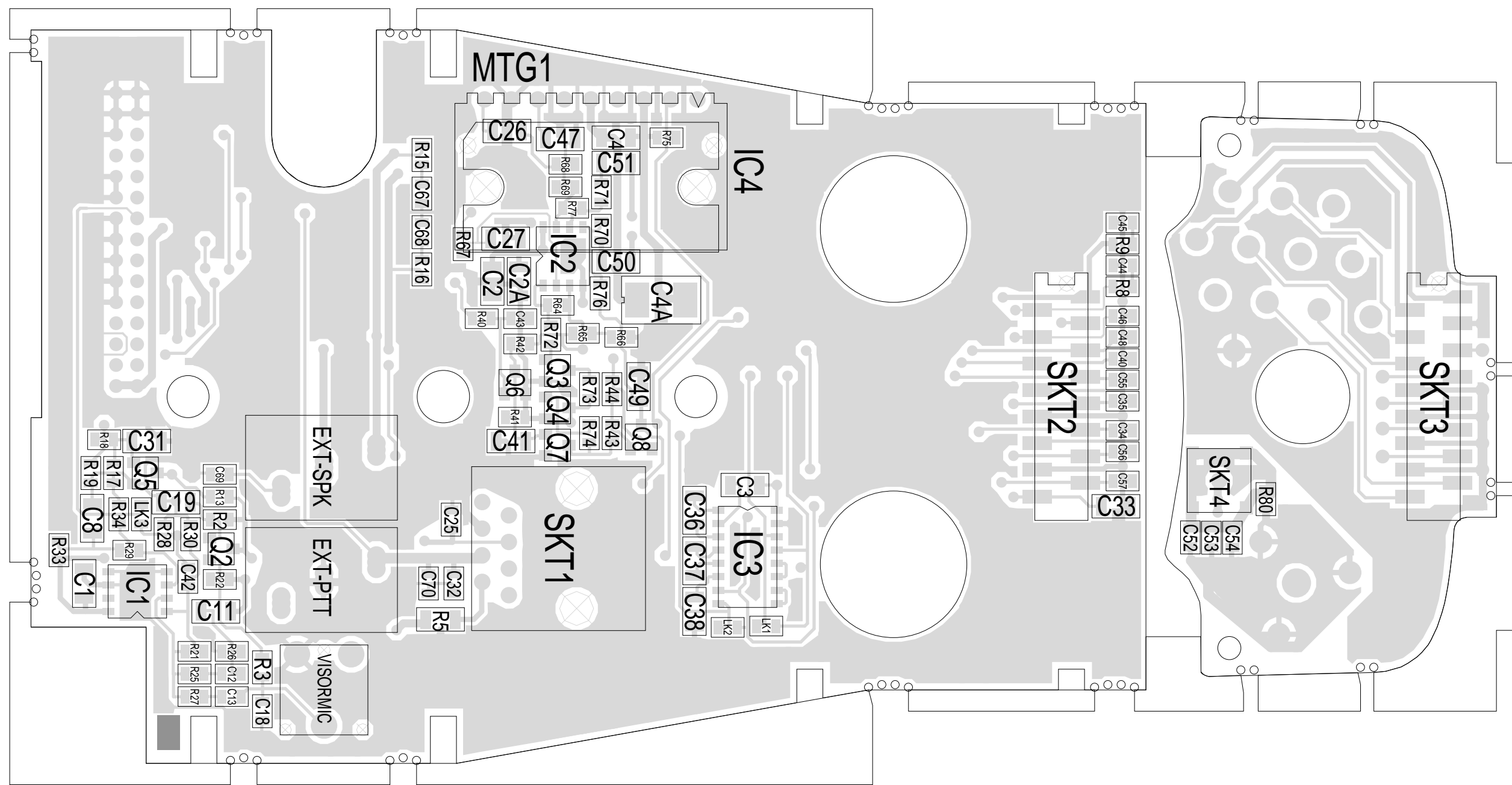


**TAIT ELECTRONICS**

**TAIT ORCA SERIES  
CAR KIT VOX PCB**

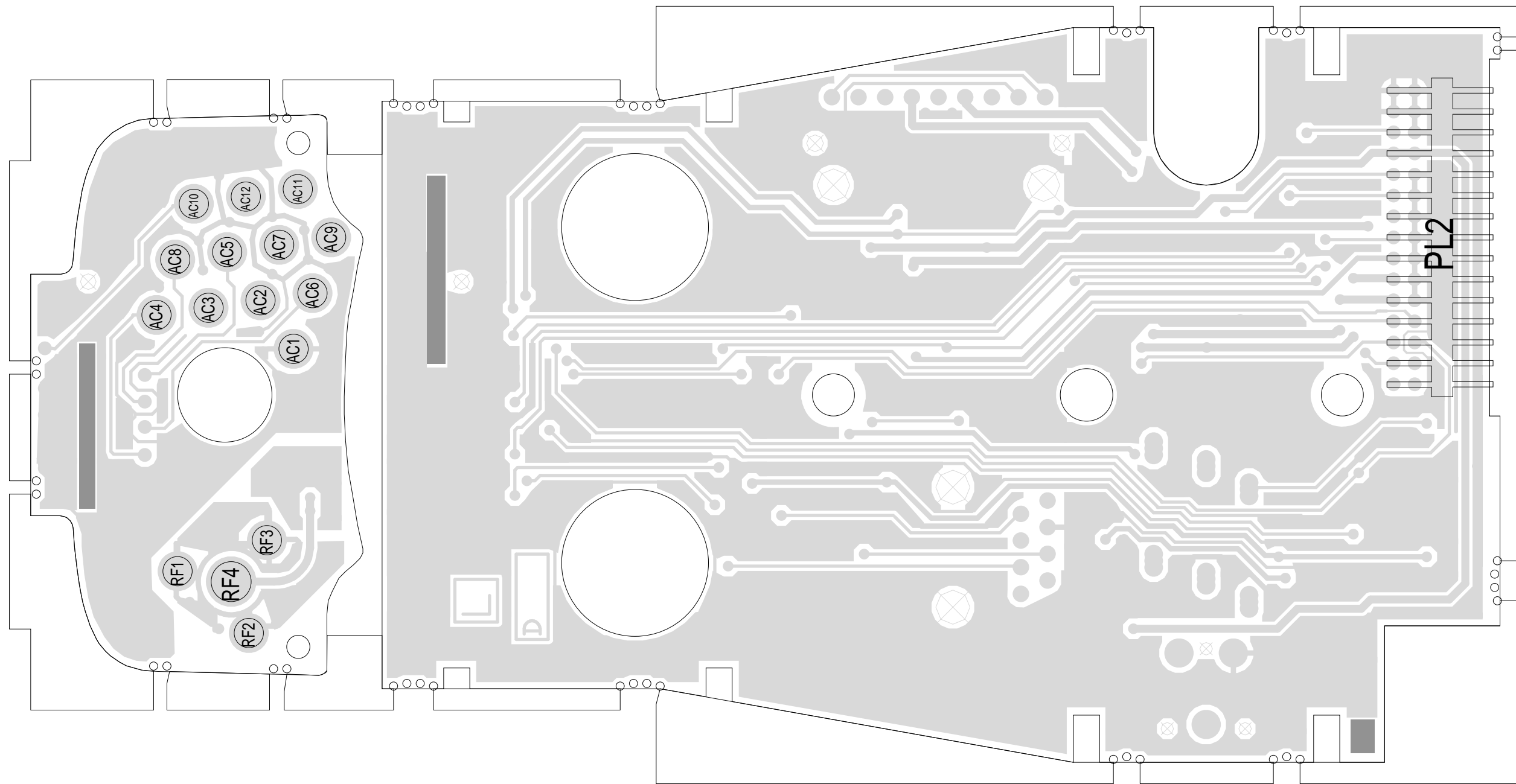
IPN: 220-01505-03	ISSUE: A	ID: 2.SC. 1
PROJECT: ORCA	DESIGNER: TS	FILE NAME: 150503A
	FILE DATE: 31-8-98	NO. SHEETS: 1

REV/ISS	AMENDMENTS	DRAWN	CHKD	D.O.	APVD	DATE



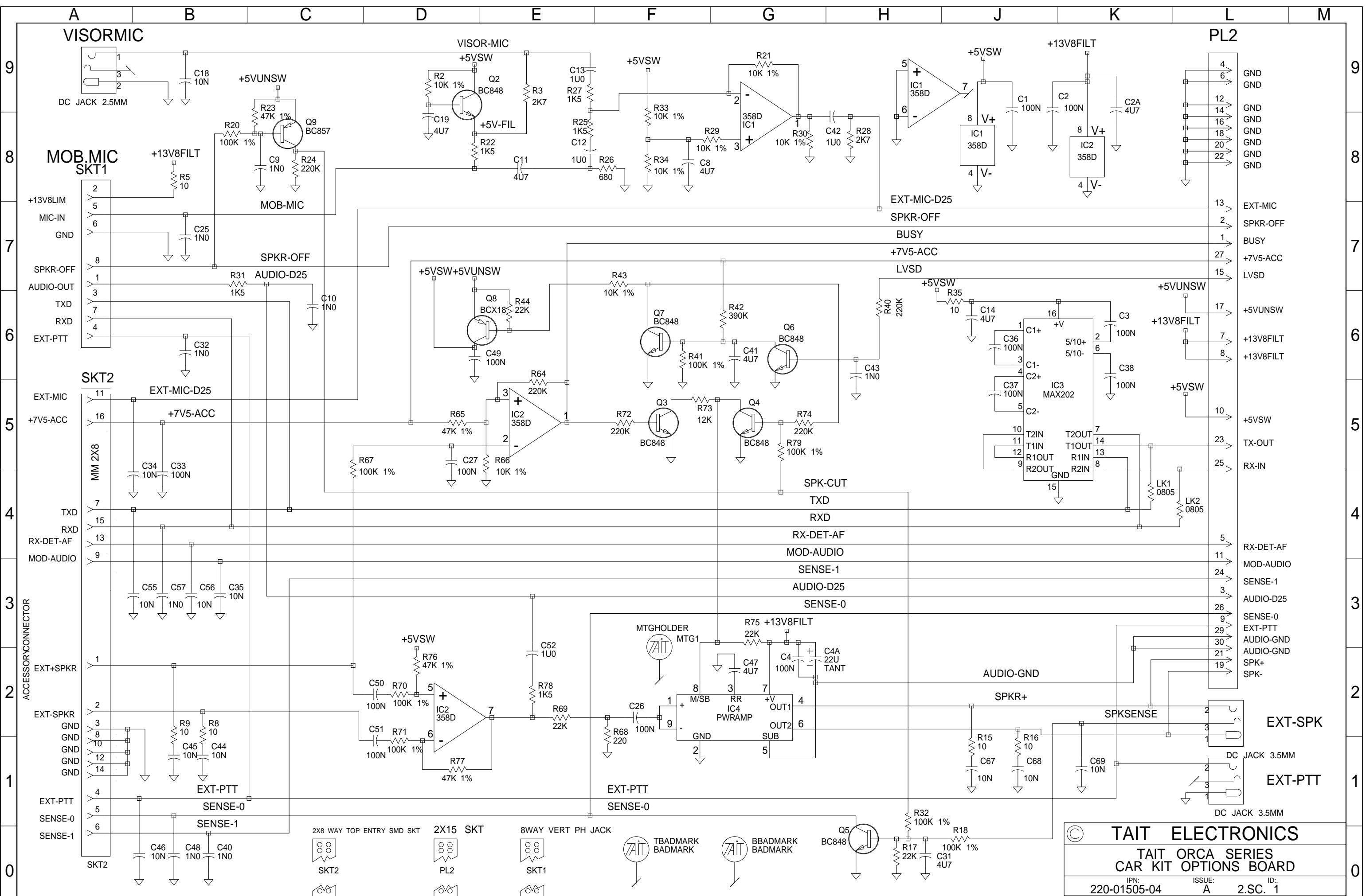
<b>TAIT ELECTRONICS</b>	IPN: 220-01505-03	ISS: A	ID: 1.TA	DATE: 4 Sep 1998
	OPTIONS PCB PCB LAYOUT - TOP SIDE			





TAIT ELECTRONICS	IPN:	ISS:	ID:	DATE:
	220-01505-03	A	2.BA	4 Sep 1998
OPTIONS PCB PCB LAYOUT - BOTTOM SIDE				

Scale: 2.3:1 ; Rotation: 0 degrees

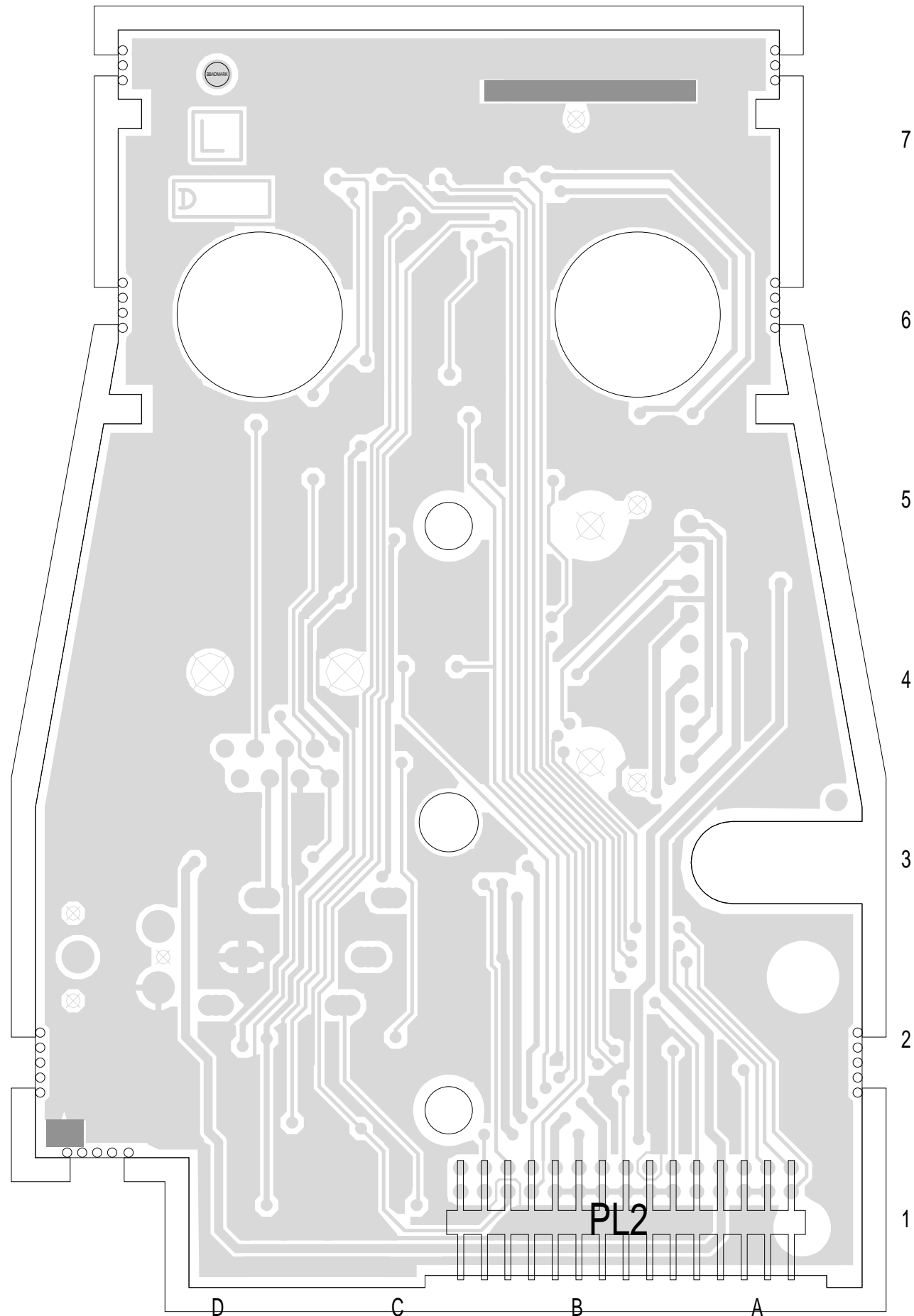


**© TAIT ELECTRONICS**

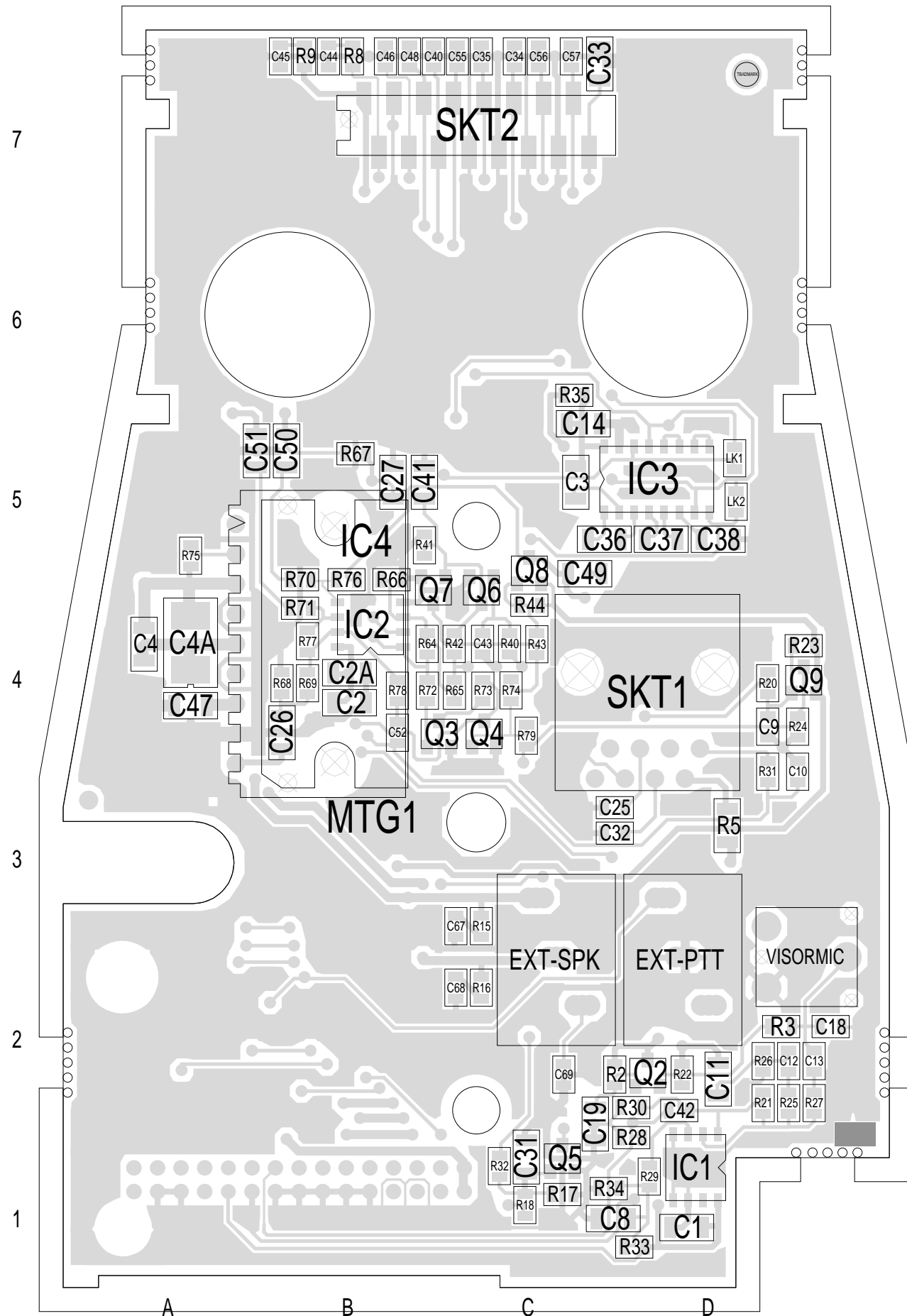
**TAIT ORCA SERIES  
CAR KIT OPTIONS BOARD**

IPN: 220-01505-04	ISSUE: A	ID: 2.SC. 1
PROJECT: ORCA	DESIGNER: TS	FILE NAME: 150504A
	FILE DATE: 19-11-98	NO.SHEETS: 1

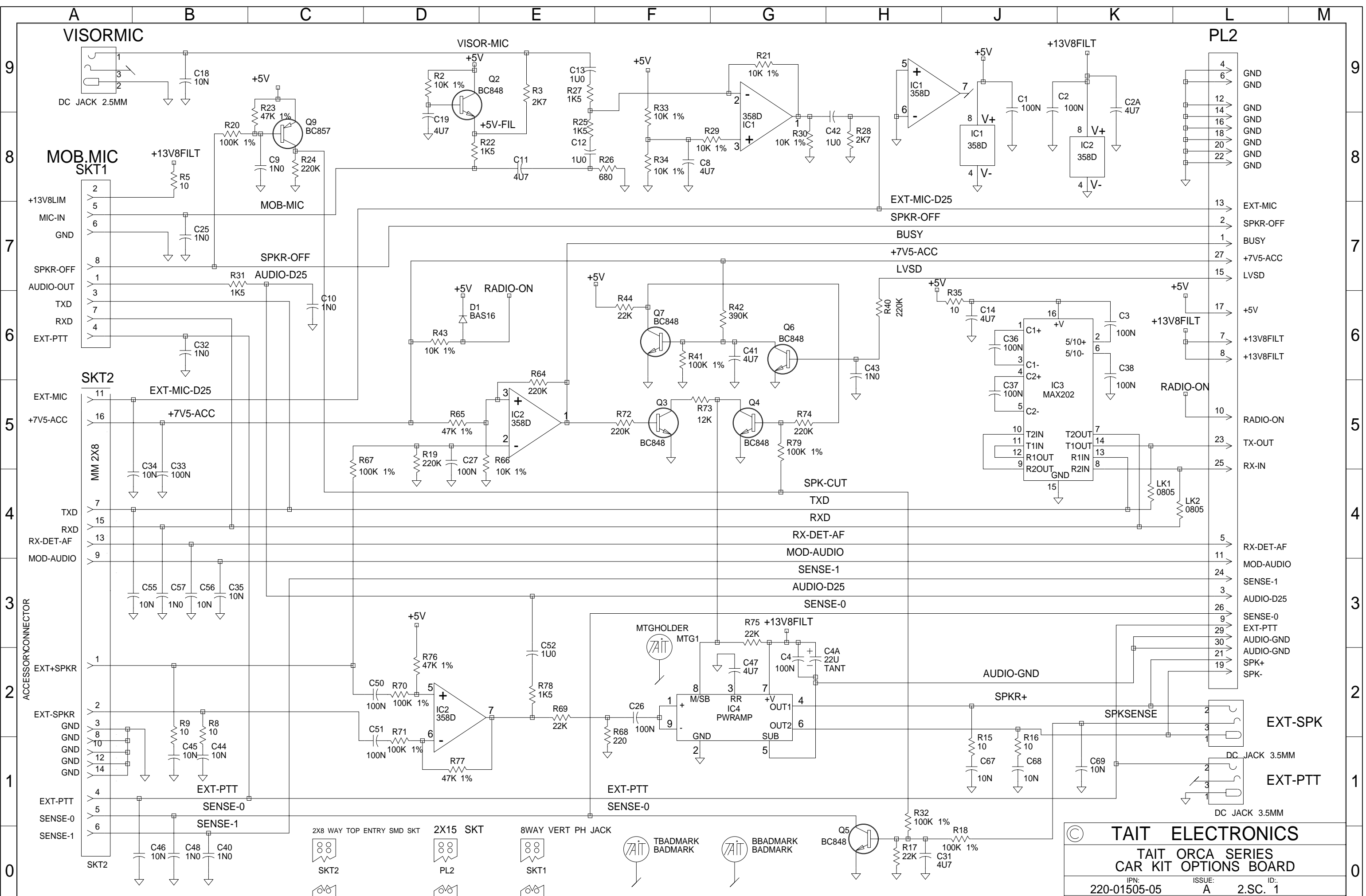
REV/ISS	AMENDMENTS	DRAWN	CHKD	D.O.	APVD	DATE



<b>TAIT ELECTRONICS</b>	IPN:	ISS:	ID:	DATE:
	220-01505-04	A	2.BA	16 Nov 1998
<b>OPTIONS PCB PCB LAYOUT - BOTTOM SIDE</b>				



TAIT ELECTRONICS IPN: 220-01505-04 ISS: A ID: 1.TA DATE: 16 Nov 1998  
 OPTIONS PCB PCB LAYOUT - TOP SIDE

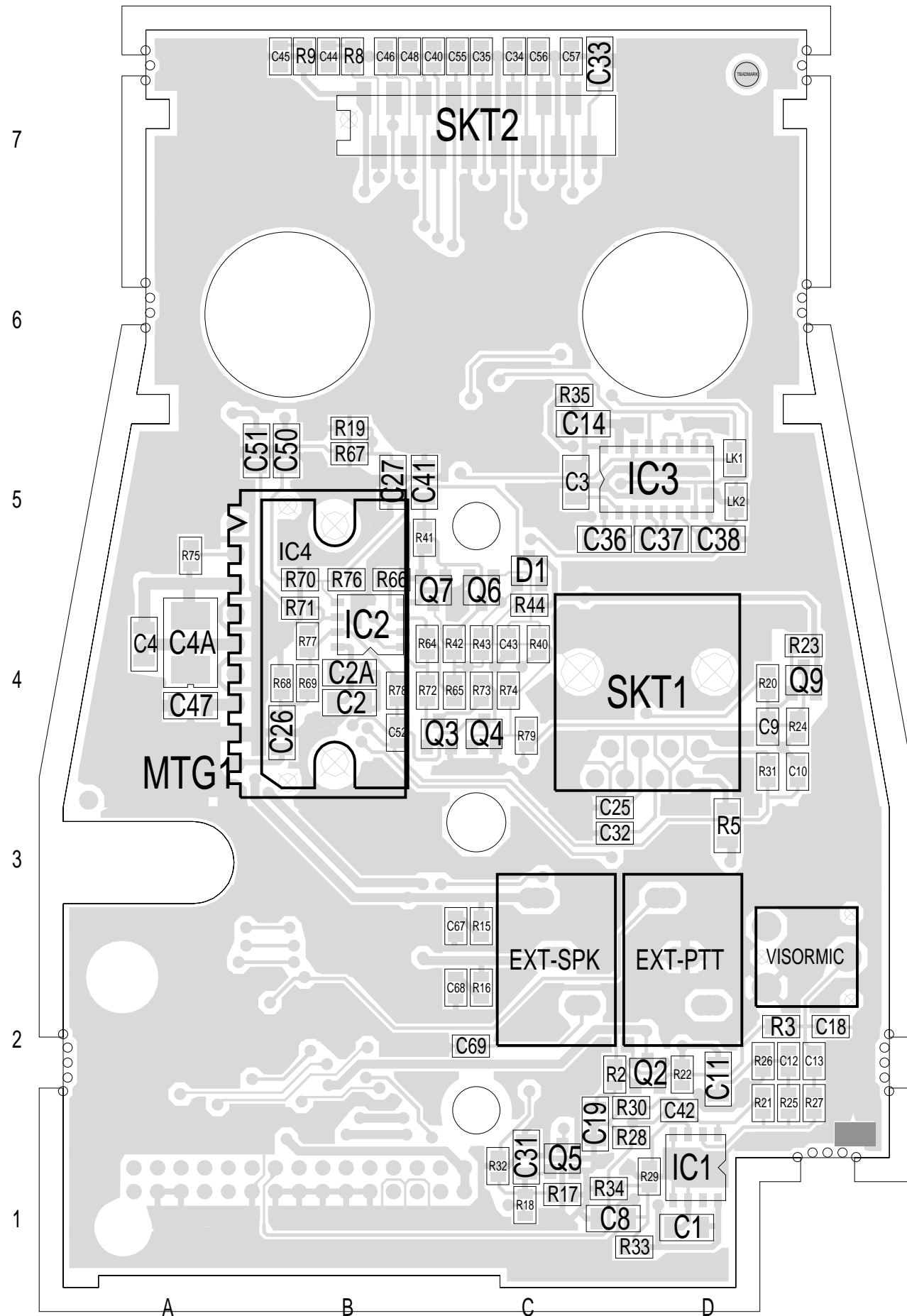


**TAIT ELECTRONICS**

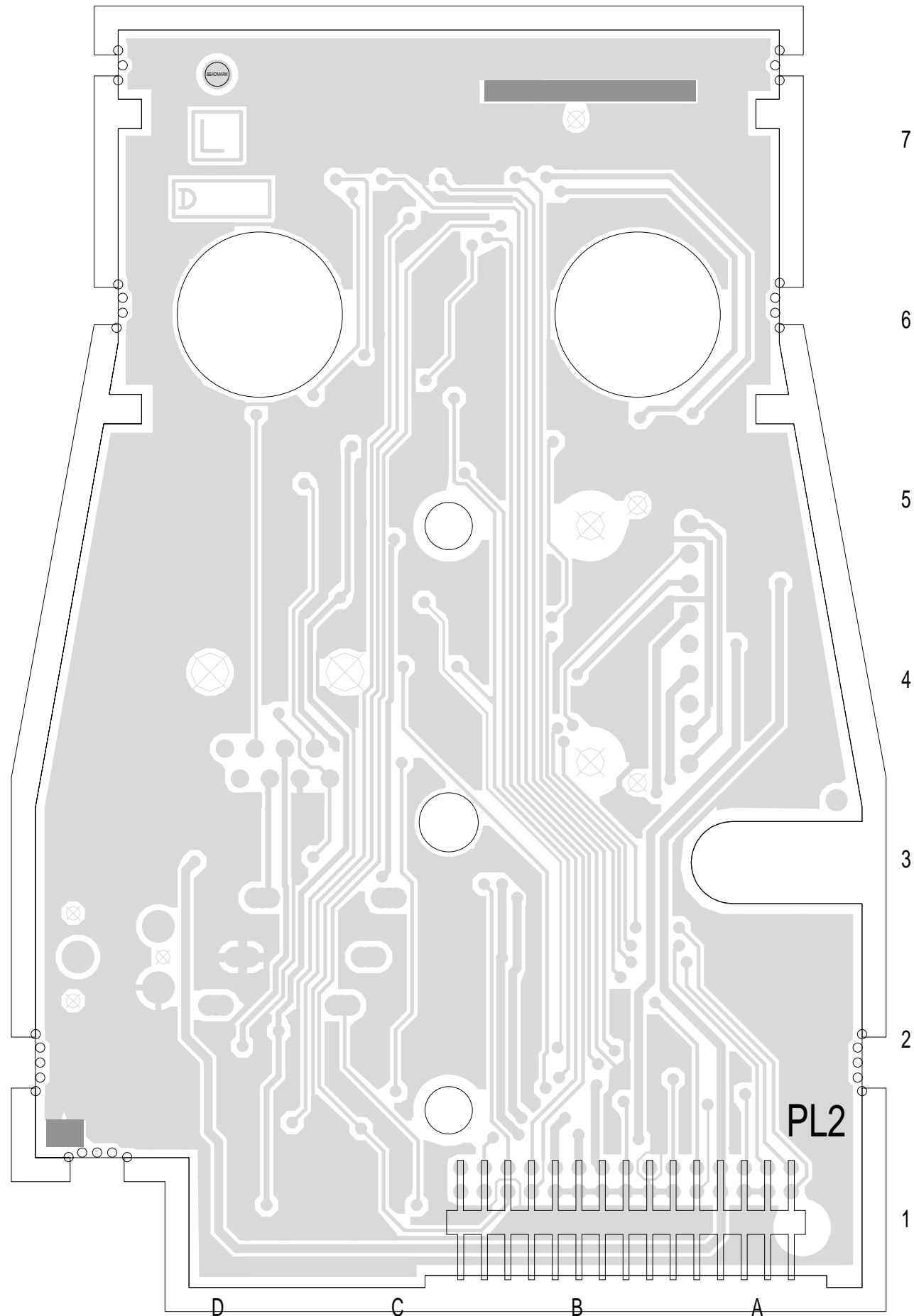
**TAIT ORCA SERIES  
CAR KIT OPTIONS BOARD**

IPN: 220-01505-05	ISSUE: A	ID: 2.SC. 1
PROJECT: ORCA	DESIGNER: TS	FILE NAME: 150505A
	FILE DATE: 26-01-99	NO.SHEETS: 1

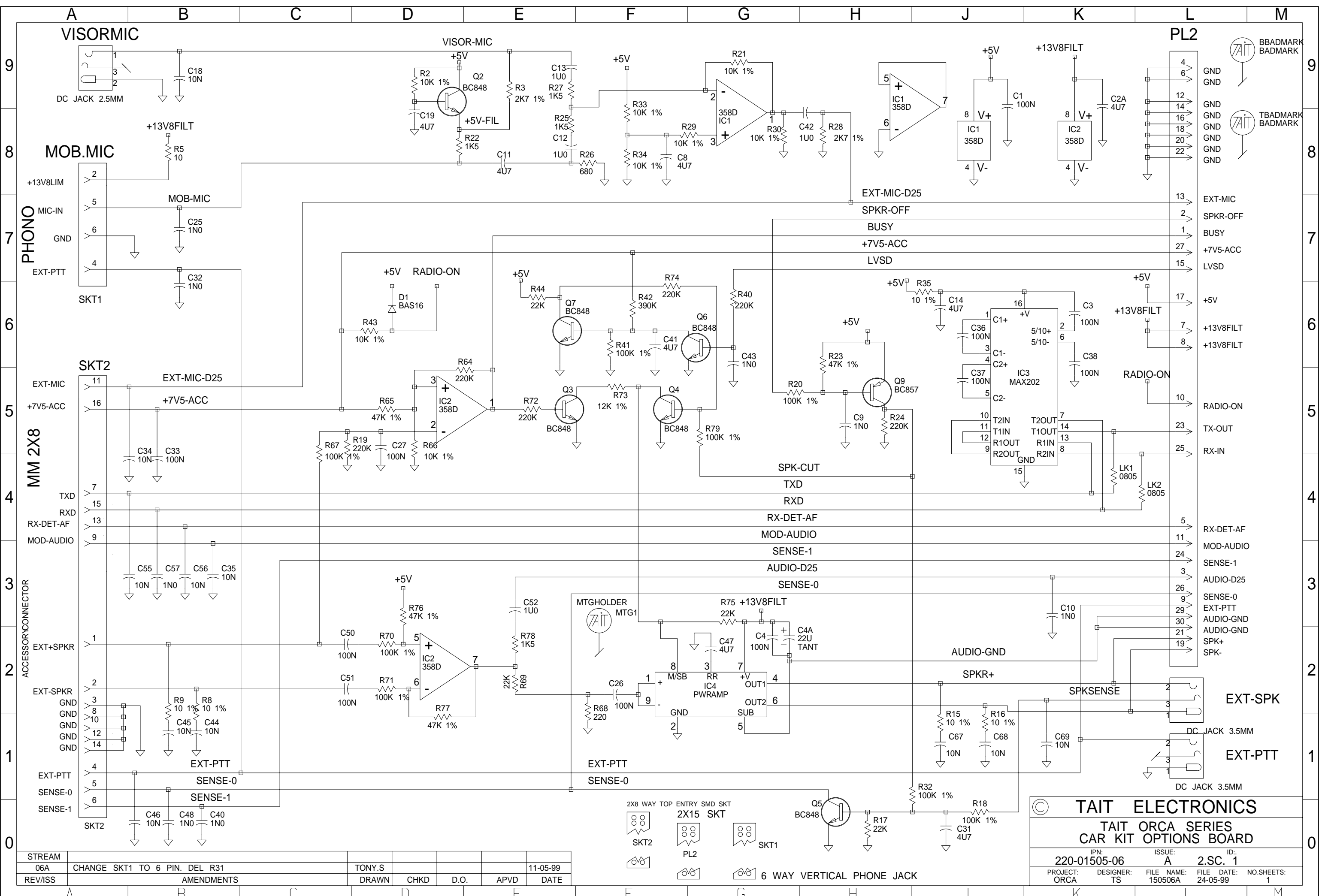
REV/ISS	AMENDMENTS	DRAWN	CHKD	D.O.	APVD	DATE



TAIT ELECTRONICS IPN: 220-01505-05 ISS: 05 ID: 1.TA DATE: 26 Jan 1999  
 OPTIONS PCB PCB LAYOUT - TOP SIDE



TAIT ELECTRONICS	IPN: 220-01505-05	ISS: 05	ID: 2.BA	DATE: 26 Jan 1999
OPTIONS PCB PCB LAYOUT - BOTTOM SIDE				

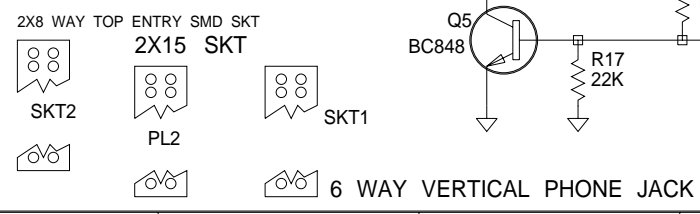


© **TAIT ELECTRONICS**  
**TAIT ORCA SERIES**  
**CAR KIT OPTIONS BOARD**

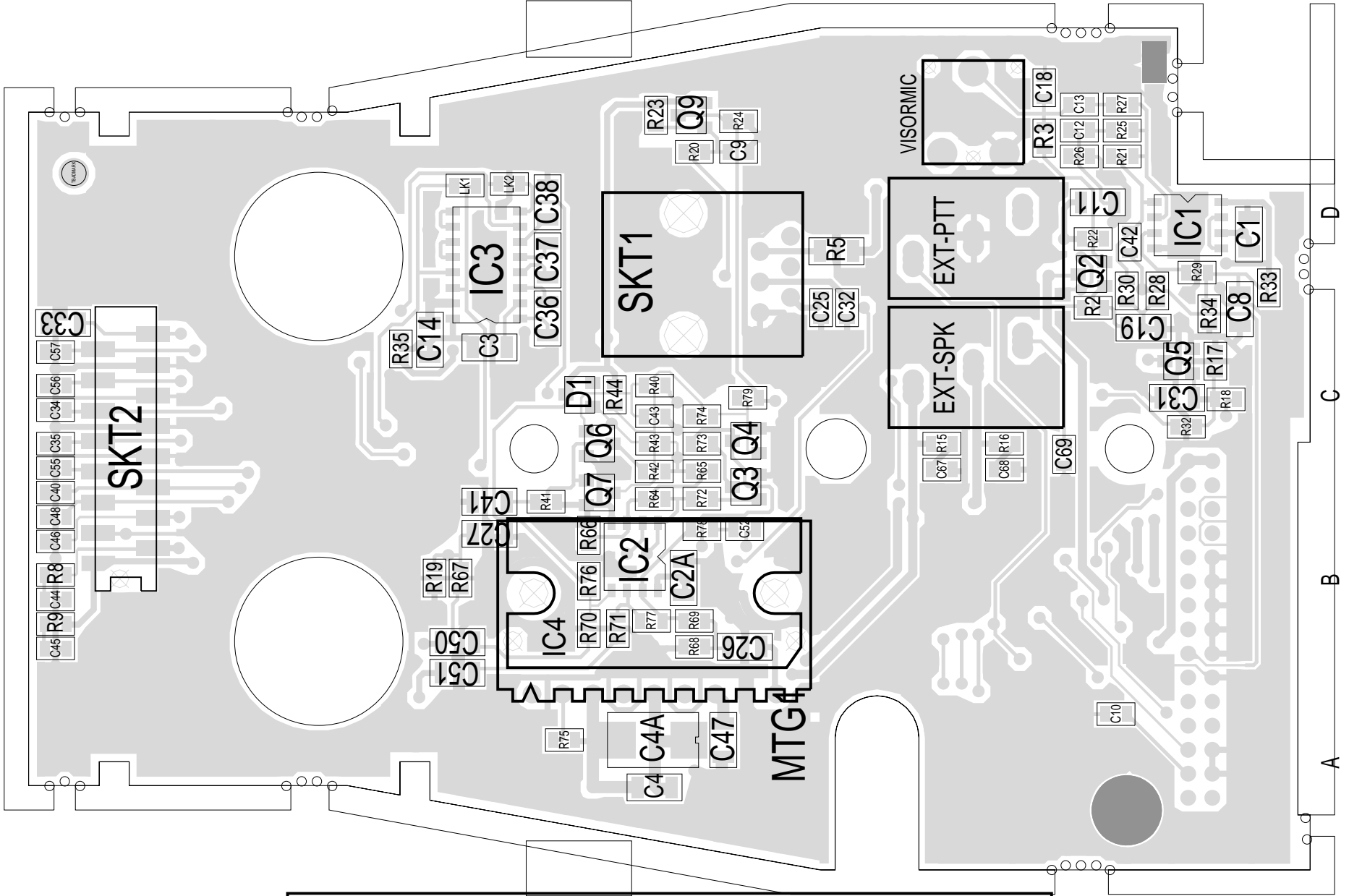
IPN: 220-01505-06    ISSUE: A    ID: 2.SC. 1

PROJECT: ORCA    DESIGNER: TS    FILE NAME: 150506A    FILE DATE: 24-05-99    NO.SHEETS: 1

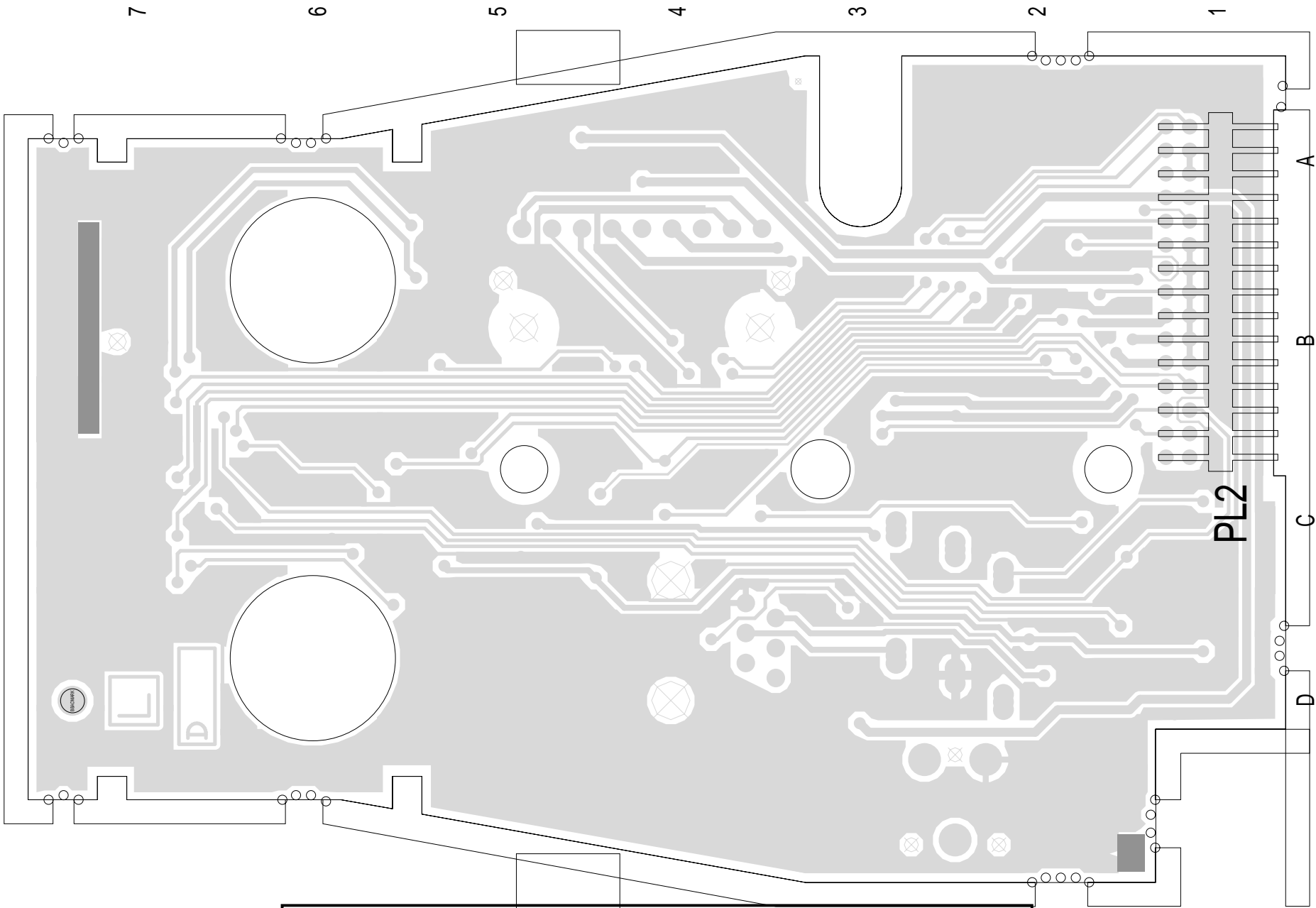
STREAM						
06A	CHANGE SKT1 TO 6 PIN. DEL R31	TONY.S				11-05-99
REV/ISS	AMENDMENTS	DRAWN	CHKD	D.O.	APVD	DATE





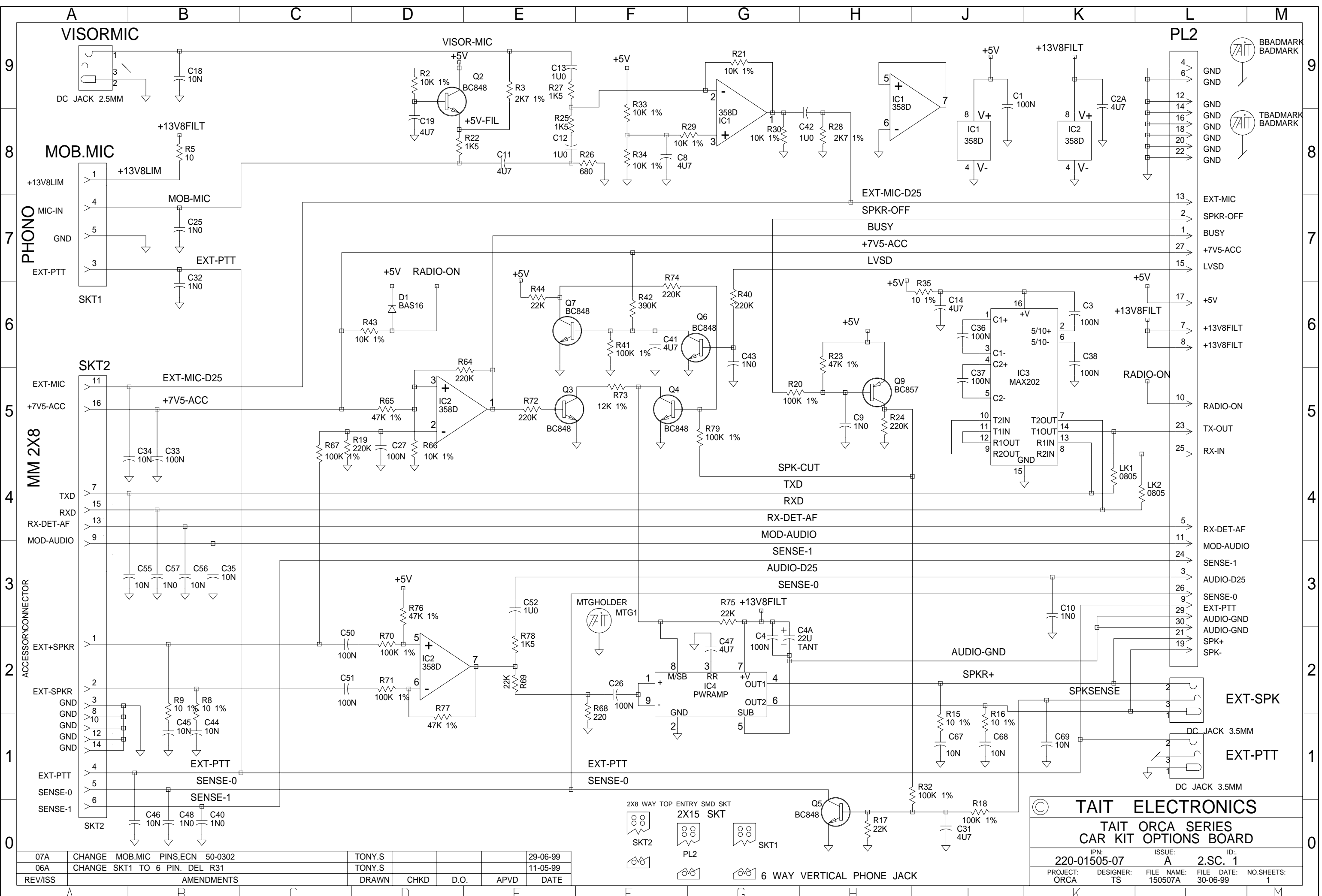


**TAIT ELECTRONICS** IPN: 220-01505-06 ISS: 06 ID: 1.TA DATE: 3 Jun 1999  
**OPTIONS PCB PCB LAYOUT - TOP SIDE**



<b>TAIT ELECTRONICS</b>	IPN: 220-01505-06	ISS: 06	ID: 2.BA	DATE: 4 Jun 1999
	<b>OPTIONS PCB PCB LAYOUT - BOTTOM SIDE</b>			

Scale:2.2:1 ; Rotation: 270 degrees

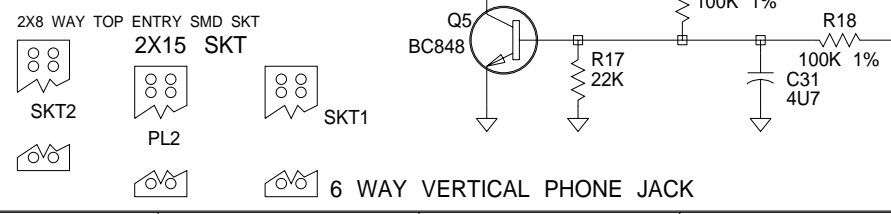


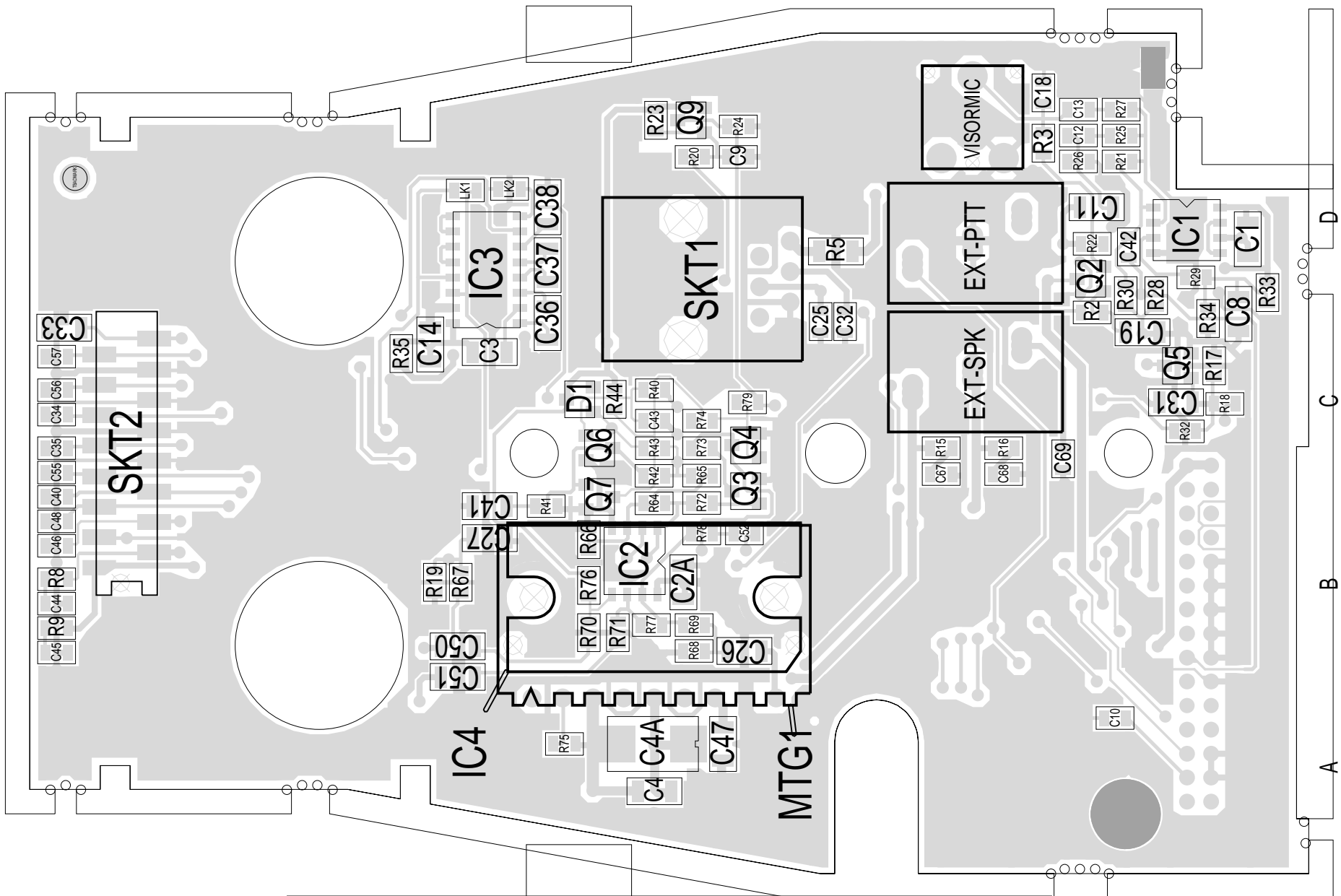
07A	CHANGE MOB.MIC PINS,ECN 50-0302	TONY.S				29-06-99
06A	CHANGE SKT1 TO 6 PIN. DEL R31	TONY.S				11-05-99
REV/ISS	AMENDMENTS	DRAWN	CHKD	D.O.	APVD	DATE

© **TAIT ELECTRONICS**  
**TAIT ORCA SERIES**  
**CAR KIT OPTIONS BOARD**

IPN: 220-01505-07    ISSUE: A    ID: 2.SC. 1

PROJECT: ORCA    DESIGNER: TS    FILE NAME: 150507A    FILE DATE: 30-06-99    NO.SHEETS: 1





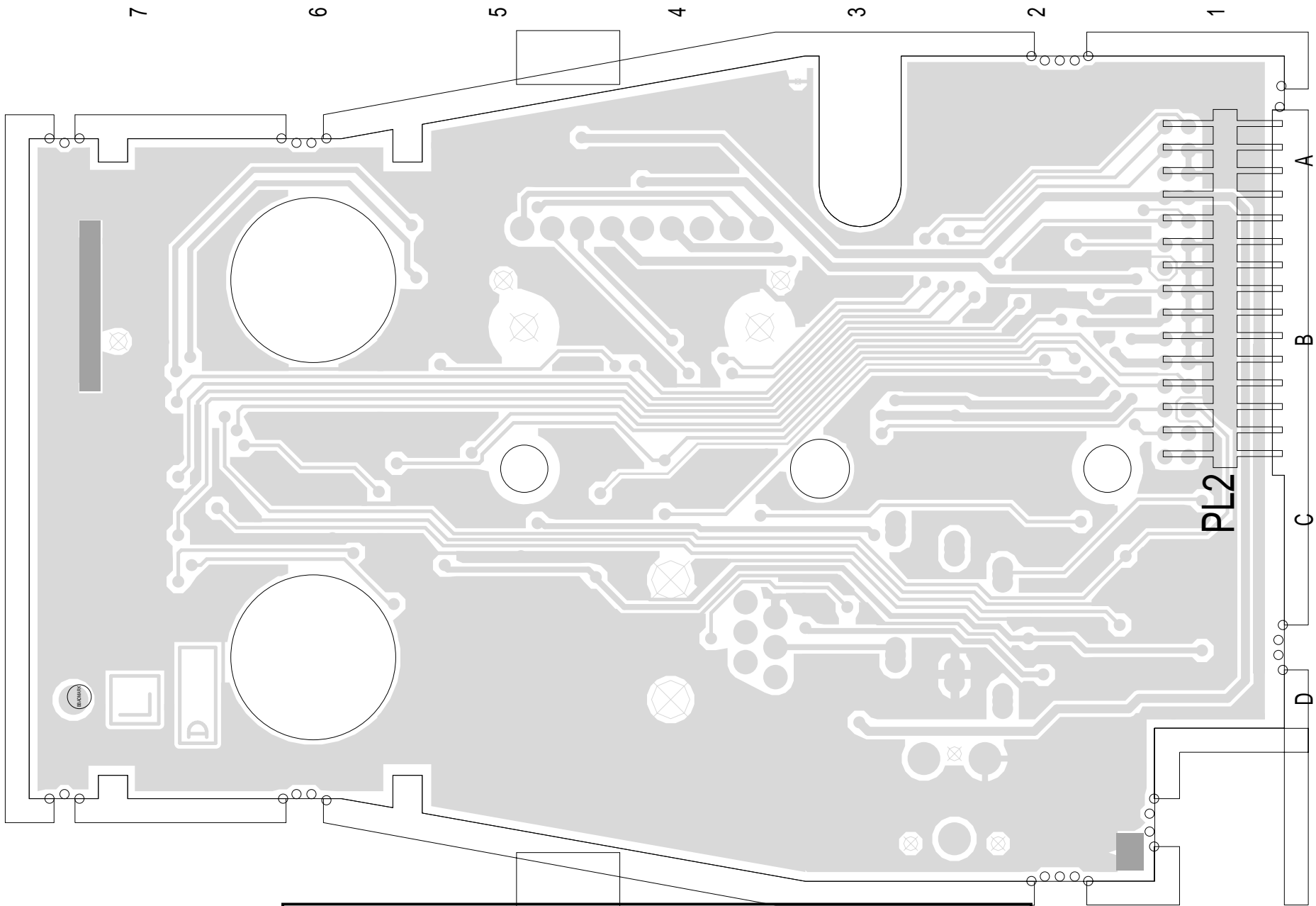
**TAIT ELECTRONICS** IPN: 220-01505-07 ISS: 07 ID: 1.TA DATE: 08 Jul 1999  
**OPTIONS PCB PCB LAYOUT - TOP SIDE**

Scale: 2.2:1 ; Rotation: 270 degrees

7

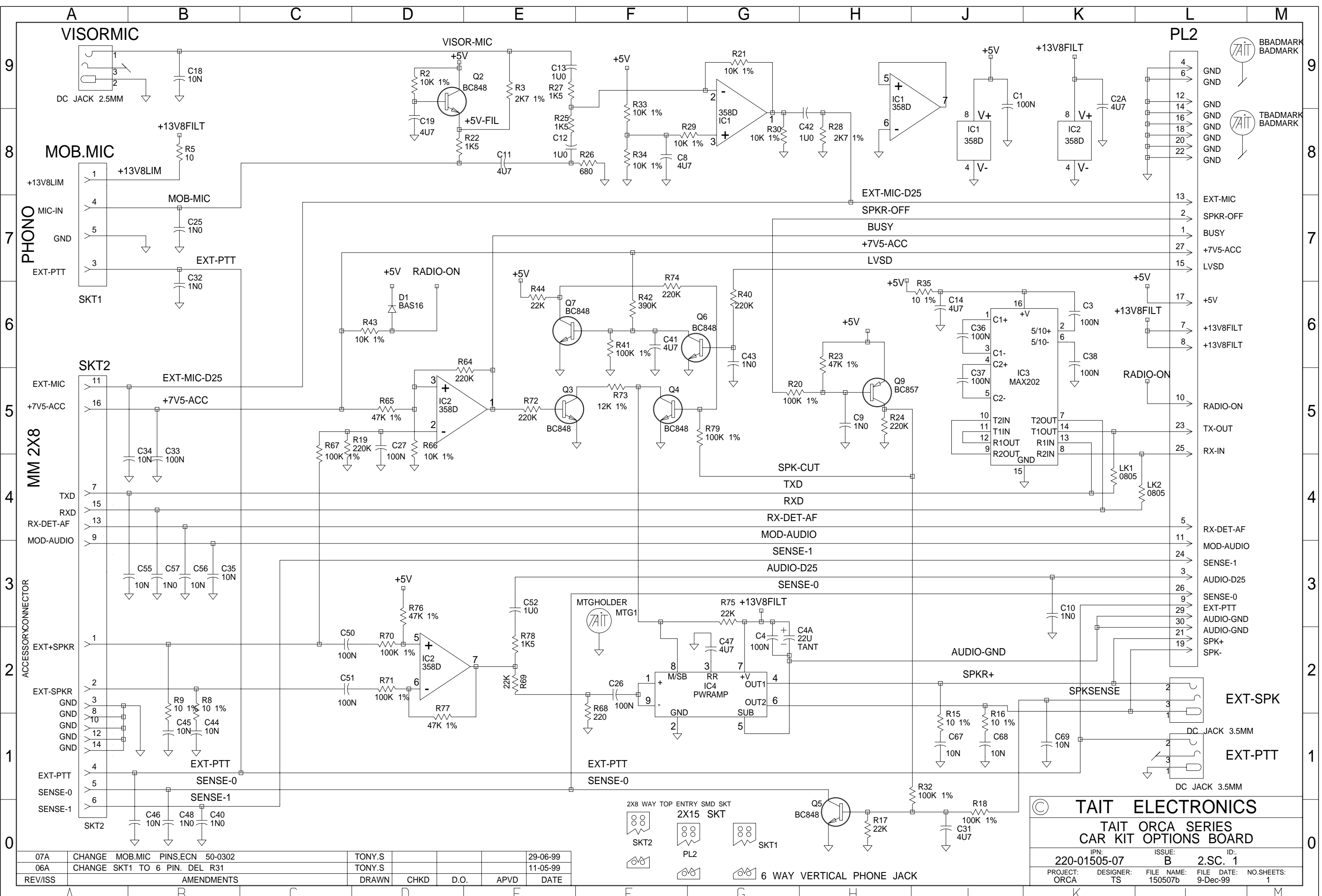
2

1



<b>TAIT ELECTRONICS</b>	IPN: 220-01505-07	ISS: 07	ID: 2.BA	DATE: 8 Jul 1999
	<b>OPTIONS PCB PCB LAYOUT - BOTTOM SIDE</b>			

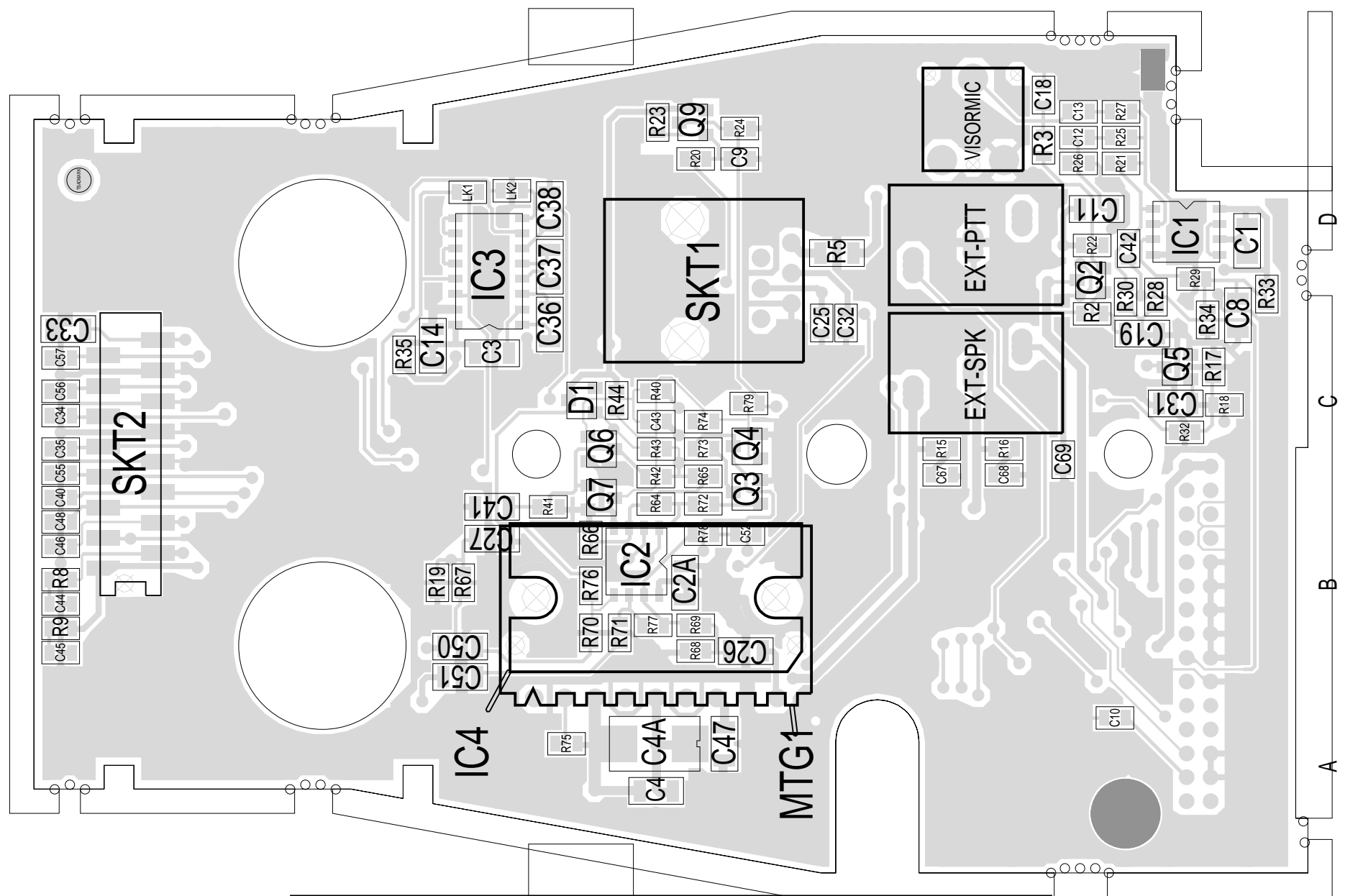
Scale: 2.2:1 ; Rotation: 270 degrees



07A	CHANGE MOB.MIC PINS,ECN 50-0302	TONY.S				29-06-99
06A	CHANGE SKT1 TO 6 PIN. DEL R31	TONY.S				11-05-99
REV/ISS	AMENDMENTS	DRAWN	CHKD	D.O.	APVD	DATE

- 2X8 WAY TOP ENTRY SMD SKT SKT2
- 2X15 SKT PL2
- 6 WAY VERTICAL PHONE JACK SKT1

© TAIT ELECTRONICS  
**TAIT ORCA SERIES CAR KIT OPTIONS BOARD**  
 IPN: 220-01505-07 ISSUE: B ID: 2.SC. 1  
 PROJECT: ORCA DESIGNER: TS FILE NAME: 150507b FILE DATE: 9-Dec-99 NO.SHEETS: 1

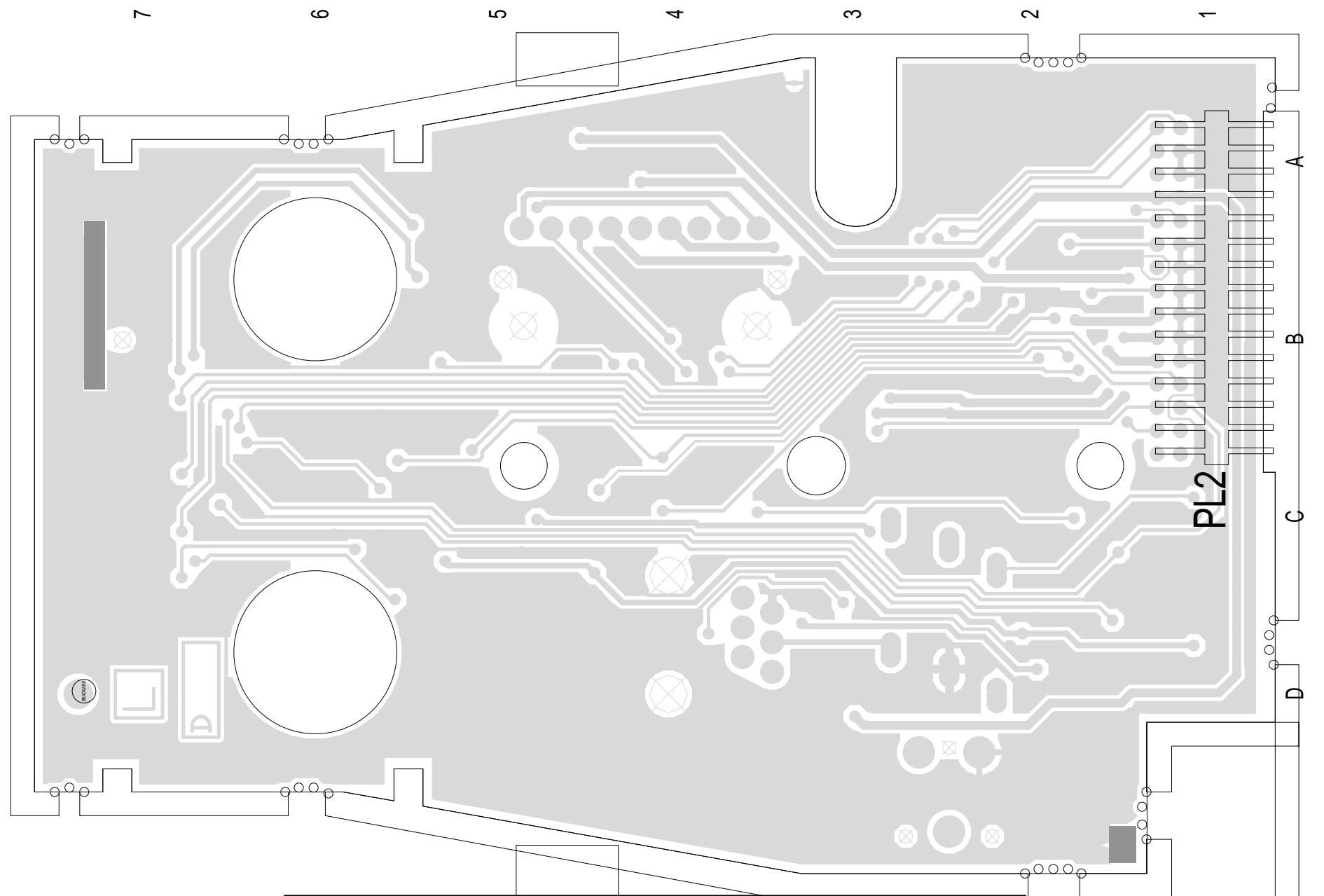


TAIT ELECTRONICS IPN: 220-01505-07 ISS: 07 ID: 1.TA DATE: 28 Jul 1999  
 OPTIONS PCB PCB LAYOUT - TOP SIDE

Scale: 2.2:1 ; Rotation: 270 degrees

7

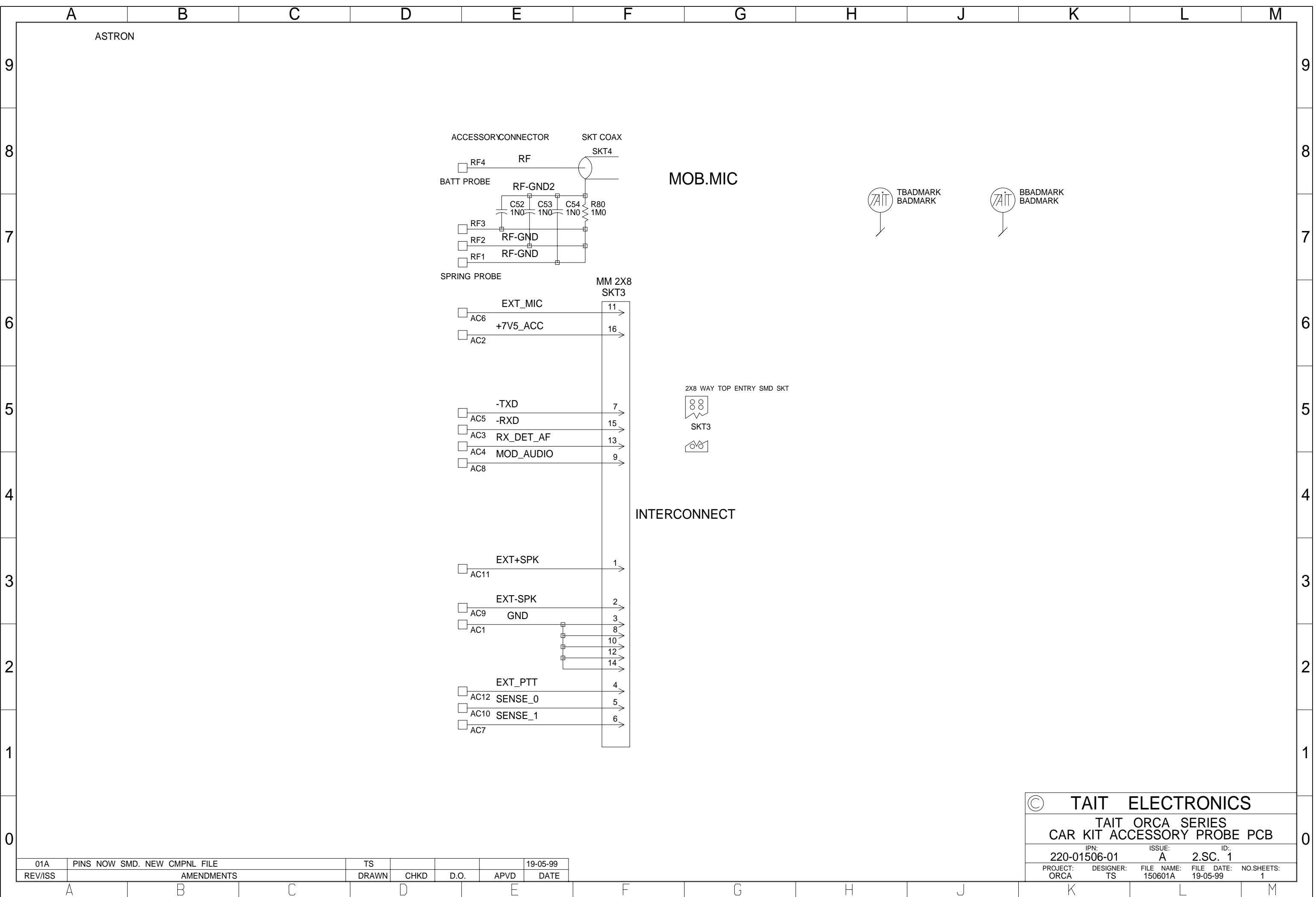
1



<b>TAIT ELECTRONICS</b>	IPN: 220-01505-07	ISS: 07	ID: 2.BA	DATE: 8 Jul 1999
<b>OPTIONS PCB PCB LAYOUT - BOTTOM SIDE</b>				

Scale: 2.2:1 ; Rotation: 270 degrees



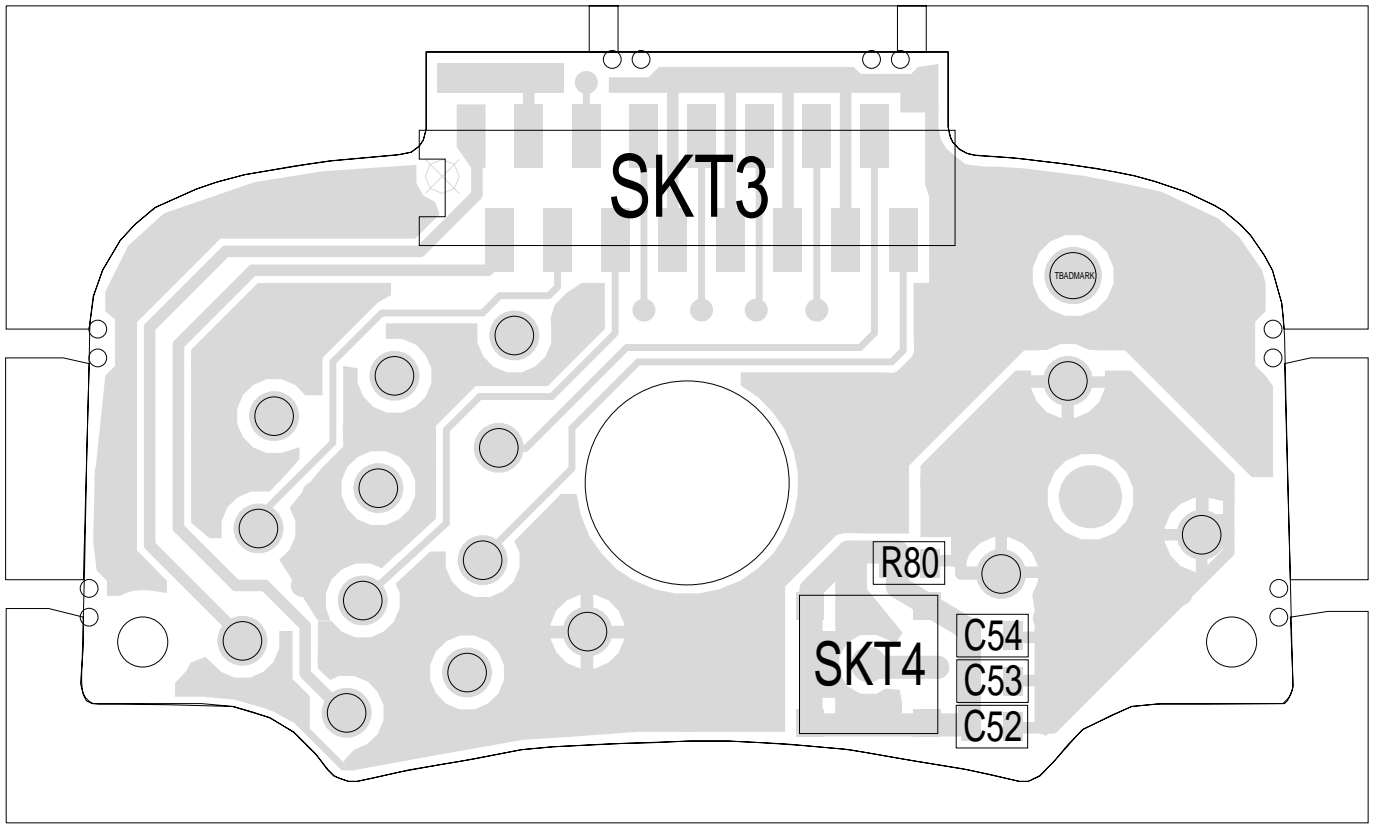


MOB.MIC

INTERCONNECT

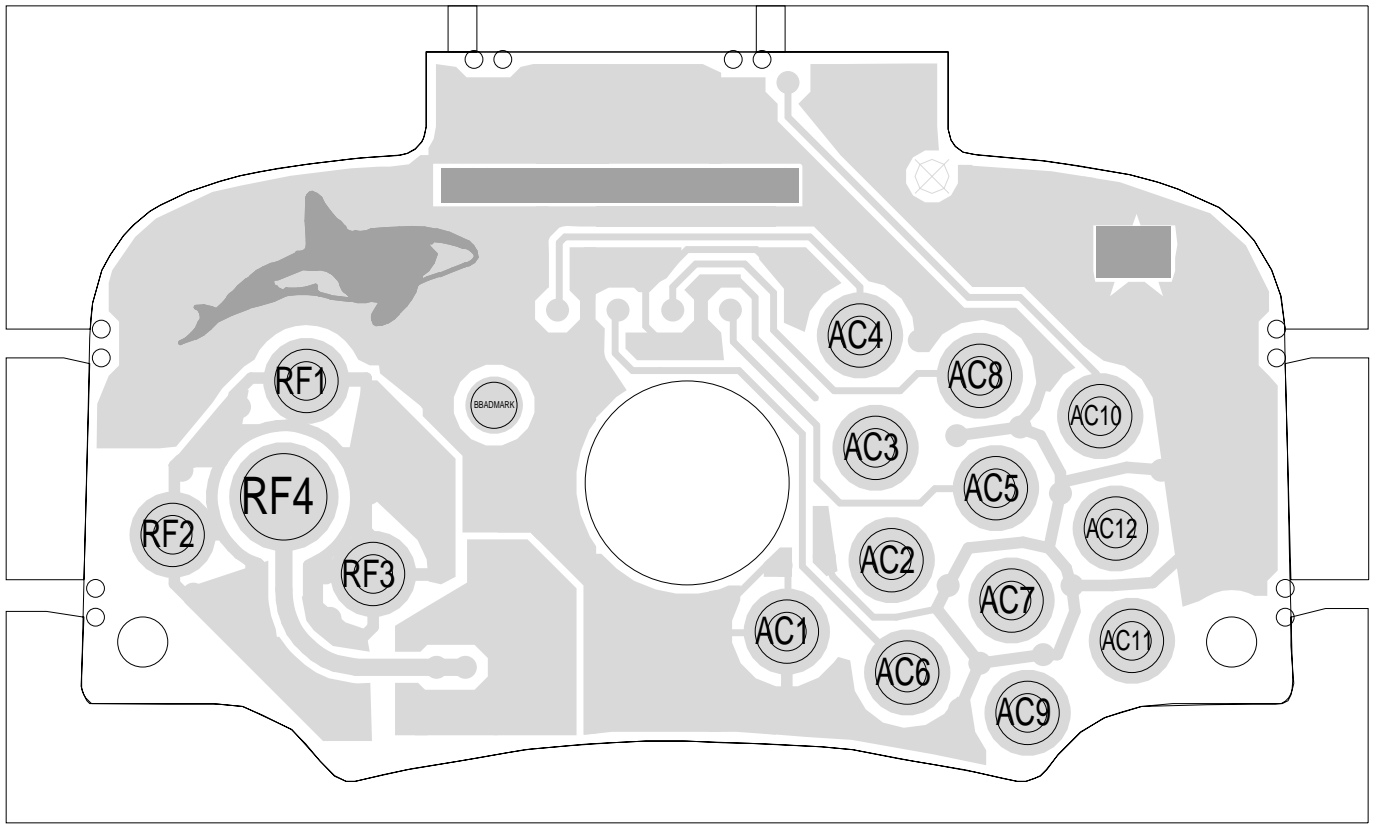
© TAIT ELECTRONICS					
TAIT ORCA SERIES CAR KIT ACCESSORY PROBE PCB					
IPN:	220-01506-01	ISSUE:	A	ID:	2.SC. 1
PROJECT:	ORCA	DESIGNER:	TS	FILE NAME:	150601A
		FILE DATE:	19-05-99	NO.SHEETS:	1

01A	PINS NOW SMD. NEW CMPNL FILE	TS				19-05-99
REV/ISS	AMENDMENTS	DRAWN	CHKD	D.O.	APVD	DATE



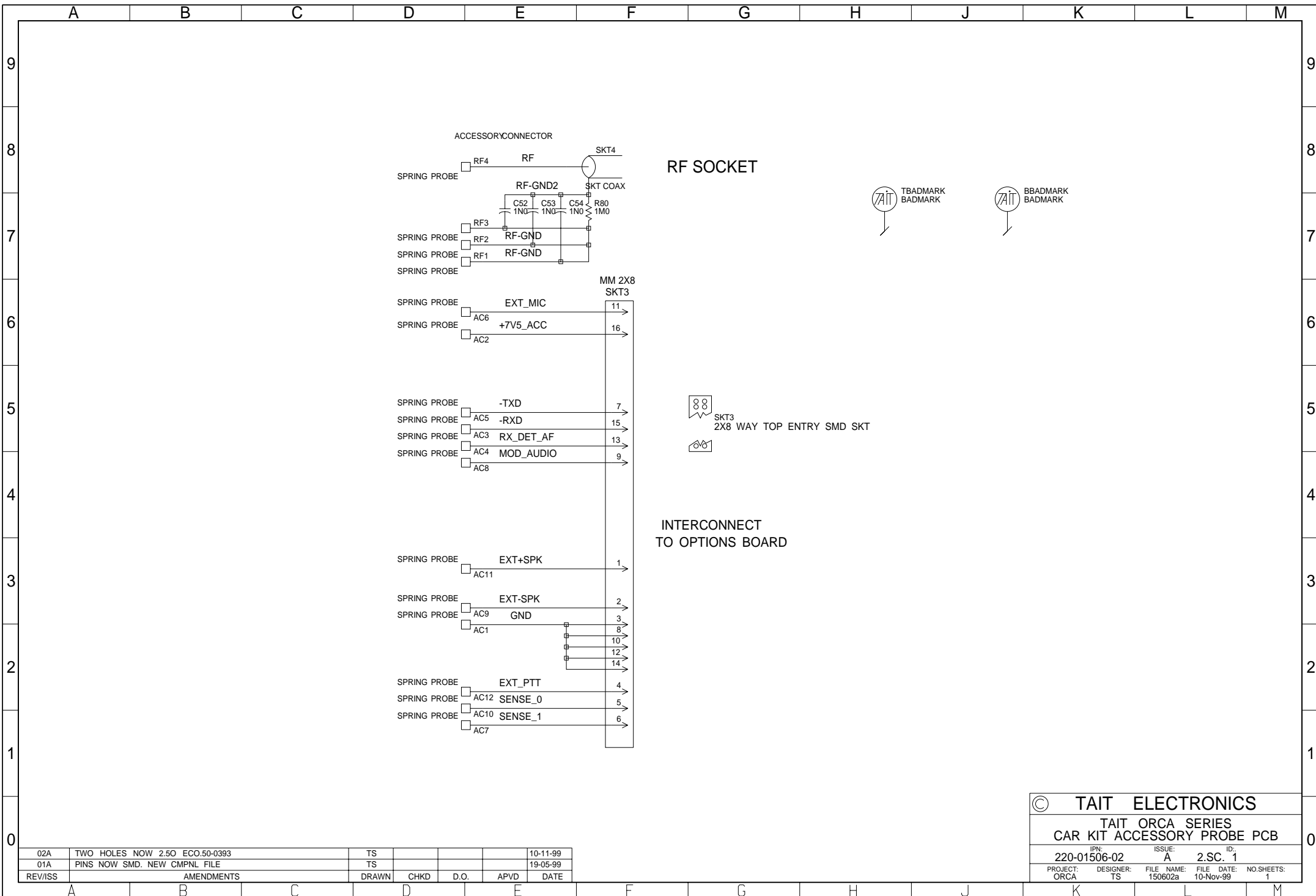
<b>TAIT ELECTRONICS</b>	IPN:	ISS:	ID:	DATE:
	220-01506-01	A	1.TA	4 Jun 1999
<b>TOVK ACC CON PCB LAYOUT - TOP SIDE</b>				

Scale:3:1 ; Rotation: 0 degrees



TAIT ELECTRONICS	IPN:	ISS:	ID:	DATE:
	220-01506-01	A	2.BA	4 Jun 1999
TOVK ACC CON PCB LAYOUT - BOTTOM SIDE				

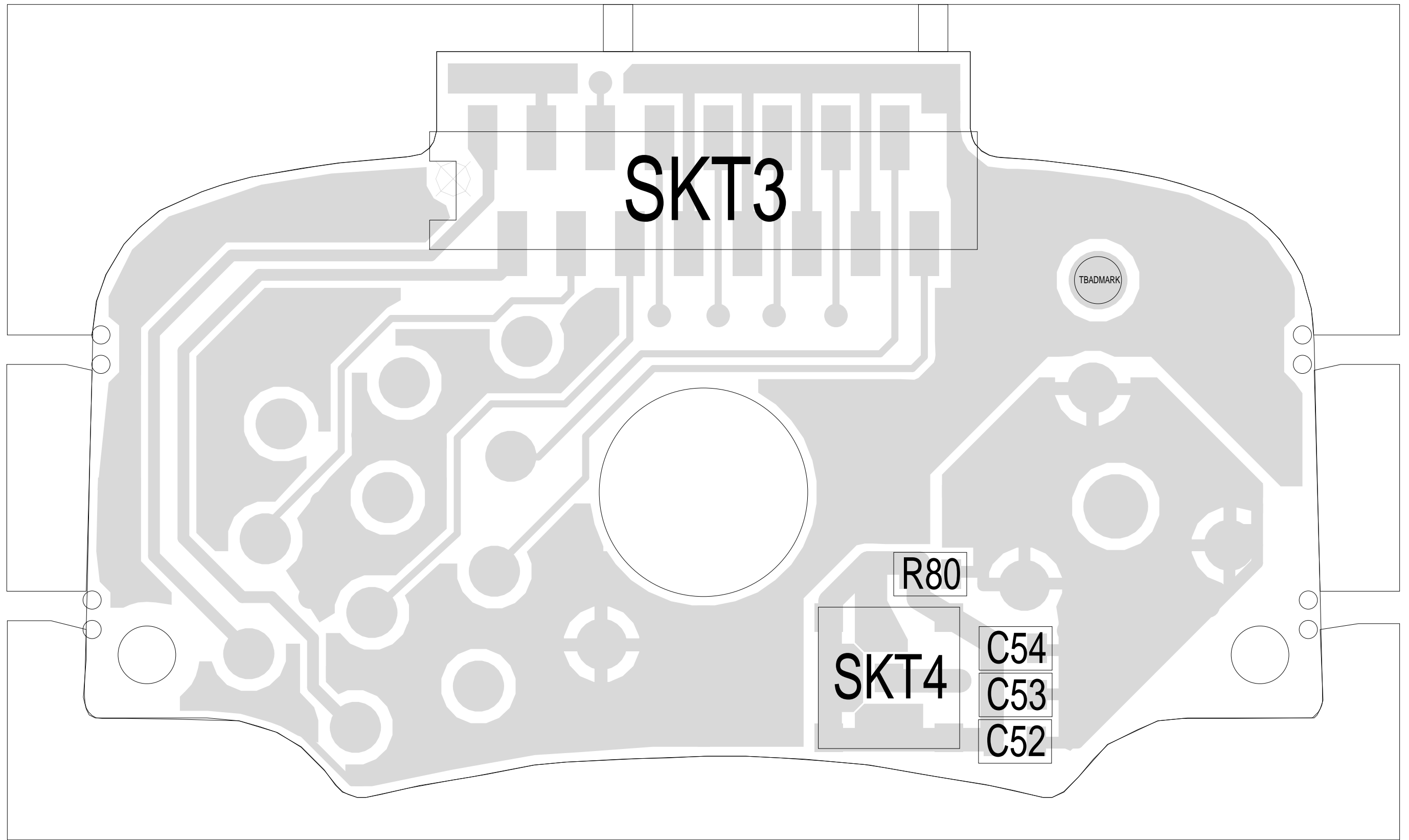
Scale:3:1 ; Rotation: 0 degrees



02A	TWO HOLES NOW 2.50 ECO.50-0393	TS				10-11-99
01A	PINS NOW SMD. NEW CMPNL FILE	TS				19-05-99
REV/ISS	AMENDMENTS	DRAWN	CHKD	D.O.	APVD	DATE

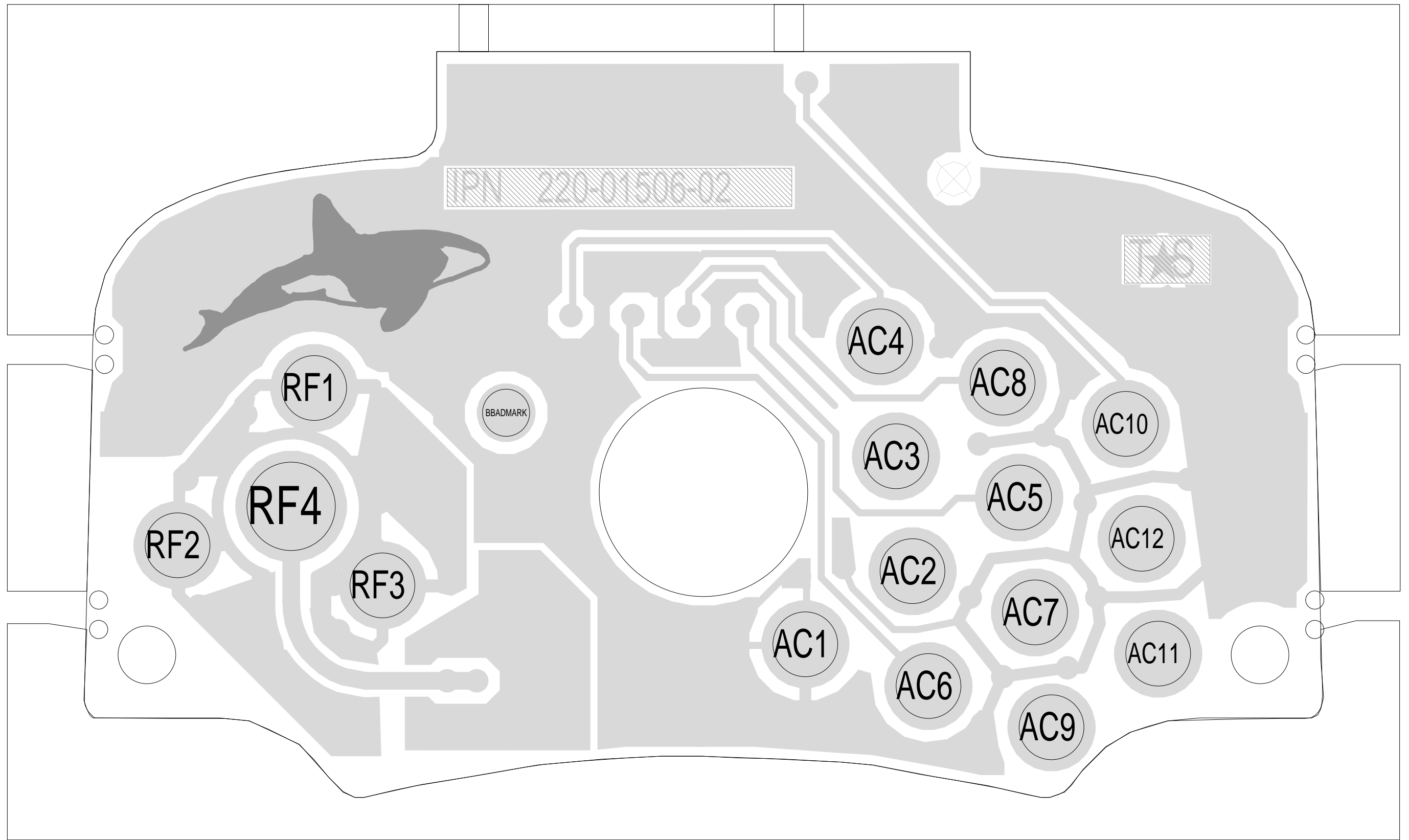
© TAIT ELECTRONICS  
 TAIT ORCA SERIES  
 CAR KIT ACCESSORY PROBE PCB

IPN:	ISSUE:	ID:
220-01506-02	A	2.SC. 1
PROJECT:	DESIGNER:	FILE NAME:
ORCA	TS	150602a
FILE DATE:	NO.SHEETS:	
10-Nov-99	1	



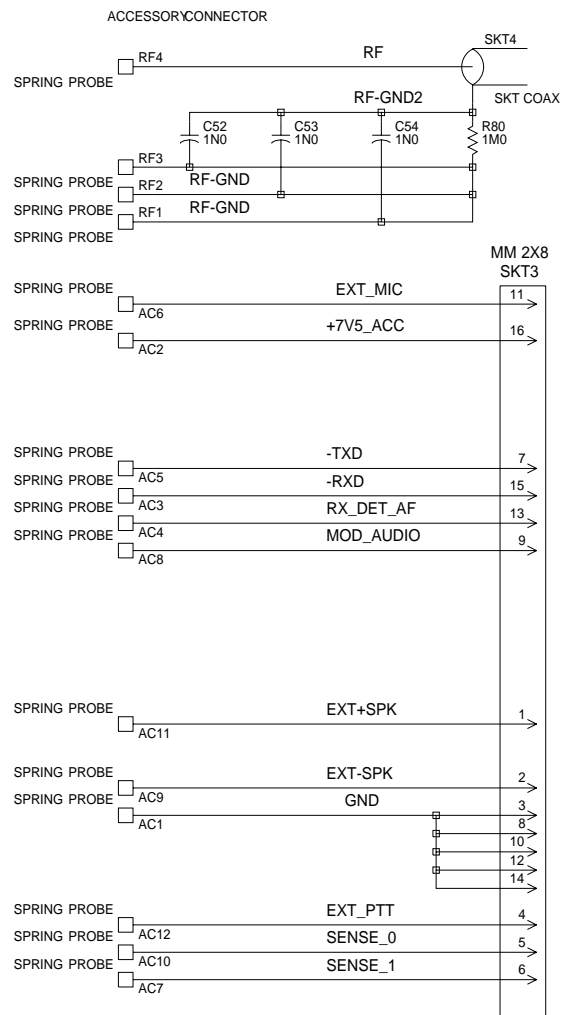
TAIT ELECTRONICS	IPN: 220-01506-02	ISS: A	ID: 1.TA	DATE: 10 Nov 1999
TOVK ACC CON PCB LAYOUT - TOP SIDE				

Scale:6.1 ; Rotation: 0 degrees

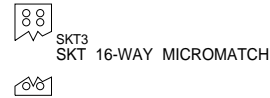


TAIT ELECTRONICS	IPN: 220-01506-02	ISS: A	ID: 2.BA	DATE: 10 Nov 1999
TOVK ACC CON PCB LAYOUT - BOTTOM SIDE				

Scale:6:1 ; Rotation: 0 degrees

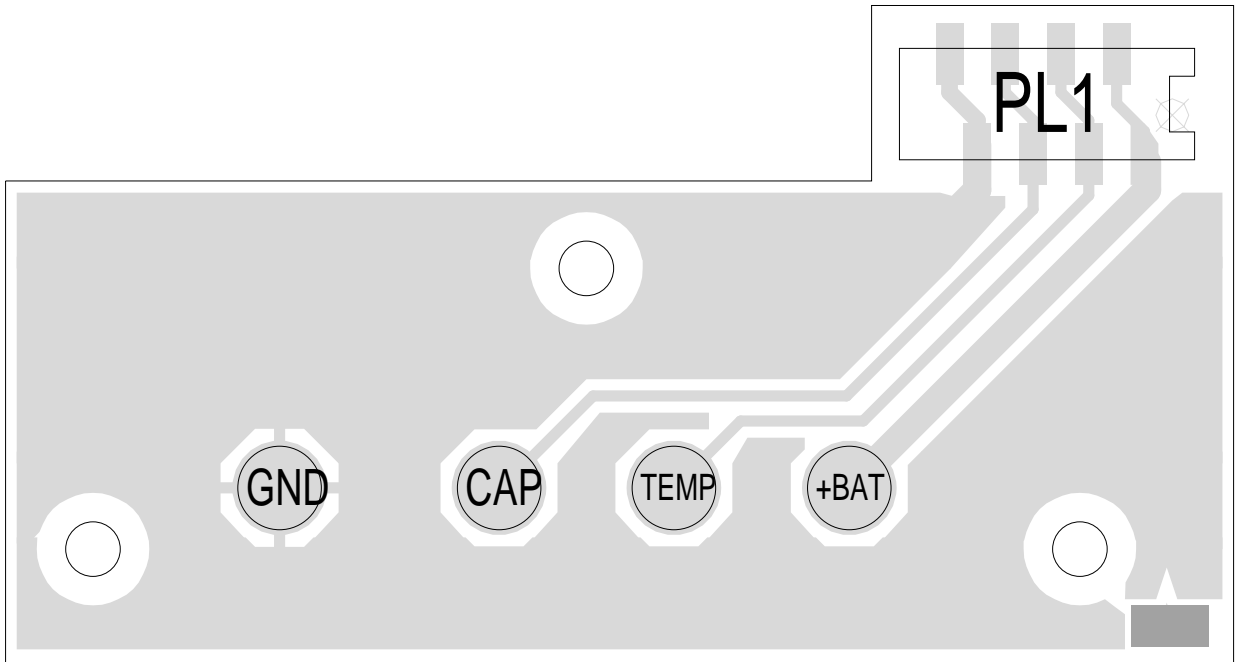


RF SOCKET



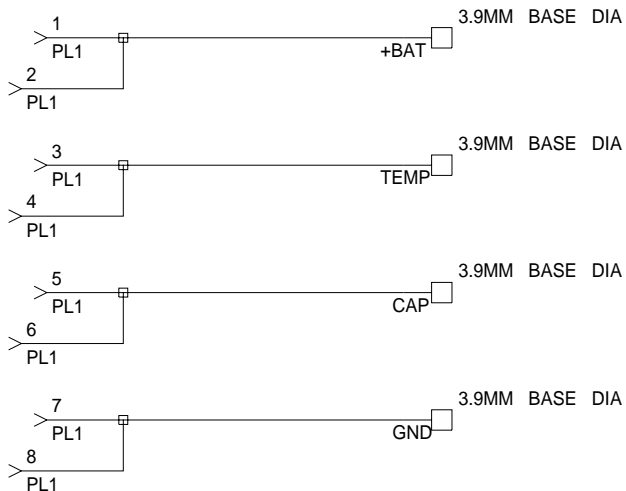
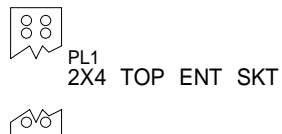
03A	ECO 50-0899 MECH CHANGES	TS				01/11/00
02A	TWO HOLES NOW 2.50 ECO.50-0393	TS				10-11-99
01A	PINS NOW SMD. NEW CMPNL FILE	TS				19-05-99
REV/ISS	AMENDMENTS	DRAWN	CHKD	D.O.	APVD	DATE

© TAIT ELECTRONICS					
TAIT ORCA SERIES					
CAR KIT ACCESSORY PROBE PCB					
IPN:	ISSUE:	ID:			
220-01506-03	A	2.S.C. 1			
PROJECT:	DESIGNER:	FILE NAME:	FILE DATE:	NO.SHEETS:	
TOVK	TS	150603a	1-Nov-00	1	



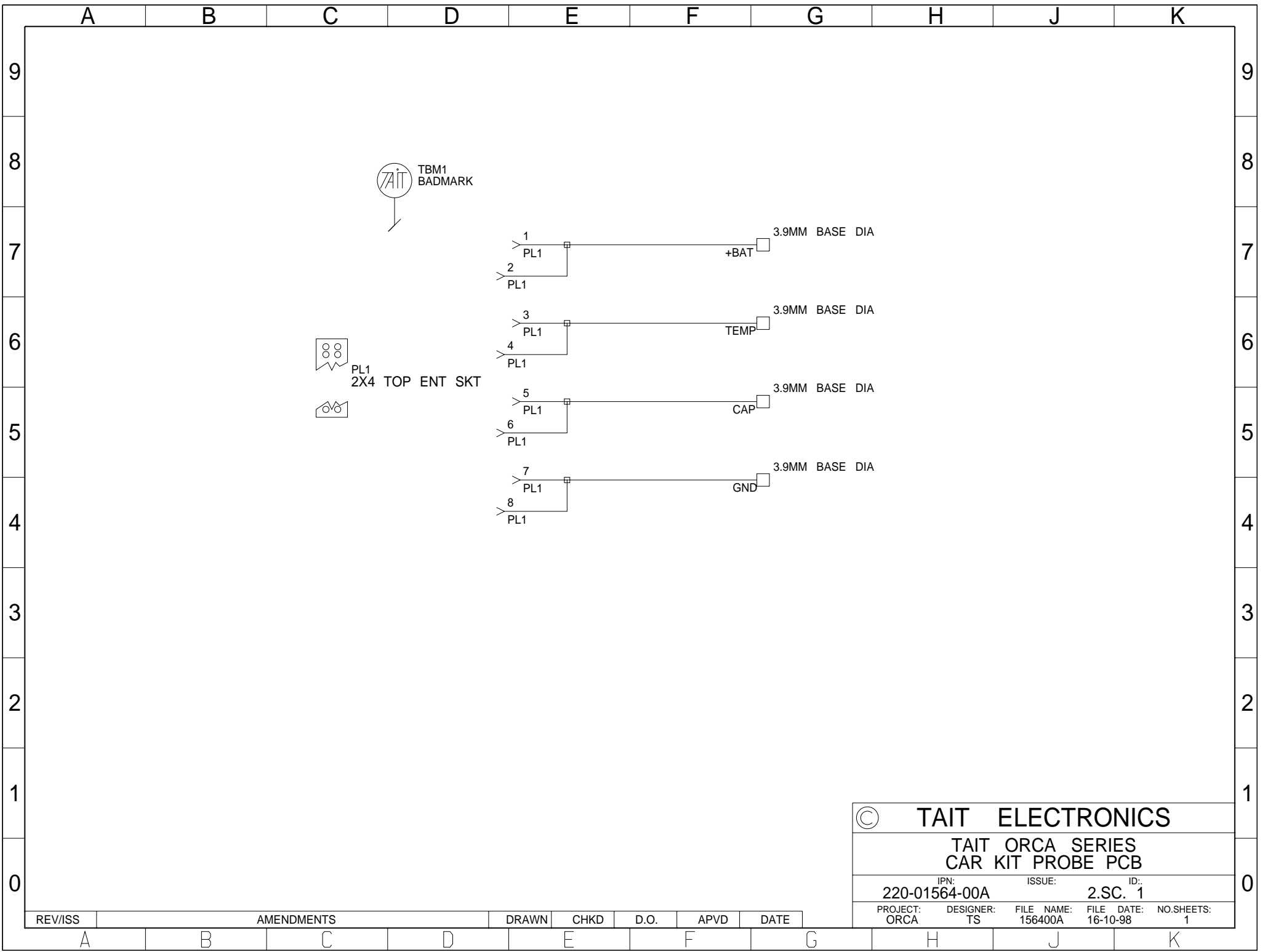
TAIT ELECTRONICS	IPN:	ISS:	ID:	DATE:
	220-0564-04	04	1.TA	14 Oct 1998
OCK BATPROBE PCB LAYOUT - TOP SIDE				





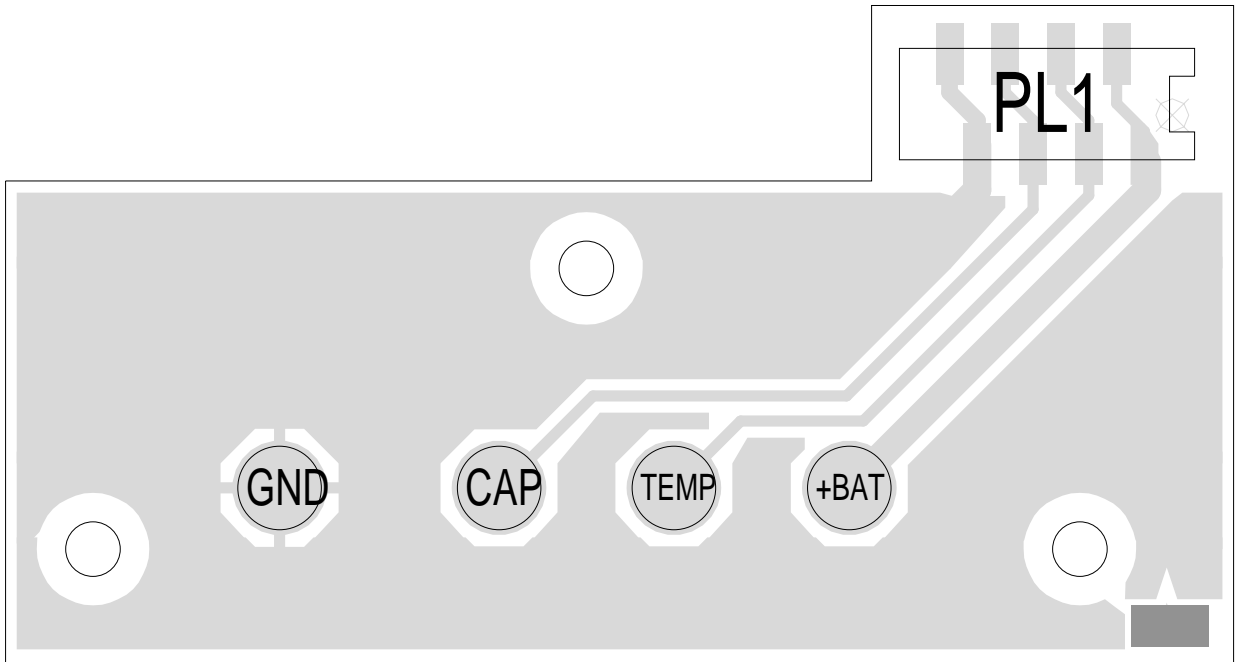
© TAIT ELECTRONICS				
TAIT ORCA SERIES CAR KIT PROBE PCB				
IPN: 220-01564-00A	ISSUE: 2.SC. 1			
PROJECT: ORCA	DESIGNER: TS	FILE NAME: 156400A	FILE DATE: 16-10-98	NO.SHEETS: 1

REV/ISS	AMENDMENTS	DRAWN	CHKD	D.O.	APVD	DATE
---------	------------	-------	------	------	------	------



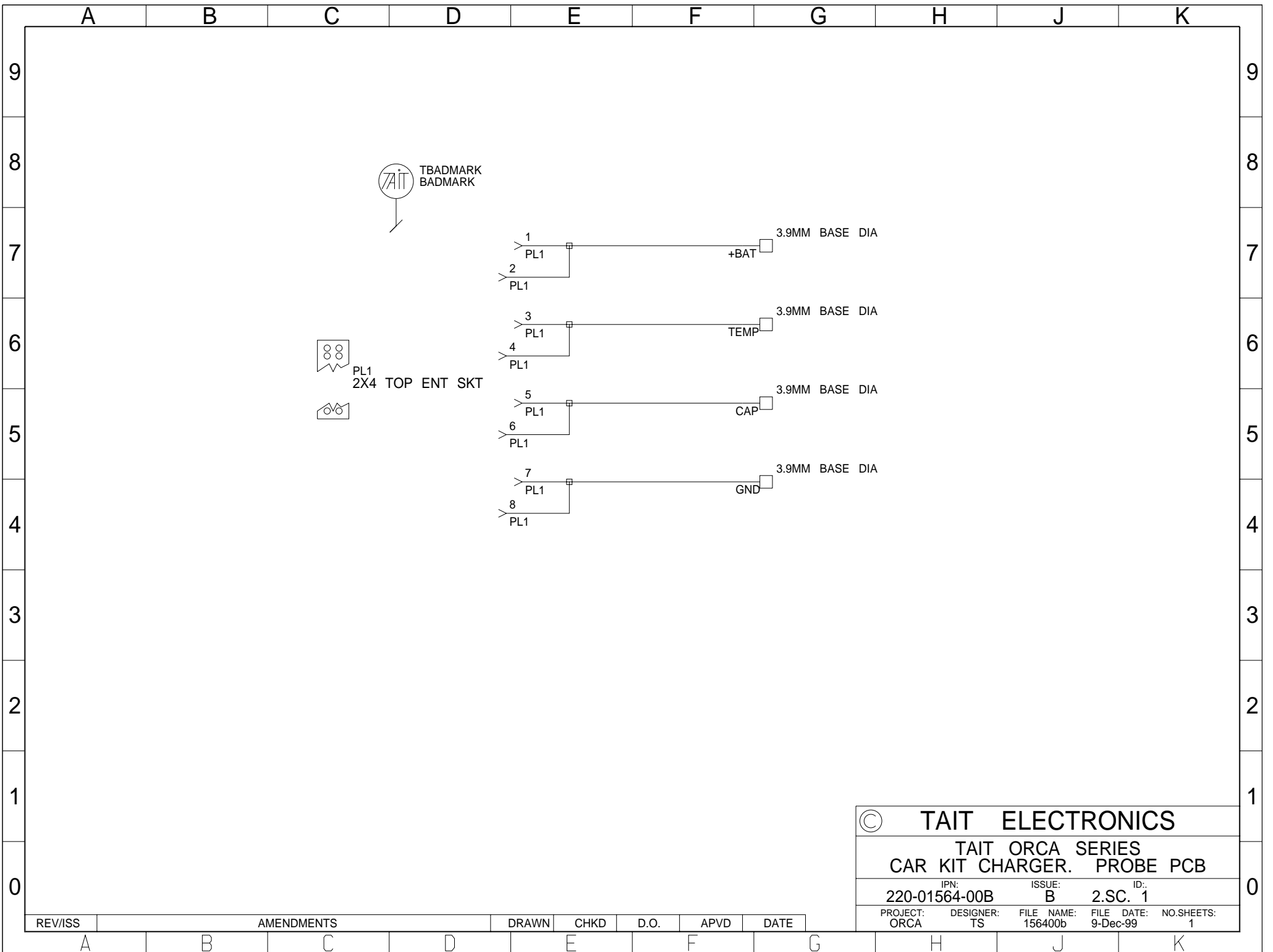
© TAIT ELECTRONICS			
TAIT ORCA SERIES CAR KIT PROBE PCB			
IPN: 220-01564-00A	ISSUE: 2.SC.	ID.:	1
PROJECT: ORCA	DESIGNER: TS	FILE NAME: 156400A	FILE DATE: 16-10-98
		NO.SHEETS:	1

REV/ISS	AMENDMENTS	DRAWN	CHKD	D.O.	APVD	DATE
---------	------------	-------	------	------	------	------

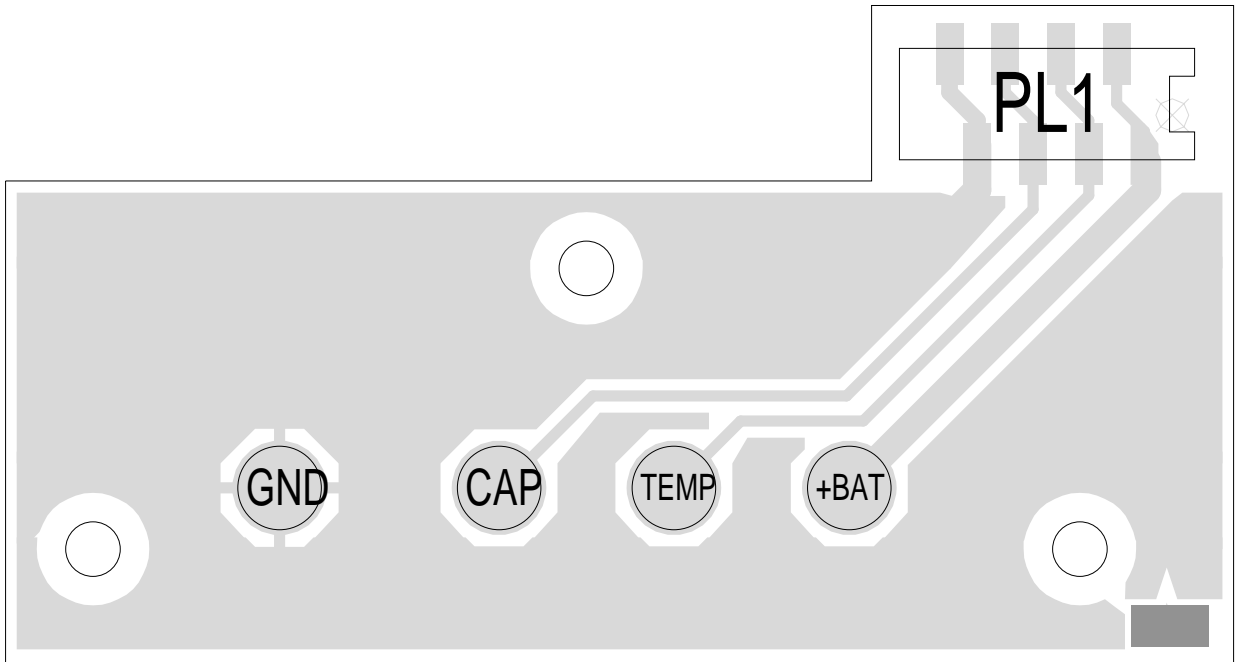


TAIT ELECTRONICS	IPN:	ISS:	ID:	DATE:
	220-0564-04	04	1.TA	14 Oct 1998
OCK BATPROBE PCB LAYOUT - TOP SIDE				

Scale:2.9:1 ; Rotation: 0 degrees



REV/ISS	AMENDMENTS			DRAWN	CHKD	D.O.	APVD	DATE
---------	------------	--	--	-------	------	------	------	------



TAIT ELECTRONICS	IPN:	ISS:	ID:	DATE:
	220-0564-04	04	1.TA	14 Oct 1998
OCK BATPROBE PCB LAYOUT - TOP SIDE				

Scale:2.9:1 ; Rotation: 0 degrees