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# T806

# Power Supply

# (M806-00)

# Issue A

## TECHNICAL INFORMATION

Any enquiries regarding this Manual or the equipment it describes should be addressed in the first instance to your nearest approved Tait Dealer or Service Centre. Further technical assistance may be obtained from the Product Support Group, Tait Electronics Ltd, at the above address.

## UPDATING EQUIPMENT AND SERVICE MANUALS

In the interests of improving performance, reliability or servicing, Tait Electronics Ltd reserve the right to update their equipment and/or Service Manuals without prior notice.

## SCOPE OF MANUAL

This Manual contains general, technical and servicing information on the T806 switching power supply.

## Ordering Tait Service Manuals

Service Manuals should be ordered from your nearest Tait Branch or approved Dealer. When ordering, quote the Tait Internal Part Number (IPN) and, where applicable, the version.

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# CONTENTS


Page

**SECTION 1 GENERAL INFORMATION**

1.1 Introduction 1.1

1.2 Specifications 1.2

1.3 Versions 1.2

**SECTION 2 CIRCUIT OPERATION**

2.1 Rectifier Circuit 2.1

2.2 Control Circuitry & Oscillator 2.1

2.3 Current Limiting 2.1

2.4 Thermal Shutdown 2.2

2.5 MOSFET Driver & Bootstrap Circuit 2.2

2.6 Bucking Convertor 2.2

2.7 Filtering 2.2

2.8 Float Charge Control Circuitry 2.2

2.9 Mains And/Or Power Supply Fail Alarm 2.2

**SECTION 3 INTRODUCTION TO SERVICING**

3.1 General 3.1
- 3.1.1 Precautions 3.1
- 3.1.2 Notes 3.2
- 3.1.3 Technical Instructions (TI's) 3.2

3.2 Mechanical 3.2
- 3.2.1 Pozidriv Recess Head Screws 3.2
- 3.2.2 Construction 3.2
- 3.2.3 Disassembly Instructions 3.3
- 3.2.3.1 To Gain Access To The PCB 3.4
- 3.2.3.2 To Gain Access To The Solder Side Of The PCB 3.4
- 3.2.4 Reassembly Instructions 3.4

3.3 Component Replacement 3.4
- 3.3.1 Leaded Components 3.4
- 3.3.2 Component Removal From PTH PCB's 3.4
- 3.3.2.1 Desoldering Iron Method 3.5
- 3.3.2.2 Component Cutting Method 3.5
- 3.3.3 Critical Components 3.5

3.4 Semiconductor Replacement 3.5

## SECTION 4 INITIAL SET-UP & TESTING


| | | |
|---|---|---|
| 4.1 | Introduction | 4.1 |
| 4.2 | Test Equipment Required | 4.1 |
| 4.3 | Preliminary | 4.1 |
| 4.4 | Thermal Shutdown | 4.2 |
| 4.5 | Current Limiting | 4.2 |
| 4.6 | Regulation | 4.2 |
| 4.7 | Low Battery Cut-Out | 4.2 |
| 4.8 | Ripple And Noise | 4.3 |


## SECTION 5 FAULT FINDING


| | | |
|---|---|---|
| 5.1 | Introduction | 5.1 |
| 5.2 | Visual Checks | 5.1 |
| 5.3 | Component Checks | 5.1 |
| | 5.3.1 General | 5.1 |
| | 5.3.2 Points To Check | 5.1 |
| 5.4 | Output Voltage Wrong Fault Finding Chart | 5.4 |
| 5.5 | Pulse Width Modulation Fault Finding Chart | 5.5 |
| 5.6 | No Float Charge Fault Finding Chart | 5.6 |


## SECTION 6 INSTALLATION


| | | |
|---|---|---|
| 6.1 | General | 6.1 |
| 6.2 | Rack Frame Earthing | 6.1 |
| 6.3 | Noise Interference Suppression Earthing | 6.1 |
| | 6.3.1 Introduction | 6.1 |
| | 6.3.2 Mounting | 6.2 |
| | 6.3.3 Earthing | 6.3 |
| | 6.3.4 Filtering | 6.3 |
| 6.4 | Float Charging A Battery | 6.3 |
| 6.5 | Mains And/Or Power Supply Failure Alarm | 6.4 |


## SECTION 7 PCB INFORMATION


| | | |
|---|---|---|
| Introduction | | 7.1 |
| Parts List | 220-01230-01 | 7.2 |
| Grid Reference Index | " | 7.4 |
| PCB Layouts - Bottom | " | 7.5 |
| - Top | " | 7.6 |
| Circuit Diagram | " | 7.7 |

## LIST OF ILLUSTRATIONS


| | | |
|---|---|---|
| Figure 2.1 | T806 Block Diagram | 2.1 |
| Figure 3.1 | T806 Mechanical Assembly | 3.3 |
| Figure 3.2 | Semiconductor Mounting Details | 3.6 |
| Figure 4.1 | Test Equipment Set-Up | 4.1 |
| Figure 5.1 | Voltage & Current Waveforms | 5.2 |
| Figure 5.2 | Voltage Waveforms & Current Test Points | 5.3 |
| Figure 5.3 | T806-10 Wiring Diagram | 5.7 |
| Figure 5.4 | T806-20 Wiring Diagram | 5.8 |
| Figure 6.1 | T806 Rack Mounting Details | 6.2 |
| Figure 6.2 | Output Voltage vs Ambient Temperature | 6.3 |
| Figure 6.3 | Rear Panel Connectors | 6.4 |

# SECTION 1 GENERAL INFORMATION

## 1.1 INTRODUCTION

The T806 Power Supply is a mains operated power supply designed to provide the DC supply requirements of Tait T800 Series 25W base stations. It consists of a toroidal transformer, rectifier and capacitive filter followed by a switched mode voltage regulator. Current limiting is included to restrict the peak current to approximately 8A. A self-restoring thermal shutdown keeps the temperature of the MOSFET switches within their "safe operation area ratings".

A T806 may be housed together with other Tait fixed equipment modules in a standard 484mm (19") rack frame, where it occupies the space of one standard 60mm module, to give an attractive and convenient installation.

The T806 also has a limited capability to float charge a lead acid battery under constant voltage conditions (see Section 6, Installation).

## 1.2 SPECIFICATIONS

### Input

T806-10:

| | |
|---|---|
| Voltage | .. 120V ±10% (limits: 108-132V AC) |
| Frequency | .. 50/60Hz |

T806-20:

| | |
|---|---|
| Voltage | .. 230V ±10% (limits: 207-253V AC) |
| Frequency | .. 50Hz |

### Output

| | |
|---|---|
| Voltage | .. 13.8V DC |
| Continuous Current Rating: | |
| $T_A$ = 40°C, mains ±10% | .. 6.0A max. |
| $T_A$ = 60°C, mains ±10% | .. 4.0A max. |
| Voltage Regulation (supply variation ±10%, currents up to 8A, temp. range -10°C to +40°C) | .. ±5% |

### Protection

| | |
|---|---|
| Current Limiting ($T_A$ = 25°C) | .. 8.0A (approx.) |
| Thermal Shutdown (Input = 230/120V) | .. 100°C |
| Input: | |
| Primary Fuse: | |
| T806-10 | .. 1.5A dual time delay |
| T806-20 | .. 0.75A dual time delay |
| Thermal Cutout | .. integral with transformer (110°C) |
| Ripple and Noise | .. 10mV rms (0-6A) |
| Operating Temperature Range | .. -10°C to +60°C |
| Dimensions: | |
| Height | .. 190mm |
| Length | .. 290mm |
| Width | .. 60mm |
| Weight | .. 3.1kg |

## 1.3 VERSIONS

| | |
|---|---|
| T806-10: | Power supply, 13.8V DC output<br>120V 50/60Hz mains input<br>6A continuously rated power supply for 25W base stations |
| T806-20: | Power supply, 13.8V DC output<br>230V 50Hz mains input<br>6A continuously rated power supply for 25W base stations |

## SECTION 2 CIRCUIT OPERATION

Refer to Figure 2.1 and Circuit Diagram IPN 220-01230-01.

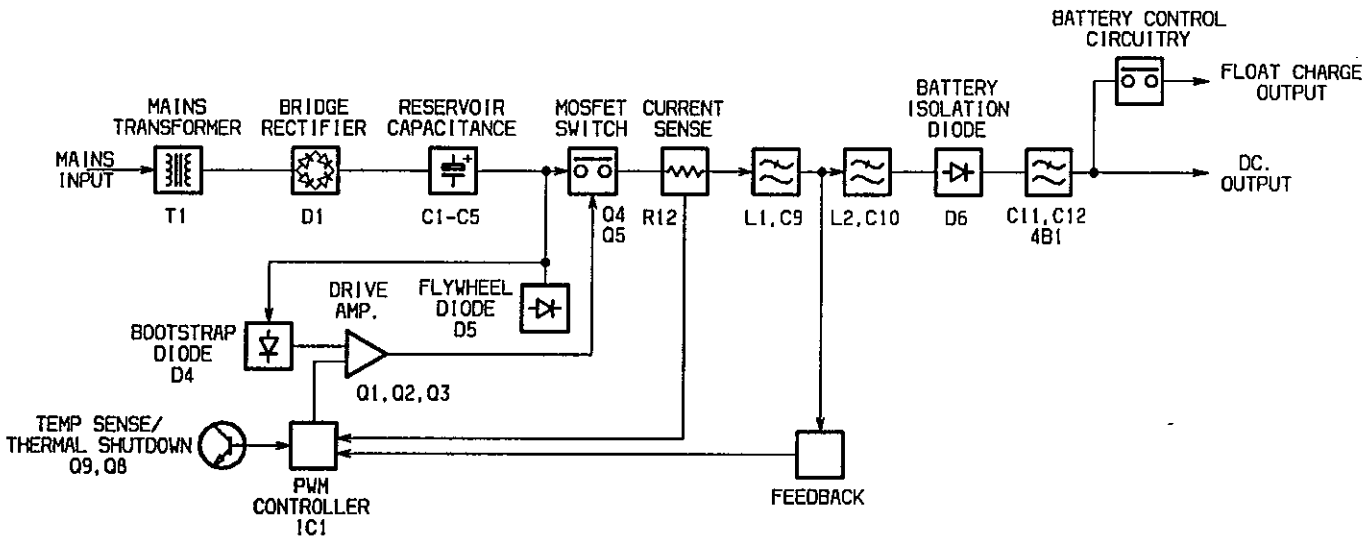



Figure 2.1 T806 Block Diagram

### 2.1 RECTIFIER CIRCUIT

The mains supply is connected to the primary of the transformer via the supply cord, the input fuse and on/off switch SW1.

A conventional bridge rectifier is used across the secondary winding of the transformer. Both positive and negative leads are isolated from earth.

The neon of SW1 illuminates when the mains input power is applied.

For ease of manufacturing, 5 PCB mounted electrolytic capacitors connected in parallel across the bridge rectifier are used as the reservoir capacitance.

### 2.2 CONTROL CIRCUITRY & OSCILLATOR

IC1 provides the pulse width modulator, oscillator, voltage reference (5V) and control amplifiers.

The output of the voltage divider formed by R9, RV10 & R11 is compared with the voltage reference to provide a signal to the modulator. Control loop stability and gain are controlled by C18, R17, C19, R18 & R19. The oscillator frequency is determined by C16 & R16 (approximately 40kHz).

### 2.3 CURRENT LIMITING

The output of the voltage divider formed by R20, R21 & R12 is compared with the voltage generated by output current flowing through R12. When the voltage across R12 is equal to R21, the output pulse width is reduced and the output voltage falls to maintain a constant output current.

## 2.4 THERMAL SHUTDOWN

Q9 is mounted on the chassis next to the switching elements and its junction temperature therefore follows that of the chassis. As the base emitter voltage required to turn on Q9 decreases in relation to the increase in chassis temperature, the correctly biased transistor (Q9) will turn on at a set temperature (100°C). RV26 and the TSD "set-up" link are used to set the correct bias at room temperature (25°C). When Q9 switches on, Q8 switches off and operates the dead time control of IC1, causing 100% dead time and resulting in Q1 being on continuously. Thus the output voltage falls to zero until Q9 switches off when the chassis has cooled sufficiently.

## 2.5 MOSFET DRIVER & BOOTSTRAP CIRCUIT

IC1 controls Q1 via the voltage divider network of R1, R2 & R3. Q1 drives the low impedance high current buffer formed by Q2 & Q3 which drive the gates of the parallel MOSFETs.

The circuit is bootstrapped by C6 & D3 to provide high side switching of the common drain MOSFETs. D2 acts to limit the gate-source voltage of the bootstrap. Considering the energy storage components L1 & C9, current paths must be provided to the positive and negative buses when there is no load to discharge the energy: the negative bus path is via D4 & Q3, the positive bus path by internal body diodes of the MOSFETs.

## 2.6 BUCKING CONVERTOR

MOSFETs Q4 & Q5 are switched on by the pulse width modulator drive circuit. D5 switches on when Q4 & Q5 are switched off by the flywheel action of the energy storage elements, L1 & C9.

Output voltage regulation is achieved by adjusting the pulse width. L1 & C9 integrate the pulse width and attenuate the 40kHz oscillations.

## 2.7 FILTERING

L2 & C10 provide an extra 2-pole filter to the circuit to reduce 40kHz noise and harmonics.

C11, C12 and a 4B1 bead form a common mode filter to further attenuate conducted noise from reaching the radio.

## 2.8 FLOAT CHARGE CONTROL CIRCUITRY

IC2 is a low voltage drop-out IC which disconnects the lead acid battery supply from the repeater if the voltage falls below a preset value, thus preventing the battery from being completely drained if the mains power fails for a sustained period of time. The trip voltage is set with RV11. The output of IC2 is fed to Q10 which is used to switch relay *RL1 on and off.

## 2.9 MAINS AND/OR POWER SUPPLY FAIL ALARM

In the case of a mains and/or power supply failure, a "logic 0" (0V) is available at the "Mains/PS Fail Alarm" output, even with a battery connected across the main DC output. If there is no fault with the mains or power supply, the main DC output voltage (typ. +13.8V) is supplied to this alarm output via R50.

# SECTION 3 INTRODUCTION TO SERVICING

## 3.1 GENERAL

### 3.1.1 PRECAUTIONS

WARNING: LETHAL VOLTAGES

The T806 power supply contains voltages that may be lethal.

**Disconnect the mains IEC connector before dismantling.**

**Servicing should be carried out only by qualified technicians and should be attempted only when powered through a mains isolating transformer of sufficient rating.**

CAUTION: HANDLE WITH CARE

This unit contains a number of quite heavy and fragile individual components which are mounted directly on the PCB. Severe mechanical shock may damage the PCB (i.e. solder joints, copper tracks) and/or components (e.g. fragile ferrite magnetic materials).

CAUTION: VENTILATION

Always ensure there is adequate ventilation around the unit and **do not** operate it in a sealed cabinet - MTBF will decrease if airflow is blocked. As a rule of thumb the life expectancy of the unit will approximately halve with every 10°C rise in temperature.

It is therefore recommended to:

- keep the ambient temperature low
- ensure that airflow is not restricted.

CAUTION: HEATSINK/CASE TEMPERATURE

The chassis and side cover of this power supply act as heatsinks for the internal power semi-conductors. Under some conditions the top and bottom sections of the chassis, side cover and internal heat spreader may reach temperatures of over 80°C. Handle with extreme care after prolonged operation.

CAUTION: ELECTROSTATIC SENSITIVE DEVICES

This equipment contains power MOSFET devices which are sensitive to electrostatic discharge. Care when handling these devices is essential. For the correct handling procedures, refer to the manufacturer's data books, e.g. Motorola Power MOSFET Transistor Data, Chapter 3, etc.

CAUTION: EARTHING OF RACK FRAME

The power supply case is internally connected to mains earth. Because the unit's case and the rack frame in which it is usually installed are painted, a secure electrical earthing connection between the unit and the rack is **not** guaranteed (i.e. it is reliant on breaking through the paint coating).

It is therefore strongly advised that an additional and secure electrical connection is provided by means of the supplied earth lead (refer to Section 6). Failure to do so may result in harmful voltage potentials between the power supply and rack frame, and/or miscellaneous power supply switching noise problems in both receivers and transmitters.

CAUTION: SUPPLY CORD

If the mains supply cord needs replacing, it must be replaced with a mains supply cord of the same size and type as originally fitted.

### 3.1.2 NOTES

If further information is required about the T806 or this Manual, it may be obtained from Tait Electronics Ltd or accredited agents. When requesting this information, please quote the equipment type (e.g. T806-20) and serial number (found on a label at the back of the set). In the case of the Circuit Diagrams quote the 'Title', 'Issue' and 'Internal Part Number' (IPN) and for the Service Manual quote the 'IPN' and 'Issue', e.g. M806-00, Issue A.

### 3.1.3 TECHNICAL INSTRUCTIONS

From time to time 'Technical Instructions' (TI's) are issued by Tait Electronics Engineering Division. These TI's may be used to update equipment or information, or to meet specific operational requirements.

## 3.2 MECHANICAL

### 3.2.1 POZIDRIV RECESS HEAD SCREWS

Pozidriv screws are the preferred standard on all Tait manufactured equipment. The very real advantages of this type of screw will not be realised unless the correct screwdrivers are used by servicing personnel.

### 3.2.2 CONSTRUCTION

All electrical components (except the transformer and rectifier) are mounted on and soldered to a single large PCB. This PCB is mounted onto the chassis and an extruded aluminium bar which is itself screwed to the chassis; both the chassis and bar provide heatsinking for the power semiconductors.

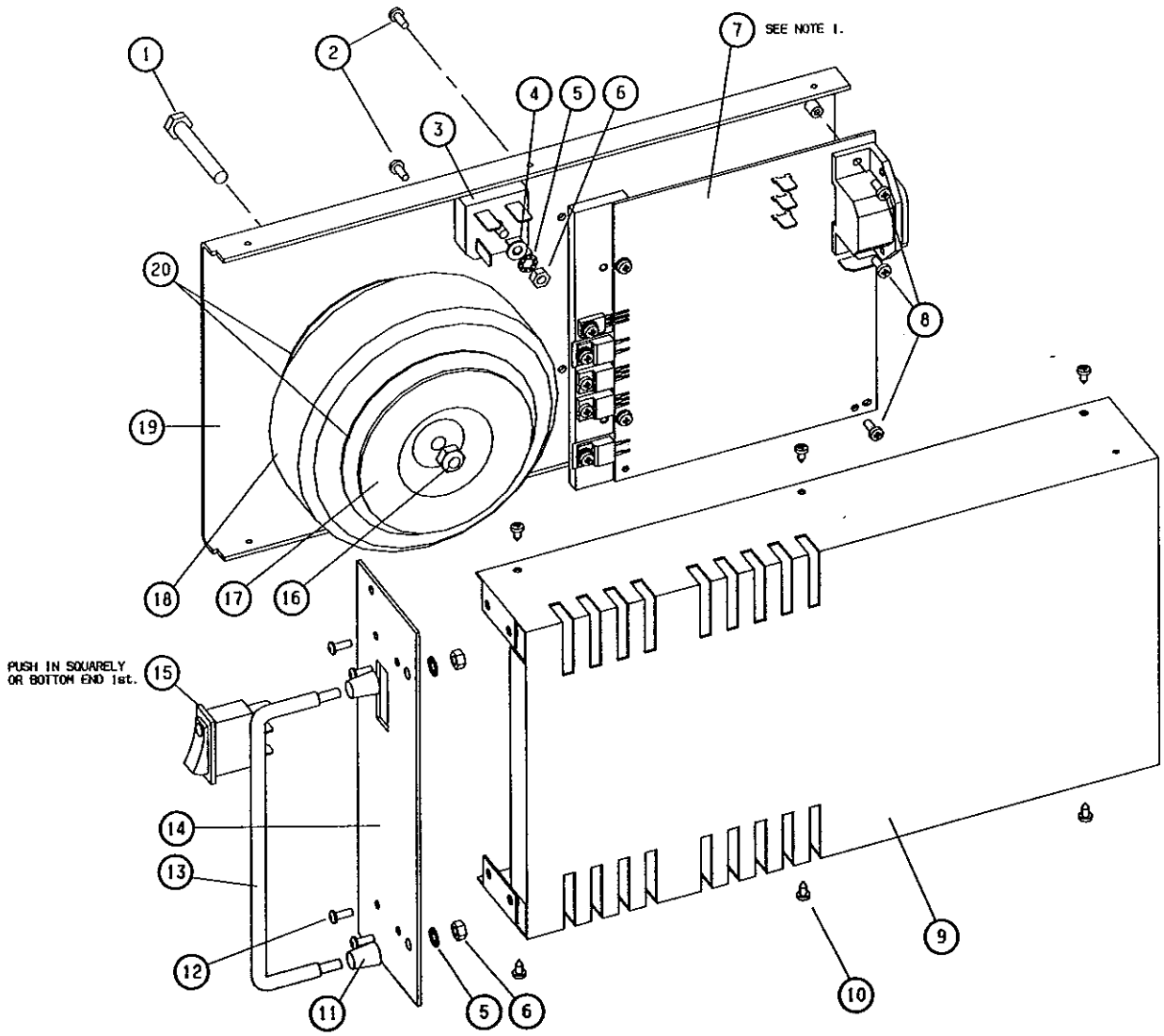
The mechanical construction of the T806 provides heatsinking, EMI shielding and user protection, and is also designed for ease of servicing and mounting.

To gain access to either side of the PCB, the fuse, link and trim pots, follow the instructions in Section 3.2.3.

## 3.2.3 DISASSEMBLY INSTRUCTIONS

**WARNING: Observe the precautions outlined in Section 3.1.1 of this Manual before disassembling this unit.**

**Isolate this unit from the mains supply before removing the covers.**




| ITEM | DESCRIPTION | IPN | QUANTITY | TORQUE (in lbf) |
|---|---|---|---|---|
| 1 | SCREW M6x40 | 345-00070-03 | 1 | |
| 2 | SCREW M3x8 TAPTITE PAN POZI | 349-00020-32 | 2 | 6 |
| 3 | BRIDGE RECTIFIER | 001-00011-37 | 1 | |
| 4 | WASHER M4 FLAT ST BZ | 353-00010-24 | 1 | |
| 5 | WASHER M4 SHAKEPROOF | 353-00010-20 | 2 | |
| 6 | NUT M4 COLD FORM | 352-00010-10 | 2 | |
| 7 | PCB SUB-ASSEMBLY (SEE SHT.1) | | 1 | |
| 8 | SCREW M3x8 PAN POZI | 345-00040-06 | 3 | |
| 9 | T806 SIDE COVER | 303-23130-00 | 1 | |
| 10 | SCREW SELFTAP No.4x1/4 | 349-00010-10 | 6 | 6 |
| 11 | HANDLE FERRULE | 306-01010-00 | 2 | |
| 12 | SCREW BUTTON SKT HD | 345-00040-20 | 4 | |
| 13 | HANDLE | 308-01007-00 | 1 | |
| 14 | T806 FRONT PANEL | 316-06454-00 | 1 | |
| 15 | ROCKER SWITCH | 230-00010-24 | 1 | |
| 16 | NUT M6 NYLOC | 352-00010-31 | 1 | |
| 17 | DISHED WASHER | SUPPLIED WITH ITEM 18 | 1 | |
| 18 | T806-20 XFMR TORIOD T4082 | 053-01065-00 | 1 | |
| | T806-10 XFMR TORIOD T4083 | 053-01066-00 | 1 | |
| 19 | T806 CHASSIS | 303-11171-00 | 1 | |
| 20 | INSULATING PAD | SUPPLIED WITH ITEM 18 | 2 | |
| | | | | |

NOTES:

1/ Attaching PCB Sub-Assembly:
1. Nip screws (8)
2. Torque screws (2)
3. Tighten screws (8)

Figure 3.1 T806 Mechanical Assembly

#### 3.2.3.1 To Gain Access To The PCB

To gain access to the fuse, test link or trim pots (refer to Figure 3.1):

Remove the 6 self-tapping screws holding the side cover onto the chassis.

Remove the 4 screws holding on the front panel.

Remove the side cover.

#### 3.2.3.2 To Gain Access To The Solder Side Of The PCB

Remove the 3 screws from the rear edge of the PCB (2 of these are in the mains connector).

Remove the 2 screws retaining the heat spreader to the chassis (accessed from the outside of the chassis).

### 3.2.4 REASSEMBLY INSTRUCTIONS

Refit the PCB/heat spreader assembly, ensuring all screws are fitted before any are tightened.

Replace the side cover and secure with the self-tapping screws.

Refit the front panel.

## 3.3 COMPONENT REPLACEMENT

### 3.3.1 LEADED COMPONENTS

Whenever components are removed from, or fitted to the printed circuit track, care must be taken to avoid damage to the track. If it is necessary to remove a component from the track, the following procedure is recommended:

Remove the solder from the component leads using a solder wick.
Loosen the individual leads from the printed track.
Withdraw the component from the top of the PCB.

Do not remove the component from the PCB while the solder is still molten.

Keep all soldering operations, and the heat and solder applied, to a minimum. A thermally controlled, fine tip soldering iron should be used. Ensure that the iron is earthed back to the frame of the set.

### 3.3.2 COMPONENT REMOVAL FROM PTH PCB's

The two satisfactory methods of removing components from PTH PCB's are detailed below.

Note: The first method requires the use of a desoldering station, e.g. Philips SBC 314 or Pace MBT-100E.

#### 3.3.2.1 Desoldering Iron Method

Place the tip over the lead and, as the solder starts to melt, move the tip in a circular motion.

Start the suction and continue the movement until 3 or 4 circles have been completed.

Remove the tip while continuing suction to ensure that all solder is removed from the joint, then stop the suction.

Before pulling the lead out, ensure it is not stuck to the plating.

If the lead is still not free, resolder the joint and try again.

Note: The desoldering iron does not usually have enough heat to desolder leads from the ground plane. Additional heat may be applied by holding a soldering iron on the tip of the desoldering iron (this may require some additional help).

#### 3.3.2.2 Component Cutting Method

Cut the leads on the component side of the PCB.

Heat the solder joint sufficiently to allow easy removal of the lead by drawing it out from the component side: do not use undue force.

Fill the hole with solder and then clear with solderwick.

### 3.3.3 CRITICAL COMPONENTS

The components in the control loop stabilisation part of the circuit are critical in both value and type. Ensure that only exact equivalents are used for repair.

## 3.4 SEMICONDUCTOR REPLACEMENT

Refer to Figure 3.2.

As the semiconductor legs are mounted flat on the PCB and not through holes, it is not necessary to remove the PCB to change these devices.

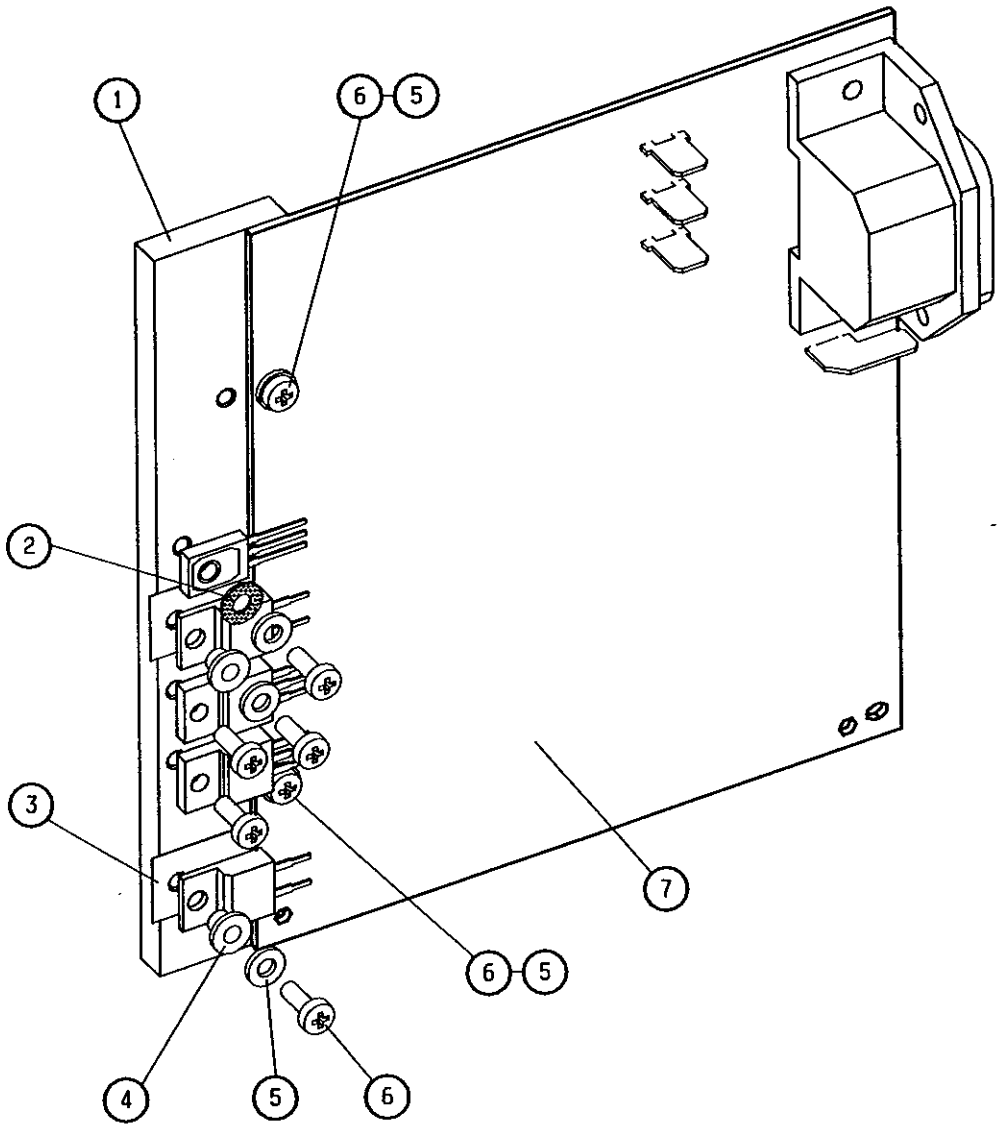
Desolder the semiconductor legs with solder wick, unscrew and remove.

Cut the legs of the new devices to the same length as those that have been removed.

Screw the new devices down onto the heatsink before soldering, ensuring that the appropriate screws, insulators and washers are fitted. Torque down to 0.7Nm (6in.lbs).

Note: Only D5 and D6 require silpad insulators.

Check with a multimeter that there is no short between the chassis and mounting tabs of D5 and D6.




| ITEM | DESCRIPTION | IPN | QUANTITY | TORQUE (in lbf) |
|---|---|---|---|---|
| 1 | HEAT SPREADER | 308-13096-00 | 1 | |
| 2 | WASHER M3 FIBRE | 353-00010-15 | 1 | |
| 3 | INSULATING SIL PAD | 362-00010-07 | 2 | |
| 4 | INSULATING BUSH - TOP HAT | 362-00010-13 | 2 | |
| 5 | WASHER M3 FLAT ST BZ | 353-00010-10 | 5 | |
| 6 | SCREW M3x8 TAPTITE PAN POZI | 349-00020-32 | 7 | 6 |
| 7 | T806 PCB (POPULATED) | | 1 | |
| | | | | |

Figure 3.2 Semiconductor Mounting Details

# SECTION 4 INITIAL SET-UP & TESTING

## 4.1 INTRODUCTION

CAUTION: It is imperative to observe the precautions listed in Section 3.1.1.

During set-up and adjustment it is essential that the T806 is connected to the mains supply via an isolating transformer.

The T806 contains voltages that may be lethal and extreme care must be taken when working on a "powered up" supply.

## 4.2 TEST EQUIPMENT REQUIRED

| | |
|---|---|
| Mains isolating transformer | - 1kVA min. |
| Variac | - 1kVA min., 0-260V AC |
| High current variable resistor load | - 0-100 ohms, rated 12A or better |
| Ammeter | - 12A range (e.g. AVO meter) |
| Multimeter | |
| Oscilloscope | |

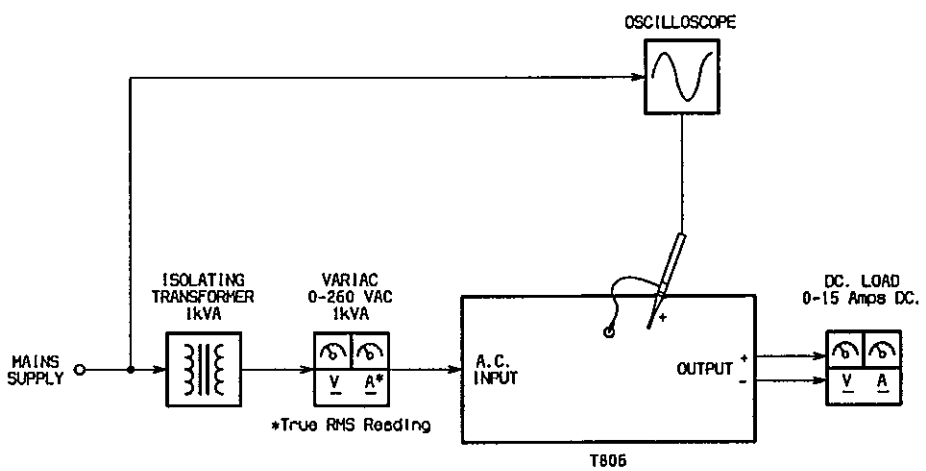



Figure 4.1 Test Equipment Set-Up

## 4.3 PRELIMINARY

Refer to the Circuit Diagram and PCB Layouts in Section 7.

Using a multimeter, check that both the negative leads and mounting tabs of D5 & D6 are electrically isolated from the chassis.

Connect the variable load in series with the ammeter across the output terminals.

Set the load to maximum resistance.

Connect the DC voltmeter across the output terminals of the connector.

Note: The DC output wiring should be of sufficient gauge to carry the load current required. It is recommended that a minimum wire size of 1.5mm$^2$ is used.

Plug in the mains connector.

## 4.4 THERMAL SHUTDOWN

Refer to the Circuit Diagram.

Before setting up the temperature shutdown, ensure that the power supply is at ambient temperature, i.e. it has not been running recently with any significant load current. The temperature shutdown is based on a heat spreader ambient temperature of 25°C.

Disconnect the variable resistor load.

Short pins 1 & 2 of the "LINK" together.

Switch on the T806.

Set RV26 so that the power supply just shuts down.

Switch off the T806.

Short pins 2 & 3 of the "LINK" together.

## 4.5 CURRENT LIMITING

The current limiter progressively reduces the output voltage when the current limit is exceeded (8-9A).

Reconnect the variable load resistance and set to zero (short circuit).

Check that the current is less than 10A.

Note: The magnetic components may produce audible noises during this test, particularly at short circuit.

## 4.6 REGULATION

Disconnect the variable load.

Set the output voltage (RV10) to 13.8V at the output connector.

Reconnect the variable load.

Increase the load to 6A and check that the output voltage is at least 13.5V.

## 4.7 LOW BATTERY CUT-OUT

Disconnect the variable load.

Set the output voltage (RV10) to 10.8V at the output connector.

Adjust RV11 until the relay triggers.

Reset RV10 for 13.8V at the output connector.

## 4.8 RIPPLE AND NOISE

Reconnect the variable load resistor and set for a reading of 6A on the current meter.

Check the ripple across the output terminals at 100Hz (50Hz mains), 120Hz (60Hz mains) and 40kHz, using an oscilloscope input that is floating with respect to earth.

Note: Connect the oscilloscope to the mains via an isolating transformer.

The readings should be as follows, with 120V AC (T806-10) or 230V AC (T806-20) in and 6A 13.8V DC out:

| | |
|---|---|
| 50Hz mains, 100Hz ripple ) | |
| 60Hz mains, 120Hz ripple ) | <40mV pp |
| high frequency noise | <10mV pp |

Check that the RMS level of the total ripple and noise is less than 10mV (use a suitable true RMS mV/meter or a wide band audio level meter).

# SECTION 5 FAULT FINDING

## 5.1 INTRODUCTION

The Fault Finding Charts and Wiring Diagrams found to the rear of this Section are intended to be used in conjunction with the Circuit Diagram and other PCB information found in Section 7, and with the Block Diagram and Circuit Description found in Section 2.

WARNING: **Observe the precautions outlined in Section 3.1.1 of this Manual before disassembling this unit.**

**Isolate this unit from the mains supply before removing the covers.**

## 5.2 VISUAL CHECKS

Refer to Section 3.2.3 for disassembly instructions.

Disconnect the power supply from the mains before removing the PCB from the chassis.

Inspect the PCB for damaged components and/or defective solder joints.

Check the fuse. If it is blown, check that the correct rating was fitted and fit a new fuse of the correct rating.

Note: If the fuse was of a lower rating and there are no signs of component damage, it may be worthwhile fitting a new fuse, replacing the covers and switching the supply on.

If the new fuse blows, proceed with fault finding as described in the following sections.

## 5.3 COMPONENT CHECKS

### 5.3.1 GENERAL

The checks listed in Section 5.3.2 have been included to provide assistance in locating faults. It is sometimes convenient to disable a complete section of the power supply in order to isolate a fault. If individual sections are isolated the rest of the unit should operate normally.

Faulty diodes and transistors can generally be found by a simple ohmmeter check. Set the ohmmeter to the ohms x 1 range and measure the front to back resistance of each junction. The resistance in one direction should be low - generally 30 to 100 ohms and the resistance in the other direction should be high (other components in the circuit may affect these readings unless the junctions are isolated).

In a faulty transistor or diode the junctions will usually be either short or open circuited.

### 5.3.2 POINTS TO CHECK

1. Dead time pin 4 IC1: <100mV (when thermal shutdown is inactive).
2. Vref pin 14 IC1: 5.0V.
3. Voltage across D2: 12.0V.

4. Using a scope probe, the voltage waveforms shown in Figures 5.1 and 5.2 should be observed during normal operation. Tracing the waveforms from IC1 pin 11, Q1 base, Q2 and Q3 base to Q4 and Q5 source should reveal which stages are at fault.

   Current waveforms are included in Figure 5.1 as an aid to understanding the circuit operation and the waveform test points are indicated in Figure 5.2.

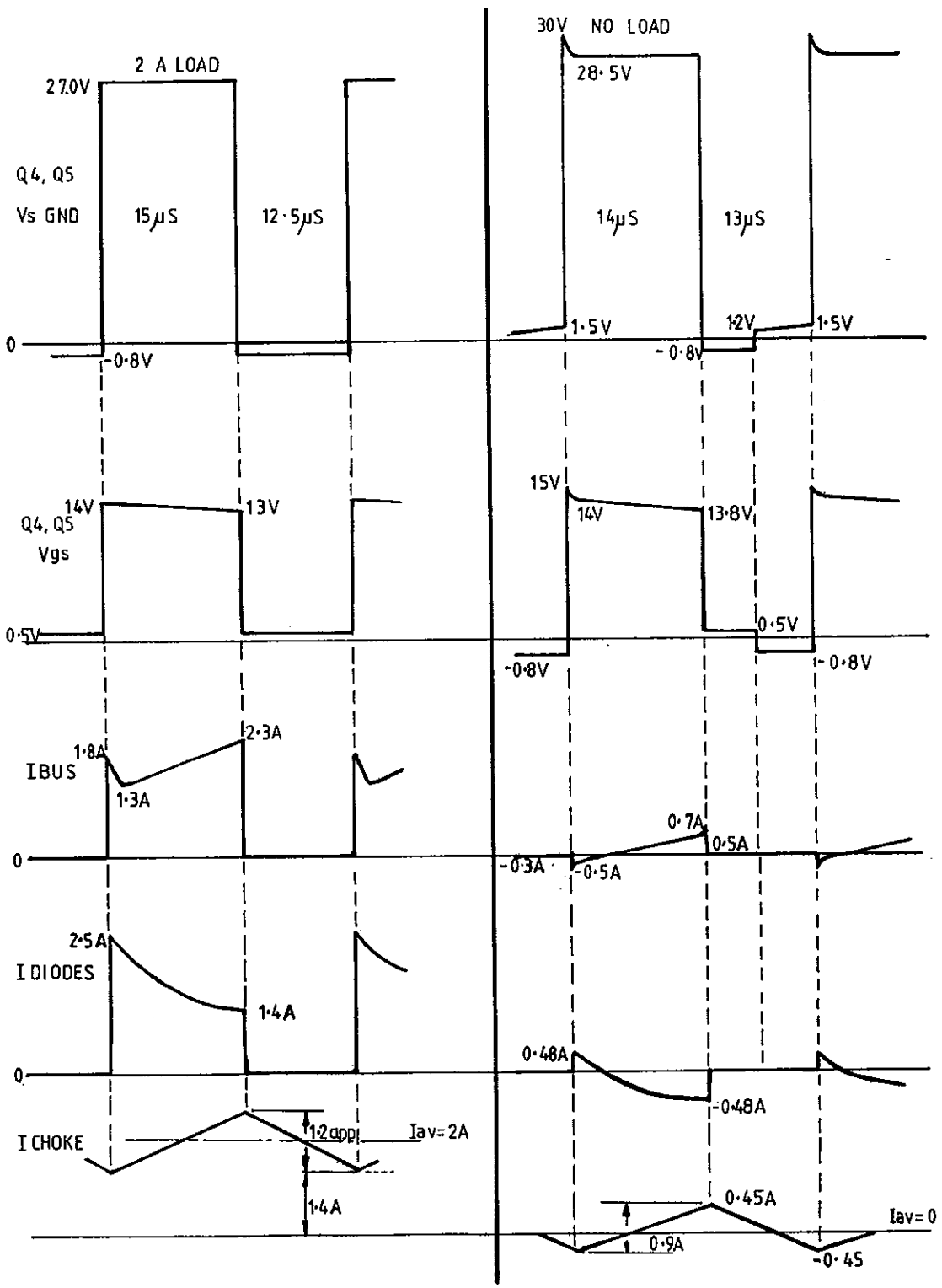



Figure 5.1 Voltage & Current Waveforms

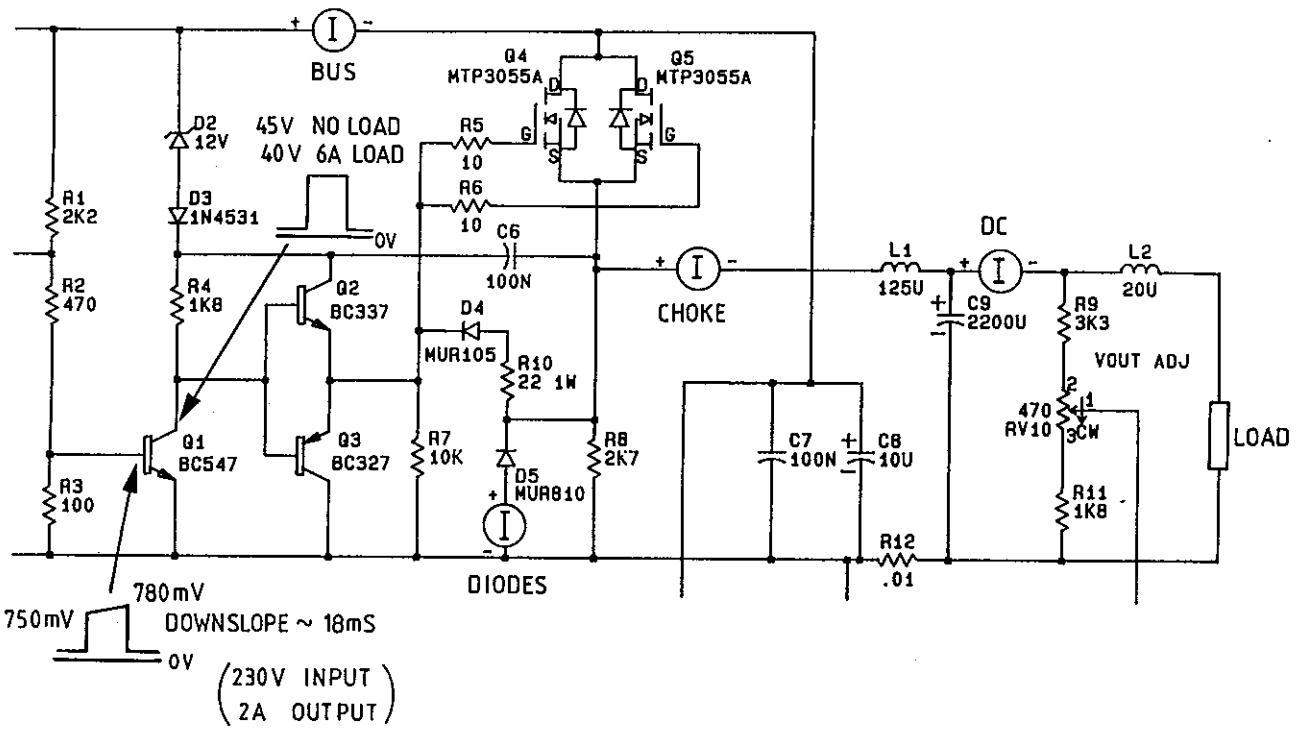
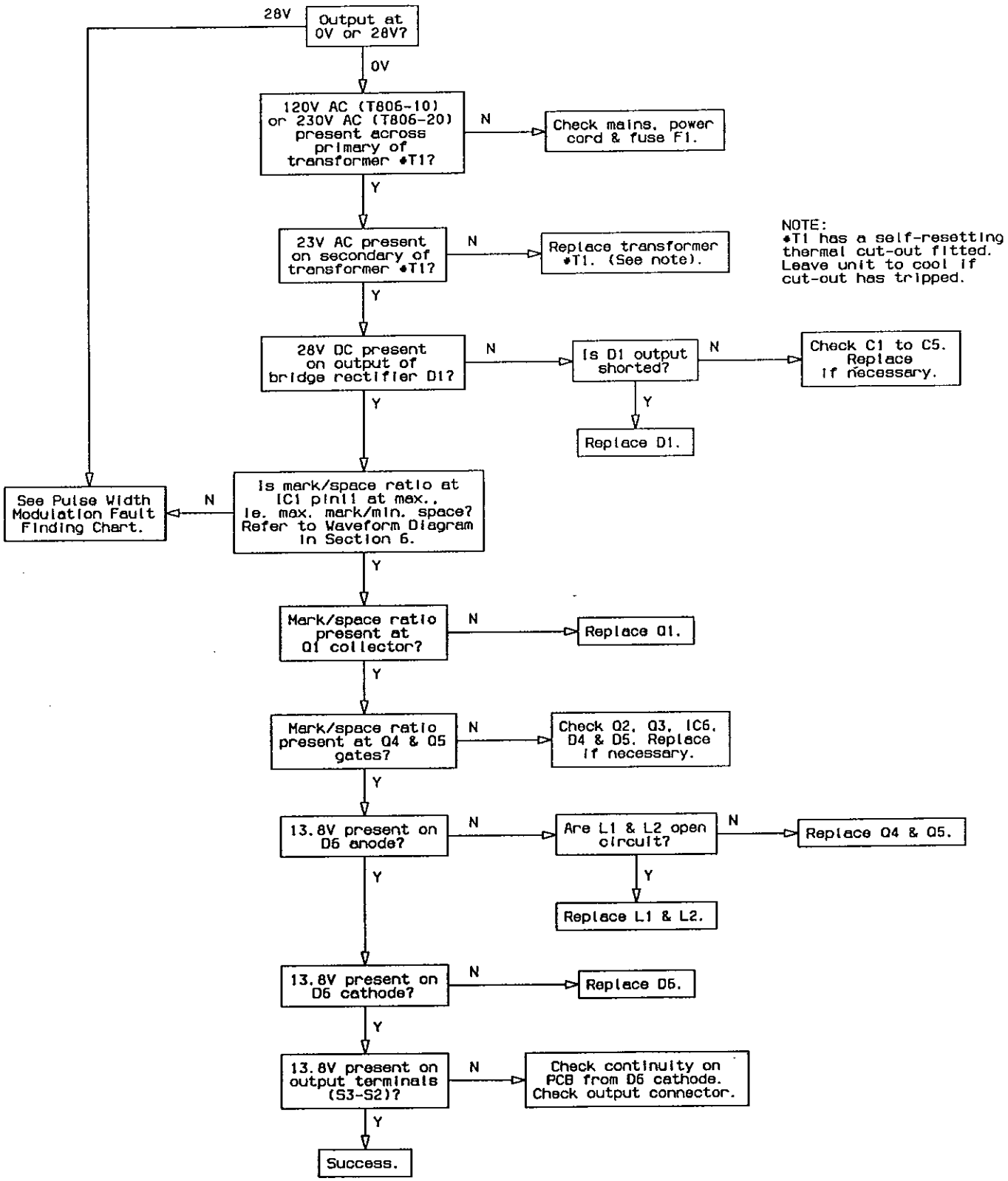
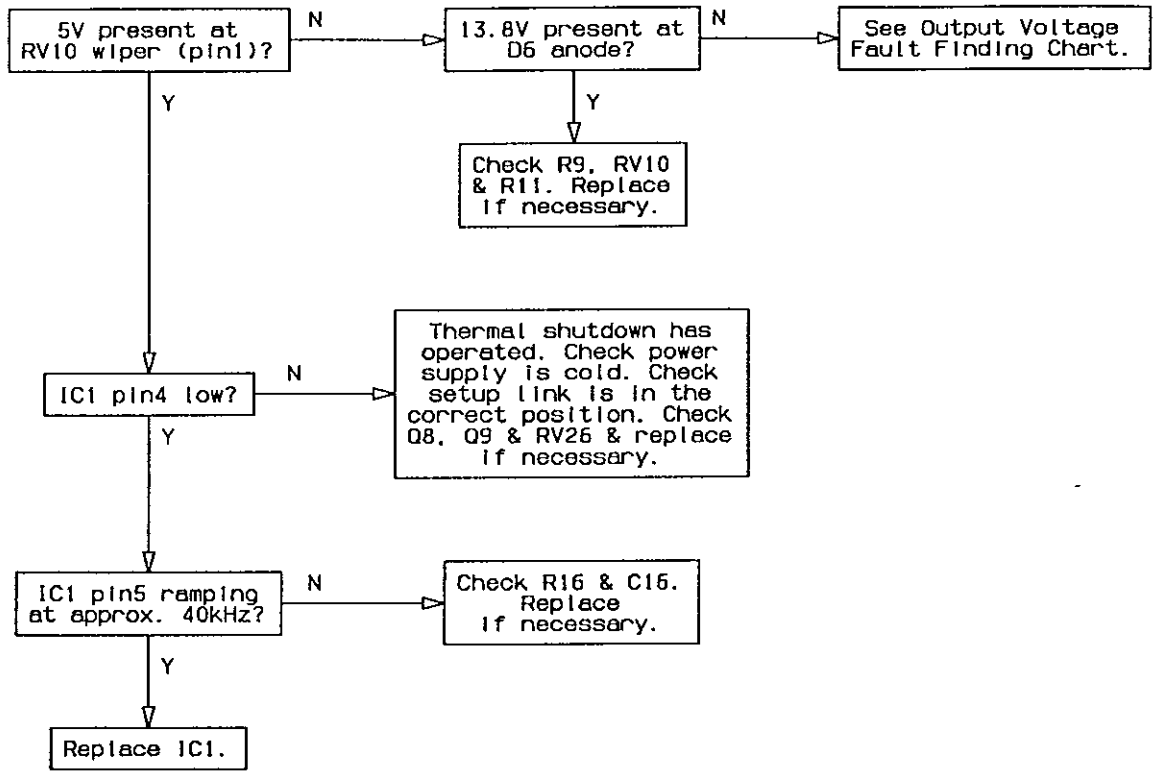



Figure 5.2 Voltage Waveforms and Current Waveform Test Points

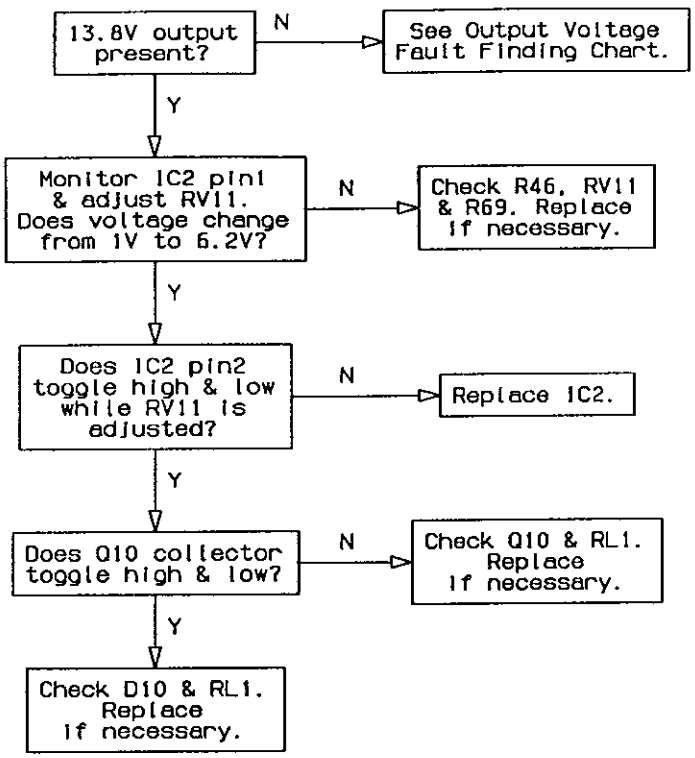
## 5.4 OUTPUT IS WRONG OR NOT PRESENT FAULT FINDING CHART



## 5.5 PULSE WIDTH MODULATION FAULT FINDING CHART



## 5.6 NO FLOAT CHARGE OUTPUT FAULT FINDING CHART



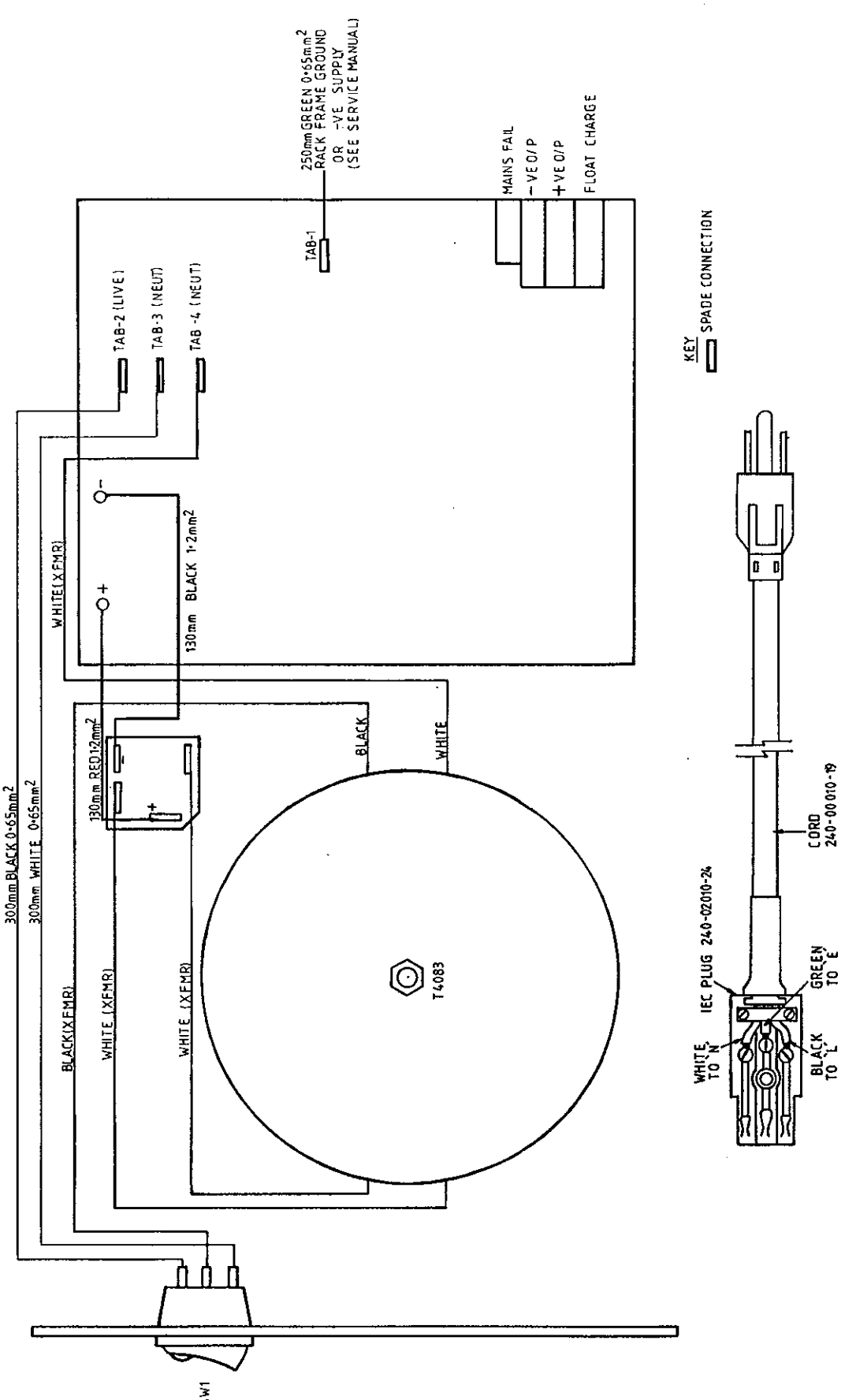



Figure 5.3 T806-10 Wiring Diagram

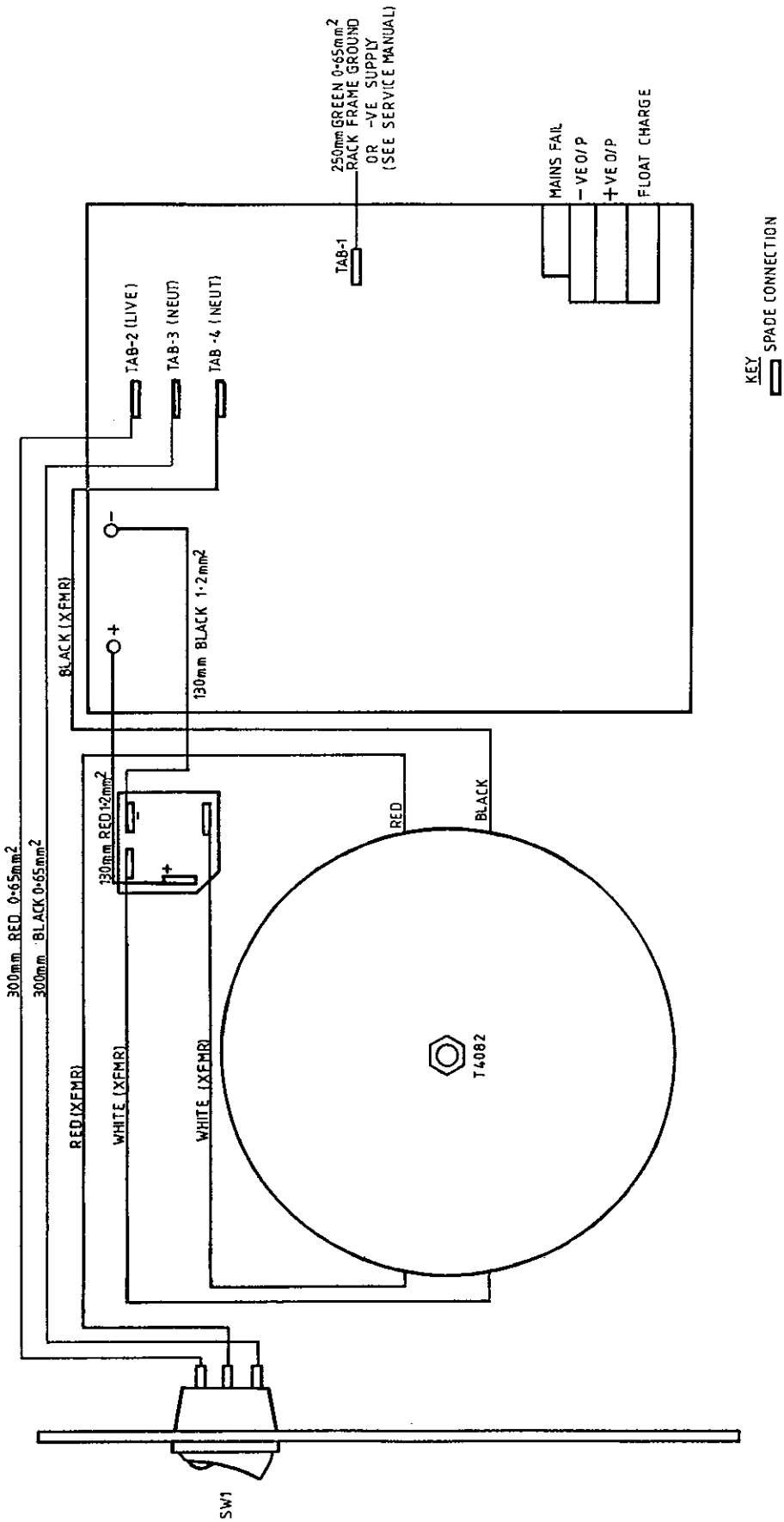



Figure 5.4 T806-20 Wiring Diagram

# SECTION 6 INSTALLATION

## 6.1 GENERAL

The T806 is supplied with a guide rail, spacer bar and mounting screws to maintain the front panel flush with other units in the rack (refer to Figure 6.1).

Use only an IEC type connector for normal mains input wiring and ensure that this wiring has a current rating of at least 3A.

The DC output wiring must be of sufficient gauge to carry the current required without excessive voltage drops. The minimum recommended wire size is 2.0mm$^2$ (e.g. 152/153 auto cable).

Although the T806 is a high efficiency switching power supply, a considerable amount of heat is generated during normal operation. An adequate flow of cooling air is therefore essential for reliable operation. **Do not** operate this unit in a completely enclosed cabinet.

If continuous operation at high ambient temperatures is necessary, forced air cooling is recommended for additional reliability. It is estimated that the average life expectancy of this unit will double with every 10°C drop in ambient temperature.

## 6.2 RACK FRAME EARTHING

The power supply case is internally connected to mains earth. Because the unit's case and the rack frame in which it is usually installed are painted, a secure electrical earthing connection between the unit and the rack is **not** guaranteed (i.e. it is reliant on breaking through the paint coating).

It is therefore strongly advised that an additional and secure electrical connection is provided by means of the supplied earth lead (see below). Failure to do so may result in harmful voltage potentials between the power supply and rack frame, and/or miscellaneous power supply switching noise problems in both receivers and transmitters.

Fit the "push-on" connector on one end of the earthing cable onto the earthing tab at the rear of the power supply.

Fit the slotted spade connector on the other end of the cable under a conveniently located screw on the rack frame, ensuring that a secure electrical and mechanical connection is achieved.

Alternatively, the slotted spade connector can be cut off and the earth wire fitted to a -DC rail terminal, either on the rear of the power supply or on a -DC rail (0V) terminal nearby. This should be done only if a mechanically and electrically secure connection between -DC rail and the rack frame is installed as part of the system.

## 6.3 NOISE INTERFERENCE SUPPRESSION EARTHING

### 6.3.1 INTRODUCTION

The problem of noise interference may occur in installations which include receivers and T806 power supplies. The procedures outlined in the following Sections will minimise the possibility of noise interference from three main sources:

- noise directly picked up via the aerial system if the receive aerial is within approximately 3 metres of the power supply;

- noise directly radiated into the receiver;
- noise carried via the 13.8V line to the receiver.

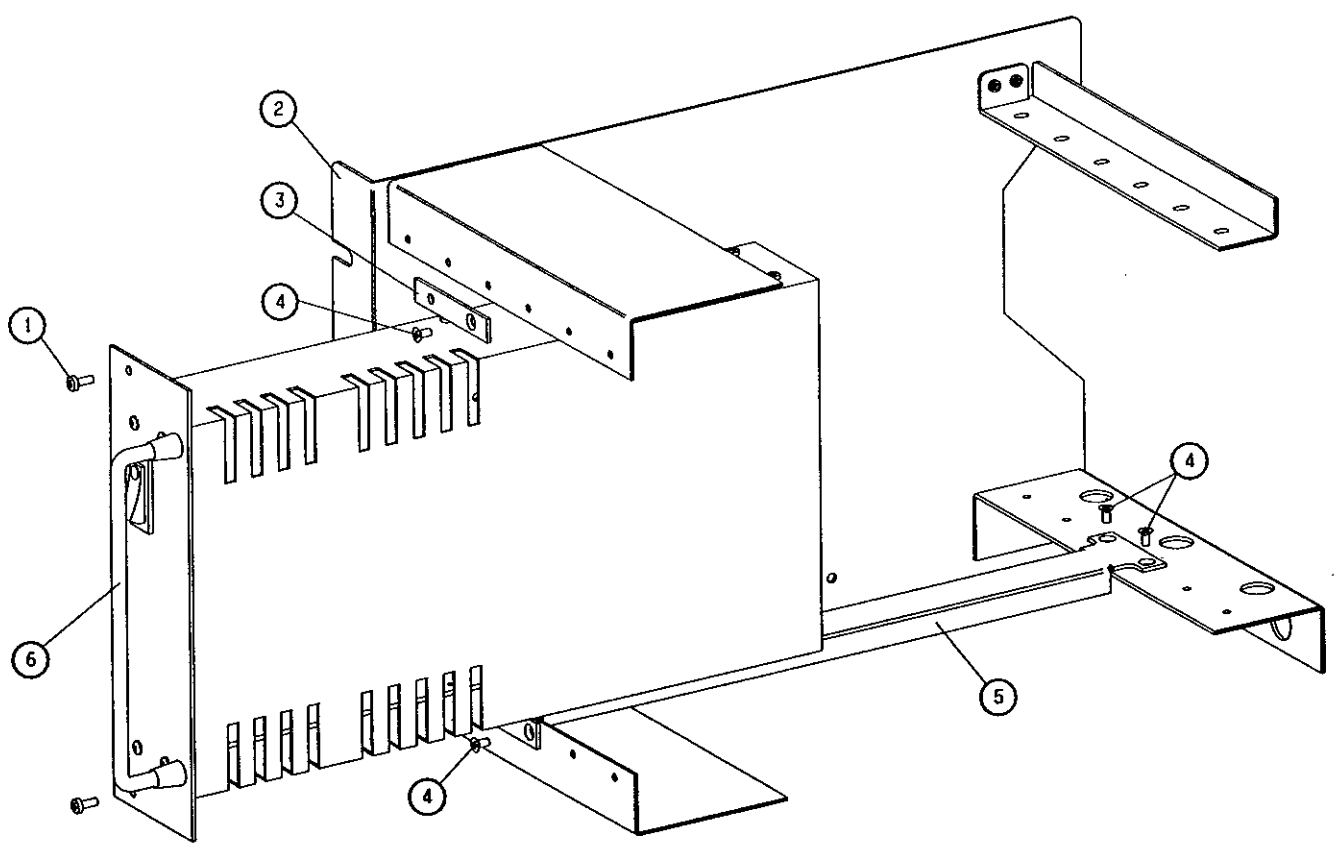
These procedures should also be followed to ensure that both the individual units and the rack frame are earthed to mains earth for reasons of mains safety.

### 6.3.2 MOUNTING

The T806 should be mounted as far as possible from the receiver, i.e. in a typical repeater system there should be a transmitter, duplexer and speaker panel between the power supply and the receiver. Mount the aerial at least 3m from the T806.

Fit the spacer bar to the upper front face of the rack frame and the guide rail to the lower face of the rack frame (refer to Figure 6.1) using the 4 M3 x 6mm countersunk screws.

Fit the T806 to the rack and secure with the 2 M3 x 8mm screws.




| ITEM | DESCRIPTION | IPN | QUANTITY |
|---|---|---|---|
| 1 | SCREW M3x8 PAN POZI | 345-00040-06 | 2 |
| 2 | RACK FRAME | 318-01016-00 | 1 |
| 3 | SPACER BAR | 319-30035-00 | 1 |
| 4 | SCREW M3x6 CSK | 345-00040-09 | 4 |
| 5 | GUIDE RAIL | 307-02029-10 | 1 |
| 6 | T806 POWER SUPPLY | - | 1 |
| | | | |

Figure 6.1 T806 Rack Mounting Details

### 6.3.3 EARTHING

Ensure that all the individual units (receiver, transmitter, power supply) are earthed to the front of the rack via the front panel and the rear of the rack frame via a separate earthing strap.

T806 power supplies already have the front panel earthed to the chassis. On other units, the upper and lower M3 x 8mm front panel mounting screws require M3 internal shakeproof washers (IPN 353-00010-13) to break through the paint and earth the front panel to the rack.

T806's have an earth terminal at the rear of the unit which should be connected securely to earth. Other units will require a strap from the chassis earth to the rack in the immediate vicinity of the unit. This can be done via the negative rail for each unit.

### 6.3.4 FILTERING

The 13.8V supply to the receiver can be filtered to prevent noise entering and desensing the receiver.

Fit one Tait No. 8 inductor (IPN 056-00010-08) in the positive lead and one in the negative lead.

Note: Fit the inductors to the receiver supply leads only. The maximum current handling capability of the No. 8 inductor is less than the T806 maximum output current.

## 6.4 FLOAT CHARGING A BATTERY

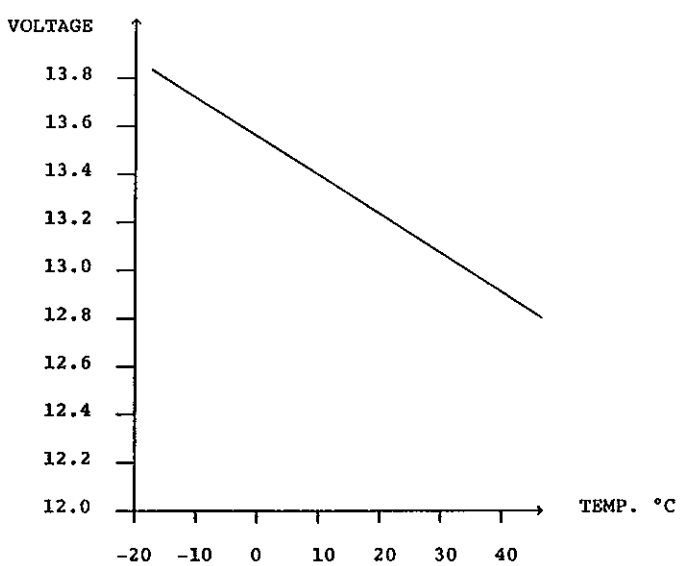



Figure 6.2 Output Voltage vs Ambient Temperature

The T806 power supply can be used to float charge a 12V battery under constant voltage conditions (e.g. a conventional lead acid battery). The current limit circuit will prevent the charging current from becoming excessive if the battery connected is completely discharged. However, connecting a completely discharged battery to a T806 which is supplying a repeater may result in insufficient remaining current capacity to power the repeater.

For short circuit and reverse polarity protection, it is recommended that a fuse of suitable rating is inserted in the battery line.

Before connecting the battery, turn the T806 on and measure the output voltage at the battery wires.

Using RV10, set the voltage to the value on the graph corresponding to the normal ambient temperature.

Note: The T806 does not compensate for the temperature dependence of lead acid batteries. The use of a constant voltage to float charge may result in damage to the battery if an excessive charging voltage is used.

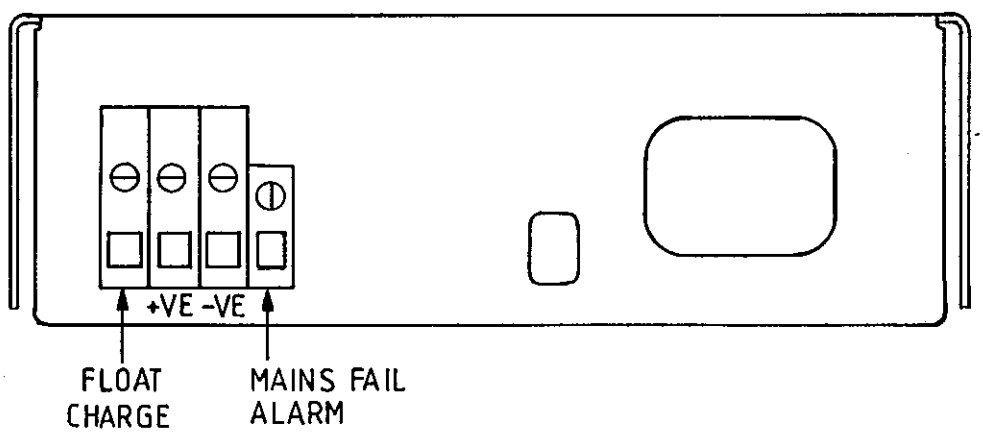



Figure 6.3 Rear Panel Connectors

## 6.5 MAINS AND/OR POWER SUPPLY FAILURE ALARM

A mains and/or power supply failure alarm output signal is available on the T806 rear panel for system monitoring purposes.

| | |
|---|---|
| Mains & power supply OK: | approx. +Vout (via 1k resistor - typ. 13.8V) |
| Mains &/or power supply failure: (with or without a battery across main DC output) | approx. -Vout (via 1k resistors - typ. 0V) |

This alarm output can be directly connected to an opto-coupler input of a T802 remote monitor unit.

# SECTION 7 PCB INFORMATION

## INTRODUCTION

### PARTS LIST

The 10 digit numbers (000-00000-00) in the parts lists are 'internal part numbers' (IPN's). Your spare parts orders can be handled more efficiently if you quote: equipment type, circuit reference and IPN, along with a brief description of the part.

The components listed in the parts lists are divided into two main types: those with a circuit reference (e.g. C201, D106, R121, etc) and those without (mechanical and miscellaneous).

Those with a circuit reference are grouped firstly by PCB, then by circuit designation in numerical order. Each component entry comprises three or four columns: the circuit reference, variant number (if applicable), IPN and description. A number in the variant column indicates that this particular component is fitted only to that variant.

The miscellaneous and mechanical section lists the variant and common parts in IPN order.

### GRID REFERENCE INDEX

To assist in locating components and labelled pads on the PCB Layouts and Circuit Diagram, a Component Grid Reference Index has been provided. This index lists the components and pads in alphabetical order, along with the appropriate alphanumeric grid references.

The first digit in the Circuit Diagram reference is the sheet number, and the last two characters give the location of the component on that sheet.

The first digit in the PCB Layout reference is a '1' or '2', indicating the top or bottom side layout respectively, and the last two characters give the location of the component on that diagram.

## T806-00 PARTS (IPN 220-01230-01)

| REF | VAR | IPN | DESCRIPTION |
|---|---|---|---|
| C1 | | 020-19220-01 | CAP ELECT RADL 2200M 35V 18X36MM |
| C2 | | 020-19220-01 | CAP ELECT RADL 2200M 35V 18X36MM |
| C3 | | 020-19220-01 | CAP ELECT RADL 2200M 35V 18X36MM |
| C4 | | 020-19220-01 | CAP ELECT RADL 2200M 35V 18X36MM |
| C5 | | 020-19220-01 | CAP ELECT RADL 2200M 35V 18X36MM |
| C6 | | 022-56100-10 | CAP MYLAR AI 100N 5% 63V POTTED |
| C7 | | 022-56100-10 | CAP MYLAR AI 100N 5% 63V POTTED |
| C8 | | 020-58100-03 | CAP ELECT AI RDL 10M 50V 5X11MM |
| C9 | | 020-19220-04 | CAP 2200M ELEC 35V 16X35 L ESR |
| C10 | | 020-09470-03 | CAP ELECT RADL 470M 16V 13X20MM LO ESR |
| C11 | | 017-15470-01 | CAP CER SURFACE BARRIER 47N 20% 50V |
| C12 | | 017-15470-01 | CAP CER SURFACE BARRIER 47N 20% 50V |
| C16 | | 022-55100-10 | CAP MYLAR AI 10N 5% 63V POTTED |
| C18 | | 022-54330-10 | CAP MYLAR AI 3N3 5% 63V POTTED |
| C19 | | 022-55220-10 | CAP MYLAR AI 22N 5% 63V POTTED |
| C20 | | 011-04100-02 | CAP CER 1N0 10% T/C B 50V |
| D1 | | 001-00011-37 | DIODE BRIDGE RECT 50V/25AMP |
| D2 | | 001-00015-20 | DIODE ZENER 12V 0.4W BZX79/C12 |
| D3 | | 001-50012-05 | DIODE AI 1N4531 SI SMALL SIG |
| D4 | | 001-00011-05 | DIODE MUR105 ULTRA FAST 50V 1AMP |
| D5 | | 001-00011-50 | DIODE MUR810 8A 100V FAST RECOVERY TO-220 |
| D6 | | 001-00016-35 | DIODE M8R1635 SCHOTTKY BARRIER RECT 15A 35V |
| D7 | | 001-00011-60 | DIODE SR2607 6A/30V |
| D10 | | 001-00011-70 | DIODE 1N4001 1A/50V |
| #F1 | 10 | 265-00010-46 | FUSE 1.5A CARTRIDGE 6*32MM SLOBLOW |
| #F1 | 20 | 265-00010-52 | FUSE 0.75A CARTRIDGE 6*32MM SLOBLOW |
| IC1 | | 002-00016-63 | IC TL494/594 SMPS PWM CTRL (S) |
| IC2 | | 002-00013-05 | IC MC34064P-5 UNDER VOLT SENSE TO-226 |
| LINK | | 240-00020-59 | HEADER 3 WAY 1 ROW PCB MTG |
| L1 | | 056-00010-47 | IND FXD 125UH PWR CHOKE TOROIDAL |
| L2 | | 056-00010-19 | IND FXD 20UH PWR CHOKE |
| Q1 | | 000-00011-10 | XSTR BC548B/BC547B NPN TO-92 AF SMALL SIG |
| Q2 | | 000-00010-66 | XSTR BC337 NPN TO-92 AF PWR |
| Q3 | | 000-00010-60 | XSTR BC327 PNP TO-92 AF PWR |
| Q4 | | 000-00012-64 | XSTR MPT3055AFI ENHCD N PWR MOSFET TO-220 |
| Q5 | | 000-00012-64 | XSTR MPT3055AFI ENHCD N PWR MOSFET TO-220 |
| Q8 | | 000-00011-10 | XSTR BC548B/BC547B NPN TO-92 AF SMALL SIG |
| Q9 | | 000-00011-91 | XSTR BD139 NPN TO-126 AF PWR |
| Q10 | | 000-00010-66 | XSTR BC337 NPN TO-92 AF PWR |
| R1 | | 030-54220-20 | RES FILM AI 2K2 5% 0.4W 4X1.6MM |
| *RL1 | | 237-00010-30 | RELAY 12V COIL 240V 10A SPDT |
| R2 | | 030-53470-20 | RES FILM AI 470E 5% 0.4W 4X1.6MM |
| R3 | | 030-53100-20 | RES FILM AI 100E 5% 0.4W 4X1.6MM |
| R4 | | 030-54180-20 | RES FILM AI 1K8 5% 0.4W 4X1.6MM |
| R5 | | 030-52100-20 | RES FILM AI 10E 5% 0.4W 4X1.6MM |
| R6 | | 030-52100-20 | RES FILM AI 10E 5% 0.4W 4X1.6MM |
| R7 | | 030-55100-20 | RES FILM AI 10K 5% 0.4W 4X1.6MM |
| R8 | | 030-54270-20 | RES FILM AI 2K7 5% 0.4W 4X1.6MM |
| R9 | | 030-54150-20 | RES FILM AI 1K5 5% 0.4W 4X1.6MM |
| R10 | | 032-32220-00 | RES M/F PWR 22E 5% 1W 12X4.5MM |
| RV10 | | 042-03470-06 | RES PRESET 470E CARBON 6MM FLAT |
| R11 | | 030-54100-20 | RES FILM AI 1K 5% 0.4W 4X1.6MM |
| RV11 | | 042-04470-06 | RES PRESET 4K7 CARBON 6MM FLAT |
| R12 | | 039-10023-74 | RES WIRE WOUND 0.01E A4M2374 T708 |
| R16 | | 030-54270-20 | RES FILM AI 2K7 5% 0.4W 4X1.6MM |
| R17 | | 030-55560-20 | RES FILM AI 56K 5% 0.4W 4X1.6MM |
| R18 | | 030-55100-20 | RES FILM AI 10K 5% 0.4W 4X1.6MM |
| R19 | | 030-54220-20 | RES FILM AI 2K2 5% 0.4W 4X1.6MM |
| R20 | | 030-54560-20 | RES FILM AI 5K6 5% 0.4W 4X1.6MM |
| R21 | | 030-53100-20 | RES FILM AI 100E 5% 0.4W 4X1.6MM |
| R22 | | 030-55220-20 | RES FILM AI 22K 5% 0.4W 4X1.6MM |
| R23 | | 030-54390-20 | RES FILM AI 3K9 5% 0.4W 4X1.6MM |
| R24 | | 030-54330-20 | RES FILM AI 3K3 5% 0.4W 4X1.6MM |
| R25 | | 030-54820-20 | RES FILM AI 8K2 5% 0.4W 4X1.6MM |
| RV26 | | 042-03470-06 | RES PRESET 470E CARBON 6MM FLAT |
| R44 | | 032-33180-00 | RES M/F PWR 180E 5% 1W 12X4.5MM |
| R45 | | 030-53100-20 | RES FILM AI 100E 5% 0.4W 4X1.6MM |
| R46 | | 030-54220-20 | RES FILM AI 2K2 5% 0.4W 4X1.6MM |
| R47 | | 030-54470-20 | RES FILM AI 4K7 5% 0.4W 4X1.6MM |
| R48 | | 030-54470-20 | RES FILM AI 4K7 5% 0.4W 4X1.6MM |
| R49 | | 030-53820-20 | RES FILM AI 820E 5% 0.4W 4X1.6MM |
| R50 | | 030-55100-20 | RES FILM AI 10K 5% 0.4W 4X1.6MM |
| SW1 | | 230-00010-24 | SWITCH ROCKER SPST 250V 16A PNL MTG ILLUM |
| S1 | | 240-00010-23 | PLUG 3 PIN 10AMP 250V PCB MTG |
| S2 | | 240-04030-06 | TRMNL BLOCK 1WAY PC MT PHOENIX |
| SP2 | | 356-00020-06 | RECEPTL 6.3MM QUICK CONNECT FLARED INSULATED |
| S3 | | 240-04030-06 | TRMNL BLOCK 1WAY PC MT PHOENIX |
| SP3 | | 356-00020-06 | RECEPTL 6.3MM QUICK CONNECT FLARED INSULATED |
| S4 | | 240-04030-06 | TRMNL BLOCK 1WAY PC MT PHOENIX |
| SP4 | | 356-00020-06 | RECEPTL 6.3MM QUICK CONNECT FLARED INSULATED |
| S5 | | 240-04030-07 | TERML BLK PCB MTG 1WAY FRT 2.5H/SA10 |
| TAB-1 | | 356-00020-21 | TAB 6.3MM RT ANGLE SPADE CAR QUICK CONN PCB MNT |
| #T1 | 10 | 053-01066-00 | XFMR TOROID T4083 FOR 120V T806 |
| #T1 | 20 | 053-01065-00 | XFMR TOROID T4082 FOR T806 |
| TAB-2 | | 356-00020-20 | TAB 6.3MM PCB MTG QUICK CONNECT |
| TAB-3 | | 356-00020-20 | TAB 6.3MM PCB MTG QUICK CONNECT |
| TAB-4 | | 356-00020-20 | TAB 6.3MM PCB MTG QUICK CONNECT |

## T806-00 MECHANICAL & MISCELLANEOUS PARTS

| IPN | DESCRIPTION |
|---|---|
| ###T806-10 VARIANT PARTS | |
| 201-00051-09 | WIRE .65MM2 HI TEMP 85PVC WHT |
| 240-00010-19 | PLUG US 3PIN MOULDED ON 2.4M FLEX 120V 10A |
| 240-02010-24 | SKT 3 WAY CORD MTG BULGIN 230V MAIN |
| ###T806-20 VARIANT PARTS | |
| 201-00051-02 | WIRE APPLC 0.65MM2 RED HI TEMP PVC85 |
| 240-02010-22 | SKT MAINS 3PIN FLEX 2M/10A |
| ###T806 COMMON PARTS | |
| 065-00010-20 | BEAD FERRITE BALUN 4B1 PHILIPS<br>BEAD1 (2X40MM SLEEVING 2X50MM 1.5MM TCW) |
| 200-00010-35 | WIRE T/C 1.5MM/1.4MM |
| 201-00051-05 | WIRE APPLC 0.65MM2 GREEN HI TEMP PVC85 |
| 201-00051-10 | WIRE APPLC 0.65MM2 BLACK HI TEMP PVC85 |
| 201-00051-12 | WIRE APPLC 1MM2 RED HI TEMP PVC85 |
| 201-00051-20 | WIRE APPLC 1MM2 BLACK HI TEMP PVC85 |
| 220-01230-01 | PCB T806 PWR SUPPLY |
| 240-04020-62 | SKT 2 WAY RECEPTL SHORTING LINK |
| 240-06010-27 | BLANKING PLATE 2.5MM GREEN |
| 303-11171-00 | CHASSIS A2M2631 COVER T806 ALUMINIUM |
| 303-23130-00 | COVER A2M2632 T806 SIDE ZINTEC |
| 306-01010-00 | FERRULE A4M948 HANDLE FXD EQUIP |
| 307-02029-00 | GUIDE REAR T807/808 A4M2409 |
| 308-01007-00 | HANDLE A4M949 FXD EQUIP |
| 308-13096-00 | HSINK A4M2634 HEAT SPREADER T806 ALUMIN.EXTRUS. |
| 316-06454-00 | PNL A3M2633/2 FRT SCRN T806 COMPL |
| 319-30035-00 | SPACER A4M1469 FRT PNL T359-02 |
| 340-00010-06 | FUSE CLIP PCB MTG 6.3MM CARTRIDGE FUSE |
| 340-00011-52 | COVER INSULATING FUSEHLDR PCB MTD |
| 345-00040-06 | SCREW M3*8MM PAN POZI ST BZ |
| 345-00040-06 | SCREW M3*8MM PAN POZI ST BZ |
| 345-00040-09 | SCREW M3*6MM CSK POZI TRUNCATED HEAD ST BZ |
| 345-00040-20 | SCREW M3*8MM BUTTON SKT HD BLACK ZINC PHOS |
| 345-00070-03 | SCREW M6X40MM BOLT BZ |
| 349-00010-10 | SCREW SELFTAP NO 4*1/4 IN TYPE AB PAN POZI BZ |
| 349-00010-10 | SCREW SELFTAP NO 4*1/4 IN TYPE AB PAN POZI BZ |
| 349-00020-32 | SCREW TAPTITE M3X8MM PAN POZI BZ |
| 352-00010-10 | NUT M4 COLD FORM HEX ST BZ |
| 352-00010-31 | NUT M6 NYLOC HEX |
| 353-00010-10 | WASHER M3 FLAT ST BZ 6.75MM OD A4M1215 |
| 353-00010-13 | WASHER M3 SHAKEPROOF INT BZ |
| 353-00010-15 | WASHER M3 FIBRE 8MM OD X 1MM |
| 353-00010-20 | WASHER M4 SHAKEPROOF INT BZ |
| 353-00010-24 | WASHER M4 FLAT ST BZ A4M1957 |
| 356-00020-06 | RECEPTL 6.3MM QUICK CONNECT FLARED INSULATED |
| 356-00020-07 | RECEPTL QUICK CONNECT RED M3.5 OPEN END TERMINL |
| 356-00020-07 | RECEPTL QUICK CONNECT RED M3.5 OPEN END TERMINL |
| 356-00020-23 | PIN 1.5MM PCB MTG PREFERRED<br>CTCSS |
| 362-00010-07 | GASKET SIL INSULATING TO-220 |
| 362-00010-13 | BUSH INSULATING 1.1MM TOP HAT |
| 365-00011-54 | LABEL WHITE RW1556/2 SPECIAL ADHESIVE |
| 365-00013-59 | LABEL T807/808 HI VOLTAGE WARNING A4A651 |
| 365-00100-03 | LABEL BLANK 10.8X30MM S/A METLSD POLYES |
| 365-00100-05 | LABEL BLANK 50X9MM S/A METLSD POLYES |
| 365-00100-20 | LABEL WHITE S/A 28X11MM QUIKSTIK RW718/4 |
| 369-00010-14 | TIE CABLE NYLON 100*2.6MM |
| 399-00010-51 | BAG PLASTIC 75*100MM |
| 400-00020-07 | SLEEVING 2MM SIL RUBBER |
| 410-01081-00 | CRTN T800 MODULE KIWI REF24408 PRTD 402X192X66MM |
| 410-01082-00 | CRTN 10 T800 KIWI REF24417 423X410X360 |

## T806 GRID REFERENCE INDEX (220-01230-01)

| DEVICE | PCB | CIRCUIT |
|---|---|---|
| BEAD1 | 1:H3 | 1-O5 |
| C1 | 1:B11 | 1-D5 |
| C2 | 1:B10 | 1-E5 |
| C3 | 1:C9 | 1-E5 |
| C4 | 1:D10 | 1-E5 |
| C5 | 1:D11 | 1-E5 |
| C6 | 1:C6 | 1-H5 |
| C7 | 1:B8 | 1-I5 |
| C8 | 1:B8 | 1-I5 |
| C9 | 1:F5 | 1-I5 |
| C10 | 1:B4 | 1-J5 |
| C11 | 1:H2 | 1-N5 |
| C12 | 1:H5 | 1-N4 |
| C16 | 1:F7 | 1-F2 |
| C18 | 1:F7 | 1-G3 |
| C19 | 1:F6 | 1-H3 |
| C20 | 1:D7 | 1-F3 |
| D1 | | 1-D6 |
| D2 | 1:D5 | 1-F6 |
| D3 | 1:D6 | 1-F6 |
| D4 | 1:C6 | 1-G5 |
| D5 | 1:A7 | 1-H5 |
| D6 | 1:A3 | 1-K5 |
| D7 | 1:H6 | 1-K5 |
| D10 | 1:G4 | 1-M5 |
| #F1 | 1:H10 | 1-B7 |
| IC1 | 1:F6 | 1-G2 |
| IC2 | 1:H5 | 1-L5 |
| LINK | 1:E6 | 1-I2 |
| | | 1-I2 |
| | | 1-I2 |
| | | 1-C0 |
| L1 | 1:D4 | 1-I5 |
| *LINK1 | 1:H2 | 1-L6 |
| *LINK2 | 1:G2 | 1-L6 |
| L2 | 1:B3 | 1-J5 |
| Q1 | 1:D7 | 1-F5 |
| Q2 | 1:C6 | 1-G5 |
| Q3 | 1:C7 | 1-G5 |
| Q4 | 1:A6 | 1-H6 |
| Q5 | 1:A5 | 1-H6 |
| Q8 | 1:D7 | 1-G2 |
| Q9 | 1:A8 | 1-H2 |
| Q10 | 1:G5 | 1-M5 |
| *RL1 | 1:G3 | 1-M5 |
| | | 1-M6 |
| | | 1-N6 |
| R1 | 1:D7 | 1-F6 |
| R2 | 1:E7 | 1-F5 |
| R3 | 1:C6 | 1-F4 |
| R4 | 1:C6 | 1-F5 |
| R5 | 1:B5 | 1-G6 |
| R6 | 1:B5 | 1-G6 |
| R7 | 1:C6 | 1-G5 |
| R8 | 1:B7 | 1-H5 |
| R9 | 1:E8 | 1-J5 |
| R10 | 1:B6 | 1-H5 |
| RV10 | 1:E8 | 1-J5 |
| RV11 | 1:H6 | 1-L5 |
| R11 | 1:E8 | 1-J4 |
| R12 | 1:G5 | 1-I4 |
| R16 | 1:F7 | 1-F2 |
| R17 | 1:F6 | 1-H3 |
| R18 | 1:F5 | 1-H3 |
| R19 | 1:F5 | 1-H3 |
| R20 | 1:E6 | 1-I3 |
| R21 | 1:E8 | 1-I3 |
| R22 | 1:F5 | 1-H2 |
| R23 | 1:D5 | 1-H2 |
| R24 | 1:D5 | 1-H2 |
| R25 | 1:E5 | 1-I2 |
| RV26 | 1:D6 | 1-I2 |
| R44 | 1:G6 | 1-K5 |
| R45 | 1:D7 | 1-F4 |
| R46 | 1:G6 | 1-L5 |
| R47 | 1:G6 | 1-M5 |
| R48 | 1:G6 | 1-M4 |
| R49 | 1:H6 | 1-L4 |
| R50 | 1:H4 | 1-L7 |
| SW1 | | 1-C6 |
| S1 | 1:J11 | 1-B5 |
| | | 1-B6 |
| | | 1-B4 |
| | | 1-A0 |
| SP2 | | 1-B6 |
| S2 | 1:J4 | 1-P4 |
| SP3 | | 1-B6 |
| S3 | 1:J3 | 1-P5 |
| SP4 | | 1-C5 |

| DEVICE | PCB | CIRCUIT |
|---|---|---|
| S4 | 1:J3 | 1-P6 |
| S5 | 1:J4 | 1-P7 |
| #T1 | | 1-C7 |
| TAB-1 | 1:J8 | 1-C4 |
| TAB-2 | 1:G12 | 1-B6 |
| TAB-3 | 1:G11 | 1-B5 |
| TAB-4 | 1:G11 | 1-C5 |

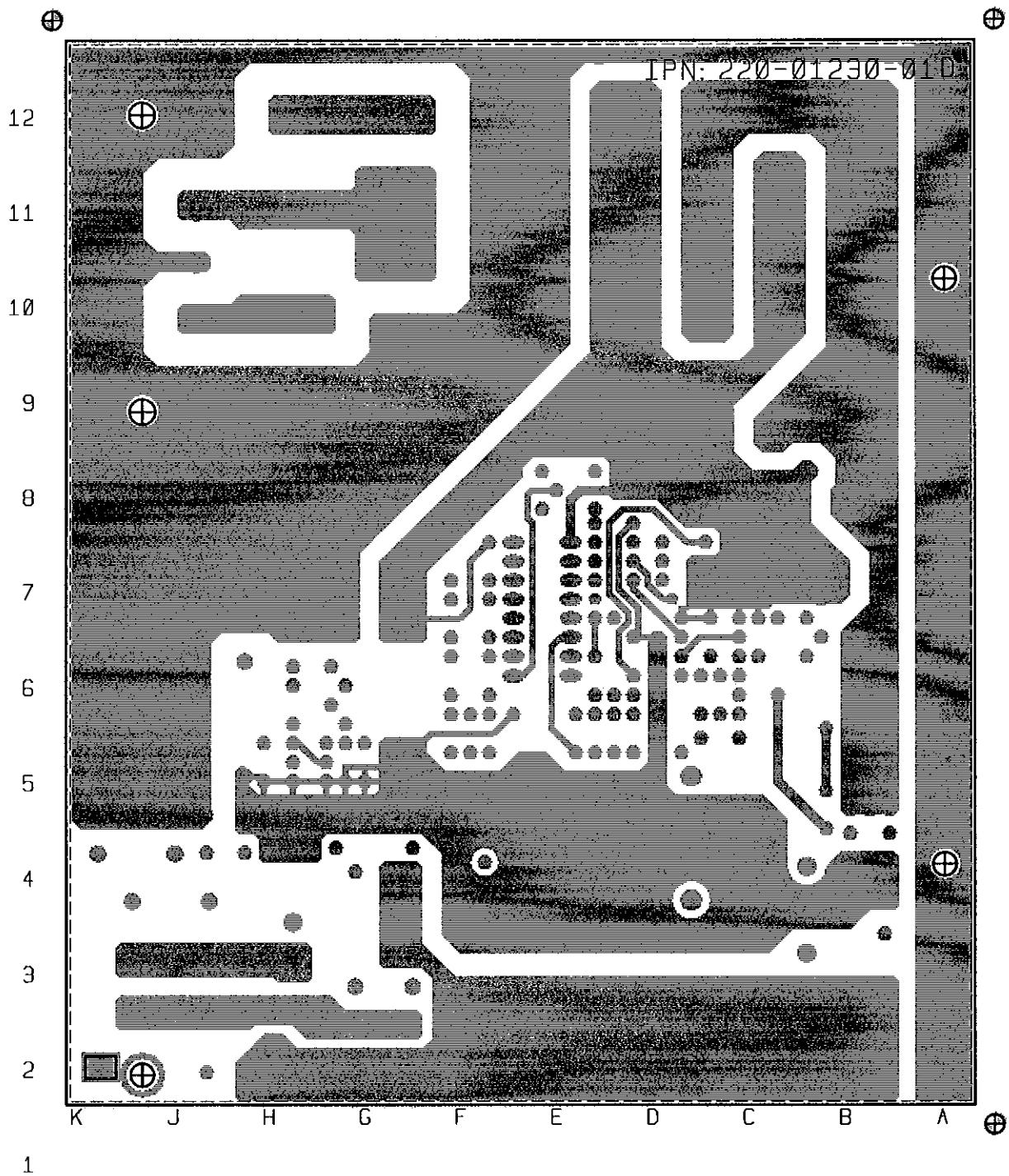



DIAGRAM 1 T806 PCB LAYOUT - BOTTOM SIDE

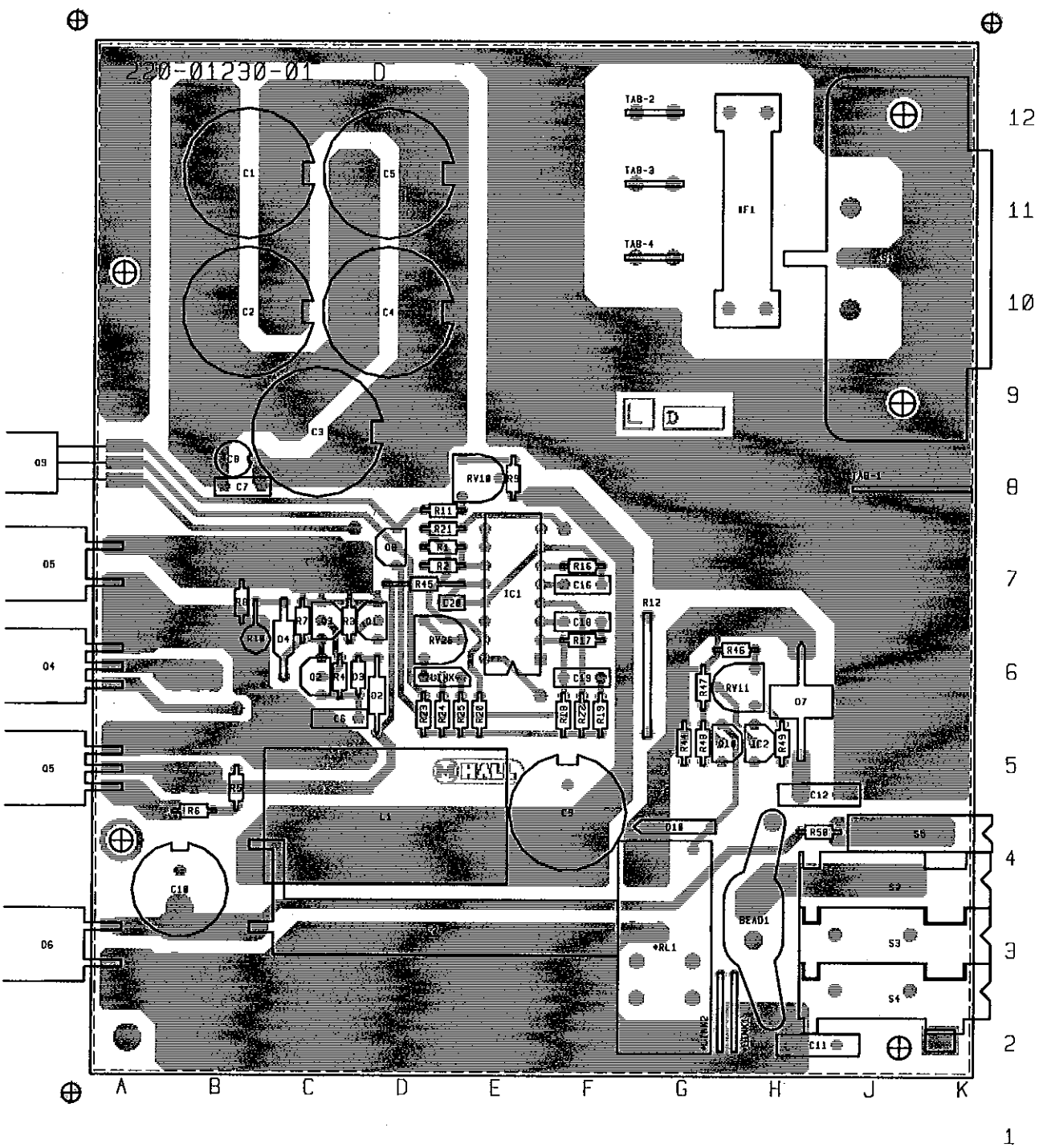



DIAGRAM 2 T806 PCB LAYOUT - TOP SIDE

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