

# **T3000 Series II Service Manual**

**Issue 202**

**May 1998**

**M3000-00-202**



**Corporate Head Office &  
Manufacturing, New Zealand**

Tait Electronics Ltd  
Phone: +64-3-358 3399  
Fax: +64-3-358 0340  
E-mail: tait@taitworld.com

**Australia**

Tait Electronics (Aust) Pty Ltd  
Phone: +61-7-3865 7799  
Fax: +61-7-3865 7990  
E-mail: australia@taitworld.com

**Beijing**

Tait Mobile Radio (Hong Kong) Ltd  
Phone: +86-10-6510 2680  
Fax: +86-10-6510 2686  
E-mail: beijing@taitworld.com

**Canada**

Tait Mobile Radio Inc  
Phone: +1-905-472 1100  
Fax: +1-905-472 5300  
E-mail: canada@taitworld.com

**France**

Tait France S.A.R.L.  
Phone: +33-1-41 14 05 50  
Fax: +33-1-41 14 05 55  
E-mail: france@taitworld.com

**Germany**

Tait Mobilfunk GmbH  
Phone: +49-911-967 460  
Fax: +49-911-967 4679  
E-mail: germany@taitworld.com

**New Zealand**

Tait Communications Ltd  
Phone: +64-3-348 3301  
Fax: +64-3-343 0558  
E-mail: newzealand@taitworld.com

**Tait Europe**

Regional Head Office, United Kingdom  
Tait Mobile Radio Ltd  
Phone: +44-1480 52255  
Fax: +44-1480 411996  
E-mail: unitedkingdom@taitworld.com

**Tait North Asia**

Regional Head Office, Hong Kong  
Tait Mobile Radio (Hong Kong) Ltd  
Phone: +852-2369 3040  
Fax: +852-2369 3009  
E-mail: hongkong@taitworld.com

**Tait South East Asia**

Regional Head Office, Singapore  
Tait Electronics (Far East) Pte Ltd  
Phone: +65-471 2688  
Fax: +65-479 7778  
E-mail: singapore@taitworld.com

**Taiwan**

Tait Mobile Radio (Taiwan) Ltd  
Phone: +886-2 2731 1290  
Fax: +886-2-2711 6351  
E-mail: taiwan@taitworld.com

**Thailand**

Tait Mobile Radio Ltd  
Phone: +662-267 6290  
Fax: +662-267 6293  
E-mail: thailand@taitworld.com

**USA**

Tait Electronics (USA) Inc  
Phone: +1-713-984 8684  
Fax: +1-713-468 6944  
E-mail: usa@taitworld.com



**Errors**

If you find an error in this manual, or have a suggestion on how it might be improved, please do not hesitate to contact the Technical Writer, Product Support Group, Tait Mobile Radio Division, Tait Electronics Ltd, P.O. Box 1645, Christchurch, New Zealand.

## 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 Mobile Radio Division, Tait Electronics Ltd, Christchurch, New Zealand.

## Updating Equipment And Manuals

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

## Copyright

All information contained in this manual is the property of Tait Electronics Ltd. All rights are reserved. This manual may not, in whole or part, be copied, photocopied, reproduced, translated stored or reduced to any electronic medium or machine readable form without prior written permission from Tait Electronics Ltd.

## Ordering Tait Service Manuals

Service Manuals should be ordered from your nearest Tait Branch or approved Dealer. When ordering, quote the Tait product code and, where applicable, the version.

## Date Of Issue

M3000-00-200	T3000 Series II Service Manual Issue 200 published May 1996 Issue 201 published June 1997 (Revision R3000-00-201) Issue 202 published May 1998 (Revision R3000-00-202)
--------------	---

## List Of Effective Pages

The total number of pages in this Manual is 500, as listed below.

Page	Issue Date		
		3.4	30/09/97
		3.5	30/04/96
1	30/09/97	3.6	30/04/96
2	30/09/97	3.7	30/09/97
3	30/04/96	3.8	30/04/96
4	30/09/97	3.9	30/04/96
5	30/09/97	3.10	30/04/96
6	30/09/97	3.11	30/04/96
7	30/09/97	3.12	30/04/96
8	30/09/97	3.13	30/04/96
9	30/09/97	3.14	30/04/96
10	30/09/97	3.15	30/04/96
11	30/09/97	3.16	30/04/96
12	30/09/97	3.17	30/04/96
13	30/09/97	3.18	30/04/96
14	30/09/97	4.1	30/04/96
15	30/09/97	4.2	30/04/96
16	30/09/97	4.3	30/09/97
17	30/09/97	4.4	30/04/96
18	30/09/97	4.5	30/04/96
1.1	30/09/97	4.6	30/04/96
1.2	30/09/97	4.7	30/04/96
1.3	30/09/97	4.8	30/04/96
1.4	30/09/97	4.9	30/04/96
1.5	30/09/97	4.10	30/04/96
1.6	30/09/97	4.11	30/04/96
1.7	30/09/97	4.12	30/04/96
1.8	30/09/97	4.13	30/04/96
1.9	30/09/97	4.14	30/04/96
1.10	30/09/97	4.15	30/04/96
1.11	30/09/97	4.16	30/04/96
1.12	30/09/97	4.17	30/04/96
1.13	30/09/97	4.18	30/04/96
1.14	30/09/97	4.19	30/04/96
2.1	30/04/96	4.20	30/04/96
2.2	30/04/96	4.21	30/04/96
2.3	30/04/96	4.22	30/04/96
2.4	30/04/96	4.23	30/04/96
2.5	30/04/96	4.24	30/04/96
2.6	30/04/96	4.25	30/04/96
2.7	30/04/96	4.26	30/04/96
2.8	30/04/96	4.27	30/04/96
2.9	30/04/96	4.28	30/04/96
2.10	30/04/96	4.29	30/04/96
2.11	30/04/96	4.30	30/04/96
2.12	blank	4.31	30/04/96
3.1	30/09/97	4.32	30/04/96
3.2	30/09/97	4.33	30/04/96
3.3	30/04/96	4.34	blank

5.1	30/04/96	6.6.1	30/04/96
5.2	30/04/96	6.6.2	blank
5.3	30/04/96	6.6.3	30/04/96
5.4	30/04/96	6.6.4	30/04/96
5.5	30/04/96	6.6.5	30/04/96
5.6	30/04/96	6.6.6	blank
5.7	30/04/96	6.7.1	30/04/96
5.8	30/04/96	6.7.2	blank
5.9	30/04/96	6.7.3	30/04/96
5.10	30/04/96	6.7.4	30/04/96
5.11	30/04/96	6.7.5	30/04/96
5.12	30/04/96	6.7.6	blank
5.13	30/04/96	6.8.1	31/05/97
5.14	30/04/96	6.8.2	blank
5.15	30/04/96	6.8.3	30/04/96
5.16	30/04/96	6.8.4	30/04/96
5.17	30/04/96	6.8.5	31/05/97
5.18	blank	6.8.6	blank
5.19	30/04/96 (fold-out)	6.9.1	31/05/97
5.20	blank	6.9.2	blank
6.1.1	30/09/97	6.9.3	30/04/96
6.1.2	30/09/97	6.9.4	30/04/96
6.2.1	30/04/96	6.9.5	30/04/96
6.2.2	blank	6.9.6	blank
6.3.1	30/04/96	6.10.1	30/04/96
6.3.2	30/04/96	6.10.2	30/04/96
6.4.1	30/04/96	6.10.3	30/04/96
6.4.2	blank	6.10.4	30/04/96
6.4.3	30/04/96	6.10.5	30/04/96
6.4.4	30/04/96	6.10.6	30/04/96
6.4.5	30/04/96	6.10.7	30/04/94
6.4.6	blank	6.10.8	30/04/94
6.5.1	31/05/97	6.10.9	30/04/96
6.5.2	30/04/96	6.10.10	blank
6.5.3	30/04/96	6.10.11	30/04/96
6.5.4	30/04/96	6.10.12	blank
6.5.5	30/04/96	6.10.13	30/04/96
6.5.6	30/04/96	6.10.14	blank
6.5.7a	30/04/96	6.10.15	30/04/96
6.5.8a	30/04/96	6.10.16	blank
6.5.7	30/04/94	6.10.17	30/04/96
6.5.8	30/04/94	6.10.18	blank
6.5.9	30/04/96	6.10.19	31/05/97
6.5.10	blank	6.10.20	31/05/97
6.5.11	30/04/96	6.10.21	31/05/97
6.5.12	blank	6.10.22	31/05/97
6.5.13	30/04/96	6.10.23	31/05/97
6.5.14	blank	6.10.24	30/04/96
6.5.15	30/04/96	6.10.25	30/04/96
6.5.16	blank	6.10.26	blank
6.5.17	30/04/96	6.10.27	30/06/95
6.5.18	blank	6.10.28	30/06/95
6.5.19	30/04/96	6.10.29	30/04/96
6.5.20	blank	6.10.30	blank

6.10.31	30/04/96		6.12.21	30/09/97	
6.10.32	blank		6.12.22	30/09/97	
6.10.33	30/04/96		6.12.23	30/09/97	
6.10.34	blank		6.12.24	30/09/97	
6.10.35	30/04/96		6.12.25	30/09/97	(fold-out)
6.10.36	blank		6.12.26	30/09/97	(fold-out)
6.11.1	30/04/96		6.12.27	30/09/97	(fold-out)
6.11.2	30/04/96		6.12.28	blank	
6.11.3	30/04/96		6.12.29	30/09/97	(fold-out)
6.11.4	30/04/96		6.12.30	blank	
6.11.5	30/04/96		6.12.31	30/09/97	(fold-out)
6.11.6	30/04/96		6.12.32	blank	
6.11.7	30/04/96		6.13.1	30/09/97	
6.11.8	blank		6.13.2	30/09/97	
6.11.9	30/04/94	(fold-out)	6.13.3	30/09/97	
6.11.10	30/04/94	(fold-out)	6.13.4	30/09/97	
6.11.11	30/04/96	(fold-out)	6.13.5	30/09/97	
6.11.12	blank		6.13.6	30/09/97	
6.11.13	30/04/96	(fold-out)	6.13.7	30/09/97	
6.11.14	blank		6.13.8	30/09/97	
6.11.15	30/09/97		6.13.9	30/09/97	
6.11.16	30/09/97		6.13.10	blank	
6.11.17	30/09/97		6.13.11	30/09/97	
6.11.18	30/09/97		6.13.12	blank	
6.11.19	30/09/97		6.13.13	30/09/97	
6.11.20	30/09/97		6.13.14	blank	
6.11.21	30/04/96		6.13.15	30/09/97	
6.11.22	blank		6.13.16	blank	
6.11.23	30/04/96	(fold-out)	6.14.1	30/09/97	
6.11.24	30/04/96	(fold-out)	6.14.3	30/09/97	
6.11.25	30/04/96	(fold-out)	6.14.4	30/09/97	
6.11.26	blank		6.14.5	30/09/97	
6.11.27	30/04/96	(fold-out)	6.14.6	30/09/97	
6.11.28	blank		6.14.7	30/09/97	
6.12.1	31/05/97		6.14.8	30/09/97	
6.12.2	30/04/96		6.14.9	30/09/97	
6.12.3	30/04/96		6.14.10	blank	
6.12.4	30/04/96		6.14.11	30/09/97	
6.12.5	30/04/96		6.14.12	blank	
6.12.6	30/04/96		6.14.13	30/09/97	
6.12.7	30/04/96		6.14.14	blank	
6.12.8	30/04/96		6.14.15	30/09/97	
6.12.9	30/04/94	(fold-out)	6.14.16	blank	
6.12.10	30/04/94	(fold-out)	6.15.1	30/09/97	
6.12.11	30/04/96	(fold-out)	6.15.2	blank	
6.12.12	30/04/96		6.15.3	30/09/97	
6.12.13	30/04/96	(fold-out)	6.15.4	30/09/97	
6.12.14	blank		6.15.5	30/09/97	
6.12.15	30/04/96	(fold-out)	6.15.6	blank	
6.12.16	blank		6.16.1	30/09/97	
6.12.17	30/09/97		6.16.3	30/09/97	
6.12.18	30/09/97		6.16.4	30/09/97	
6.12.19	30/09/97		6.16.5	30/09/97	
6.12.20	30/09/97		6.16.6	30/09/97	

6.16.7	30/09/97	7.8.9	30/09/97
6.16.8	30/09/97	7.8.10	30/09/97
6.16.9	30/09/97	7.8.11	30/09/97
6.16.10	blank	7.8.12	blank
6.16.11	30/09/97	7.9.1	30/04/96
6.16.12	blank	7.9.2	30/04/96
6.16.13	30/09/97	7.9.3	30/04/96
6.16.14	blank	7.9.4	30/04/96
6.16.15	30/09/97	7.9.5	30/04/96
6.16.16	blank	7.9.6	30/04/96
6.17.1	30/09/97	7.9.7	31/05/97
6.17.2	30/09/97	7.9.8	blank
6.17.3	30/09/97	7.9.9	30/04/96
6.17.4	30/09/97	7.9.10	30/04/96
6.17.5	30/09/97	7.9.11	30/04/96
6.17.6	30/09/97	7.9.12	blank
6.17.7	30/09/97	7.9.13	30/04/96
6.17.8	30/09/97	7.9.14	blank
6.17.9	30/09/97	7.10.1	30/04/96
6.17.10	blank	7.10.2	30/04/96
6.17.11	30/09/97	7.10.3	30/04/96
6.17.12	blank	7.10.4	30/04/96
6.17.13	30/09/97	7.10.5	30/04/96
6.17.14	blank	7.10.6	blank
6.17.15	30/09/97	7.10.7	30/04/96
6.17.16	blank	7.10.8	30/04/96
7.1.1	30/04/96	7.10.9	30/04/96
7.1.2	30/09/97	7.10.10	30/04/96
7.1.3	30/09/97	7.10.11	30/04/96
7.1.4	blank	7.10.12	blank
7.2.1	30/04/96	7.11.1	30/04/96
7.2.2	30/04/96	7.11.2	30/04/96
7.2.3	30/04/96	7.11.3	30/04/96
7.2.4	blank	7.11.4	30/04/96
7.3.1	30/04/96	7.11.5	30/04/96
7.3.2	blank	7.11.6	30/04/96
7.4.1	30/04/96	7.11.7	30/04/96
7.4.2	30/04/96	7.11.8	30/04/96
7.5.1	30/04/96	7.11.9	30/04/96
7.5.2	30/04/96	7.11.10	blank
7.5.3	30/04/96	7.12.1	30/04/96
7.5.4	blank	7.12.2	30/04/96
7.6.1	30/04/96	7.12.3	30/04/96
7.6.2	blank	7.12.4	30/04/96
7.7.1	30/04/96	7.12.5	30/04/96
7.7.2	blank	7.12.6	30/04/96
7.8.1	30/04/96	7.12.7	30/04/96
7.8.2	30/04/96	7.12.8	30/04/96
7.8.3	30/04/96	7.12.9	30/04/96
7.8.4	30/04/96	7.12.10	30/04/96
7.8.5	30/04/96	7.12.11	30/04/96 (fold-out)
7.8.6	30/04/96	7.12.12	30/04/96 (fold-out)
7.8.7	30/04/96	7.12.13	30/04/96 (fold-out)
7.8.8	30/09/97	7.12.14	blank



8.1.1	30/09/97	8.2.49	30/09/97
8.1.2	blank	8.2.50	blank
8.1.3	30/09/97	8.2.51	30/09/97
8.1.4	30/09/97	8.2.52	30/09/97
8.1.5	30/09/97	8.2.53	30/09/97
8.1.6	blank	8.2.54	30/09/97
8.2.1	30/09/97	8.2.55	30/09/97
8.2.2	blank	8.2.56	30/09/97
8.2.3	30/09/97	8.2.57	30/09/97
8.2.4	30/09/97	8.2.58	30/09/97
8.2.5	30/09/97	8.2.59	30/09/97 (fold-out)
8.2.6	30/09/97	8.2.60	30/09/97 (fold-out)
8.2.7	30/09/97	8.2.61	30/09/97 (fold-out)
8.2.8	30/09/97	8.2.62	blank
8.2.9	30/09/97	8.2.63	30/09/97
8.2.10	30/09/97	8.2.64	blank
8.2.11	30/09/97	8.2.65	30/09/97
8.2.12	blank	8.2.66	blank
8.2.13	30/09/97	8.3.1	30/09/97
8.2.14	blank	8.3.2	blank
8.2.15	30/09/97	8.3.3	30/09/97
8.2.16	blank	8.3.4	30/09/97
8.2.17	30/09/97	8.3.5	30/09/97
8.2.18	blank	8.3.6	blank
8.2.19	30/09/97	8.3.7	30/09/97
8.2.20	30/09/97	8.3.8	blank
8.2.21	30/09/97		
8.2.22	30/09/97		
8.2.23	30/09/97		
8.2.24	blank		
8.2.25	30/09/97		
8.2.26	30/09/97		
8.2.27	30/09/97		
8.2.28	30/09/97		
8.2.29	30/09/97		
8.2.30	blank		
8.2.31	30/09/97		
8.2.32	blank		
8.2.33	30/09/97		
8.2.34	blank		
8.2.35	30/09/97		
8.2.36	blank		
8.2.37	30/09/97		
8.2.38	30/09/97		
8.2.39	30/09/97		
8.2.40	30/09/97		
8.2.41	30/09/97		
8.2.42	30/09/97		
8.2.43	30/09/97 (fold-out)		
8.2.44	30/09/97 (fold-out)		
8.2.45	30/09/97		
8.2.46	blank		
8.2.47	30/09/97		
8.2.48	blank		

# Contents

## 1 General Information

1.2	Specifications .....	1.3
1.2.1	Introduction .....	1.3
1.2.2	General .....	1.3
1.2.3	Receiver Performance .....	1.4
1.2.4	Transmitter Performance .....	1.6
1.2.5	Frequency Reference .....	1.7
1.2.6	Trunking .....	1.7
1.3	Product Codes .....	1.8
1.4	Operating Instructions .....	1.9
1.5	Glossary .....	1.9

## 2 Circuit Description

2.1	Introduction .....	2.2
2.2	Synthesiser .....	2.4
2.3	Receiver .....	2.4
2.4	Transmitter .....	2.5
2.5	Audio Operation .....	2.6
2.6	Power Supplies .....	2.7
2.7	Control PCB Operation .....	2.8
2.7.1	T3010 Operation .....	2.8
2.7.2	T3020, T3030, T3035 & T3040 Operation .....	2.10

## 3 Introduction To Servicing

3.1	Servicing Precautions .....	3.2
3.1.1	Servicing Warning .....	3.2
3.1.2	Caution: CMOS Devices .....	3.2
3.1.3	Screw Head Types .....	3.3
3.1.4	Shield Mounting Screws .....	3.3
3.1.4.1	Fitting Plastite Screws .....	3.3
3.1.4.2	M2 Machine Screws .....	3.3
3.1.5	Technical Instructions (TIs) .....	3.3

3.2	Disassembly Instructions . . . . .	3.5
3.2.1	To Gain Access To The Control PCB Top Side . . . . .	3.5
3.2.2	To Gain Access To The RF PCB Top Side . . . . .	3.5
3.2.3	To Gain Access To The RF PCB Bottom Side . . . . .	3.6
3.2.4	To Remove The RF PCB . . . . .	3.6
3.2.5	To Gain Access To The Control PCB Bottom Side . . . . .	3.6
3.3	Assembly Instructions . . . . .	3.9
3.3.1	Fitting The Rear Cover Assembly To The Shield . . . . .	3.9
3.3.2	Fitting The Front Panel Assembly To The Shield . . . . .	3.10
3.4	Accessory Connector . . . . .	3.12
3.5	Repair . . . . .	3.13
3.5.1	Surface Mount Devices . . . . .	3.13
3.5.1.1	Introduction . . . . .	3.13
3.5.1.2	Servicing Equipment Required . . . . .	3.13
3.5.1.3	Removal & Replacement Of SMD Components . . . . .	3.15
3.5.1.4	Common Causes Of SMD Failure . . . . .	3.17
3.5.2	Leaded Components . . . . .	3.17
3.5.2.1	Desoldering Iron Method . . . . .	3.17
3.5.2.2	Component Cutting Method . . . . .	3.18
3.6	Programming . . . . .	3.18
3.7	Test Facilities . . . . .	3.18

## 4 Calibration

4.1	Overview . . . . .	4.2
4.2	Getting Started . . . . .	4.2
4.2.1	Typographical Conventions . . . . .	4.2
4.2.2	Hardware Requirements . . . . .	4.2
4.2.3	Software Compatibility . . . . .	4.3
4.2.4	Calibration Kit Components . . . . .	4.4
4.2.5	Test Equipment Required . . . . .	4.4
4.2.6	Installing The Software . . . . .	4.5
4.2.6.1	Creating A Windows* Desktop Icon . . . . .	4.5
4.2.7	Connecting The Radio . . . . .	4.6
4.3	General Operations . . . . .	4.7
4.3.1	Starting The Program . . . . .	4.7
4.3.2	Navigation . . . . .	4.7
4.3.3	Using The Menu Bar . . . . .	4.8
4.3.4	Loading Files . . . . .	4.8
4.3.5	Saving Files . . . . .	4.9
4.3.6	Programming The Radio . . . . .	4.10
4.3.7	Using The Utility Menu . . . . .	4.11
4.3.7.1	Printing . . . . .	4.11
4.3.7.2	Configuration . . . . .	4.12
4.3.8	Test Commands . . . . .	4.13
4.3.9	Exiting The Program . . . . .	4.13

4.4	Calibration Procedures .....	4.14
4.4.1	Reading The Radio Identity .....	4.14
4.4.2	Full Calibration .....	4.16
4.4.3	TCXO Output Frequency .....	4.17
4.4.4	Power Control Test .....	4.18
4.4.5	Balance Adjust Test .....	4.19
4.4.6	Maximum Deviation Adjustment .....	4.20
4.4.6.1	T3010 & T3020 Radios - No Selcall .....	4.20
4.4.6.2	T3010 & T3020 Radios - With Selcall .....	4.22
4.4.6.3	T3030, T3035 & T3040 Radios .....	4.24
4.4.7	Front End Tuning .....	4.25
4.4.8	Maximum Volume Threshold .....	4.26
4.4.9	Squelch .....	4.27
4.4.9.1	T3010 & T3020 Non Programmable Bandwidth Radios .....	4.27
4.4.9.2	T3020-30/09/972X Programmable Bandwidth Radios .....	4.29
4.4.9.3	T3030, T3035 & T3040 Radios .....	4.31
4.4.10	RSSI Thresholds (T3030, T3035 & T3040 Radios Only) .....	4.32
4.4.11	Battery Thresholds .....	4.33

## 5 Fault Finding

5.1	Servicing Warning .....	5.2
5.2	Test Facilities .....	5.2
5.2.1	Introduction .....	5.2
5.2.2	User Controls & Indicators .....	5.3
5.2.3	Self Test Facilities .....	5.3
5.2.4	Test Mode .....	5.5
5.2.4.1	CCTM .....	5.5
5.2.4.2	Entering MTM (T3040 Radios) .....	5.5
5.3	Fault Finding Charts .....	5.8
5.3.1	Introduction .....	5.8
5.3.2	Synthesiser Fault Finding Chart .....	5.9
5.3.3	T3030, T3035 & T3040: Radio Will Not Acquire A Control Channel ..	5.10
5.3.4	T3030, T3035 & T3040: Receiver FFSK Fault .....	5.12
5.3.5	T3030, T3035 & T3040: Transmitter FFSK Fault .....	5.12
5.3.6	No Receive Audio Fault Finding .....	5.13
5.3.7	Receiver Squelch Fault Finding .....	5.14
5.3.8	IF Fault Finding .....	5.15
5.3.9	Receiver Front End Fault Finding .....	5.16
5.3.10	Transmit Audio Fault Finding .....	5.17
5.3.11	Power Amplifier Fault Finding .....	5.19

## 6 PCB Information

6.1	PCB Identification.....	6.1.2
6.2	Parts Lists.....	6.2.1
6.2.1	Variant Parts .....	6.2.1
6.3	Locating Components .....	6.3.1
6.3.1	Grid Reference Indexes .....	6.3.1
6.3.2	Using Circuit Diagrams .....	6.3.1
6.3.3	Multilayer PCBs.....	6.3.2
6.4	T3000-3000/-4000 VCO PCB.....	6.4.1
	Parts List..... IPN 220-01283-01.....	6.4.1
	PCB Layout - Top....."	6.4.3
	PCB Layout - Bottom....."	6.4.4
	Circuit....."	6.4.5
6.5	T3000-3000/-4000 RF PCB.....	6.5.1
	Parts List..... IPN 220-01233-03.....	6.5.1
	Mechanical & Miscellaneous Parts....."	6.5.4
	Grid Reference Index....."	6.5.5
	PCB Layout Errors....."	6.5.7a
	PCB Layout - Top....."	6.5.7
	PCB Layout - Bottom....."	6.5.8
	Circuits....."	6.5.9
6.6	T3000-5000 VCO PCB.....	6.6.1
	Parts List..... IPN 220-01284-00.....	6.6.1
	PCB Layout - Top....."	6.6.3
	PCB Layout - Bottom....."	6.6.4
	Circuit....."	6.6.5
6.7	T3000-5000 PA PCB.....	6.7.1
	Parts List..... IPN 220-01286-00.....	6.7.1
	PCB Layout - Top....."	6.7.3
	PCB Layout - Bottom....."	6.7.4
	Circuit....."	6.7.5
6.8	T3000-7000 VCO PCB.....	6.8.1
	Parts List..... IPN 220-01288-01.....	6.8.1
	PCB Layout - Top....."	6.8.3
	PCB Layout - Bottom....."	6.8.4
	Circuit....."	6.8.5
6.9	T3000-7000 PA PCB.....	6.9.1
	Parts List..... IPN 220-01291-01.....	6.9.1
	PCB Layout - Top....."	6.9.3
	PCB Layout - Bottom....."	6.9.4
	Circuit....."	6.9.5

6.10	T3000-5000/-7000 RF PCB	6.10.1
	Parts List	IPN 220-01235-04 6.10.1
	Mechanical & Miscellaneous Parts	" 6.10.4
	Grid Reference Index	" 6.10.5
	PCB Layout - Top	" 6.10.7
	PCB Layout - Bottom	" 6.10.8
	Circuits	" 6.10.9
	Parts List	IPN 220-01235-05 6.10.19
	Mechanical & Miscellaneous Parts	" 6.10.23
	Grid Reference Index	" 6.10.24
	PCB Layout - Top	" 6.10.27
	PCB Layout - Bottom	" 6.10.28
	Circuits	" 6.10.29
6.11	T3010 Control PCB	6.11.1
	Parts List	IPN 220-01269-06 6.11.1
	Mechanical & Miscellaneous Parts	" 6.11.5
	Grid Reference Index	" 6.11.6
	PCB Layout - Top	" 6.11.9
	PCB Layout - Bottom	" 6.11.10
	Circuits	" 6.11.11
	Parts List	IPN 220-01269-08 6.11.15
	Mechanical & Miscellaneous Parts	" 6.11.19
	Grid Reference Index	" 6.11.20
	PCB Layout - Top	" 6.11.23
	PCB Layout - Bottom	" 6.11.24
	Circuits	" 6.11.25
6.12	T3020, T303X & T3040 Control PCB	6.12.1
	Parts List	IPN 220-01294-03 6.12.1
	Mechanical & Miscellaneous Parts	" 6.12.5
	Grid Reference Index	" 6.12.6
	PCB Layout - Top	" 6.12.9
	PCB Layout - Bottom	" 6.12.10
	Circuits	" 6.12.11
6.12	T3020, T303X & T3040 Control PCB	6.12.17
	Parts List	IPN 220-01294-09 6.12.17
	Mechanical & Miscellaneous Parts	" 6.12.21
	Grid Reference Index	" 6.12.22
	PCB Layout - Top	" 6.12.25
	PCB Layout - Bottom	" 6.12.26
	Circuits	" 6.12.27
6.13	T3000-3000 FCC RF PCB	6.13.1
	Parts List	IPN 220-01365-02 6.13.1
	Mechanical & Miscellaneous Parts	" 6.13.4
	Grid Reference Index	" 6.13.5
	PCB Layout - Top	" 6.13.7
	PCB Layout - Bottom	" 6.13.8
	Circuits	" 6.13.9

6.14	T3000-5000 FCC RF PCB .....	6.14.1
	Parts List..... IPN 220-01366-01.....	6.14.1
	Mechanical & Miscellaneous Parts....."	6.14.4
	Grid Reference Index....."	6.14.5
	PCB Layout - Top....."	6.14.7
	PCB Layout - Bottom....."	6.14.8
	Circuits....."	6.14.9
6.15	T3000-8000 VCO PCB.....	6.15.1
	Parts List..... IPN 220-01311-01.....	6.15.1
	PCB Layout - Top....."	6.15.3
	PCB Layout - Bottom....."	6.15.4
	Circuit....."	6.15.5
6.16	T3000-8000 RF PCB.....	6.16.1
	Parts List..... IPN 220-01327-02/-03.....	6.16.1
	Mechanical & Miscellaneous Parts....."	6.16.4
	Grid Reference Index....."	6.16.5
	PCB Layout - Top....."	6.16.7
	PCB Layout - Bottom....."	6.16.8
	Circuits....."	6.16.9
6.17	T3000-4400 RF PCB.....	6.17.1
	Parts List..... IPN 228-13071-02.....	6.17.1
	Mechanical & Miscellaneous Parts....."	6.17.4
	Grid Reference Index....."	6.17.5
	PCB Layout - Top....."	6.17.7
	PCB Layout - Bottom....."	6.17.8
	Circuits....."	6.17.9

## 7 Accessories

7.1	T3000 Battery Packs .....	7.1.2
	7.1.1 Introduction.....	7.1.2
	7.1.2 Maintenance.....	7.1.3
	7.1.3 Restoring A Reduced Capacity Battery Pack .....	7.1.3
	7.1.4 Disposal Of Used NiCd Batteries .....	7.1.3
7.2	T3000 Speaker-Microphones.....	7.2.5
	7.2.1 Introduction.....	7.2.5
	7.2.2 Fitting & Removal.....	7.2.5
	7.2.3 Operation: T3000-2000 .....	7.2.5
	7.2.4 Operation: T3000-2100 .....	7.2.6
	7.2.5 Operation: T3000-2150 .....	7.2.7

7.3	T3000 Programming Kits . . . . .	7.3.1
7.3.1	T3000-5000 Programming Kit . . . . .	7.3.1
7.3.2	T3000-5100 Programming Update Kit . . . . .	7.3.1
7.4	T3000-7100 Calibration Kit . . . . .	7.4.1
7.4.1	T3000-7200-002 Upgrade Package . . . . .	7.4.1
7.5	T3000 Accessory Connectors . . . . .	7.5.1
7.5.1	Fitting The Accessory Connector . . . . .	7.5.1
7.5.2	Removing The Accessory Connector . . . . .	7.5.1
7.5.3	Accessory Connector External Speaker/Microphone Modes . . . . .	7.5.2
7.6	T3000 Antennas . . . . .	7.6.1
7.7	T3000 Test Leads . . . . .	7.7.1
7.7.1	T3000-7400 RF Test Lead Kit . . . . .	7.7.1
7.7.2	T3000-7500 Open Radio Control Lead Kit . . . . .	7.7.1
7.8	T3000 Selcall & DTMF Options PCB . . . . .	7.8.1
7.8.1	Introduction . . . . .	7.8.1
7.8.2	Operation . . . . .	7.8.1
7.8.3	Fitting The Selcall & DTMF Options PCB . . . . .	7.8.1
7.8.3.1	Accessing The Control PCB . . . . .	7.8.1
7.8.3.2	Replacing The Flexible Loom PCB . . . . .	7.8.2
7.8.3.3	Shield Modification . . . . .	7.8.3
7.8.3.4	Mounting The Options PCB . . . . .	7.8.3
7.9	T3000 CTCSS, VOX & Scrambler Options PCB . . . . .	7.9.1
7.9.1	Introduction . . . . .	7.9.1
7.9.2	Link Details - All Options . . . . .	7.9.1
7.9.3	CTCSS Option PCB . . . . .	7.9.2
7.9.3.1	Operation . . . . .	7.9.2
7.9.3.2	Settings . . . . .	7.9.2
7.9.4	VOX Option PCB . . . . .	7.9.3
7.9.4.1	Operation . . . . .	7.9.3
7.9.4.2	Settings . . . . .	7.9.3
7.9.5	Scrambler Option PCB . . . . .	7.9.4
7.9.5.1	Operation . . . . .	7.9.4
7.9.5.2	Settings . . . . .	7.9.4
7.9.6	Fitting The CTCSS, VOX & Scrambler Options PCB . . . . .	7.9.5
7.9.6.1	Accessing The Control PCB . . . . .	7.9.5
7.9.6.2	Replacing The Flexible Loom PCB . . . . .	7.9.5
7.9.6.3	Shield Modification . . . . .	7.9.6
7.9.6.4	Mounting The Options PCB . . . . .	7.9.6
7.10	T3002 Fast Charger . . . . .	7.10.1
7.10.1	Introduction . . . . .	7.10.1
7.10.2	Performance Specifications . . . . .	7.10.2
7.10.3	Warnings . . . . .	7.10.2
7.10.4	Operation . . . . .	7.10.3
7.10.4.1	Discharge Function . . . . .	7.10.3
7.10.4.2	Cycle & Capacity Check . . . . .	7.10.4
7.10.5	Circuit Description . . . . .	7.10.5



7.11	T3003 Trickle Charger .....	7.11.1
7.11.1	Introduction .....	7.11.1
7.11.2	Warnings .....	7.11.2
7.11.3	Operation .....	7.11.2
7.11.4	Circuit Description .....	7.11.3
7.12	T3004 Rapid Charger .....	7.12.1
7.12.1	Introduction .....	7.12.1
7.12.2	Performance Specifications .....	7.12.2
7.12.3	Warnings .....	7.12.2
7.12.4	Operation .....	7.12.3
7.12.5	Circuit Description .....	7.12.4

## 8 Intrinsically Safe (IS) Products

8.1	Introduction to IS Servicing .....	8.1.3
8.1.1	Overview .....	8.1.3
8.1.2	FM Approved IS Products .....	8.1.3
8.1.3	Identifying IS Handportable Radios .....	8.1.4
8.1.4	IS RF & Control PCB Servicing Requirements .....	8.1.5
8.2	IS PCB Information .....	8.2.1
8.2.1	T3000-3000, -4000 IS RF PCB IPN 220-01233-06 .....	8.2.3
8.2.2	T3000-5000, -7000 IS RF PCB IPN 220-01235-09 .....	8.2.19
8.2.3	T3010 IS Control PCB IPN 220-01269-09 .....	8.2.37
8.2.4	T3020, T303X & T3040 IS Control PCB IPN 220-01294-08 .....	8.2.51
8.3	T3000 IS Accessories .....	8.3.3
8.3.1	T3000-1052 IS Battery Pack .....	8.3.3
8.3.2	T3000-2150 Speaker Microphone .....	8.3.5
8.3.3	T3000-4402 Selcall & DTMF Options PCB .....	8.3.7

## List Of Illustrations

Figure 2.1	T3000 RF PCB Block Diagram .....	2.3
Figure 2.2	T3010 Control PCB Block Diagram .....	2.9
Figure 2.3	T3020, T3030, T3035 & T3040 Control PCB Block Diagram .....	2.11
Figure 3.1	Typical Anti-Static Bench Set-Up .....	3.2
Figure 3.2	T3000 Rear Panel Assembly .....	3.4
Figure 3.3	T3010 & T3035 Front Panel Assembly .....	3.7
Figure 3.4	T3020 & T3040 Front Panel Assembly .....	3.8
Figure 3.7	T3000 Accessory Connector - Top View .....	3.12
Figure 3.8	Identifying SMD Components .....	3.14
Figure 3.9	SMD Soldering Guide .....	3.16
Figure 4.1	Test Equipment Set-Up .....	4.6
Figure 8.1.1	T3000 IS Radio Labels .....	8.1.4

## List Of Tables

Table 3.1	Accessory Connector Interface Signals .....	3.12
Table 5.1	T3000 User Controls & Interfaces .....	5.3
Table 5.2	T3000 Self Test Facilities .....	5.3