PART A

Introduction

This part provides an introduction to servicing Tait Orca 5000 portable radios. It includes an outline of the Tait Orca 5000 range of products and precautions that should be taken before servicing Tait Orca 5000 portable radios.

Detailed servicing instructions and information about spare parts are found in *Part D: Servicing the radio*.

Contents

Servicing Tait Orca 5000 portable radios

The Tait Orca 5000 series is a range of portable high performance, microprocessor-controlled radios manufactured using an RF-shielded PCB and high-density SMD components.

Servicing of Tait Orca 5000 portable radios is limited to key mechanical and ancillary devices. These include:

- the front panel assembly;
- the lens (Orca 5015/2x/35/40);
- the PTT keypad;
- the speaker;
- the keypad;
- the LCD display (Orca 5015/2x/35/40);
- the shield, complete with user interface PCB assembly and polyester dome (Orca 5015/2x/35/40);
- the main PCB assembly;
- the antenna connector;
- the channel selector switch;
- the volume control switch;
- the microphone;
- the speaker contacts;
- the battery contacts;
- the PTT tact switch;
- the RF out assembly
- the auxiliary flexible PCB
- the rear panel; and
- the chassis.

The repair of PCB-related faults is the responsibility of Technical Support at Tait Electronics Ltd. Detailed schematics and component location information for the main PCB may also be obtained from Technical Support. Contact your Tait dealer for more information.

WWW technical support

Tait Electronics Ltd provides product support at the following address:

http://www.taitworld.com/support

What does this manual contain?

This manual is supplied as part of the Tait Orca 5000 service kit (TOPA-SV-117G), and provides the following:

- general information and specifications on the Tait Orca 5000 series of portable radios;
- basic circuit descriptions;
- information on finding and servicing non-PCB-related faults;
- information on Tait Orca 5000 battery packs and chargers;
- information on interfacing accessories to Tait Orca 5000 portable radios; and
- a glossary of key terms.

Calibration service kit

The TOPA-SV-117G service kit contains:

- calibration test unit (TOPA-SV-004);
- radio calibration cable for connecting the radio to the calibration test unit (TOPA-SV-007G);
- 9 pin RS232 to modular phone jack programming lead for connecting the calibration test unit to a PC (TOPA-SV-019);
- DC service adaptor (TOPA-SV-005);
- SMA to N-type RF test lead for connecting to the radio's antenna connector (TOPA-SV-006);

- T6 driver bit and 8 mm socket (TOPA-SV-011);
- this manual; and
- TOP Programming Utilities (TPU) CD-ROM (IPN 406-00003-xx).

Other items required for calibration but not included as part of the service kit are:

- RF communications test set (e.g. HP8920, MI2945/55, CMS52);
- digital current meter capable of measuring current up to 3 A, accurate to two decimal places.;
- DC power supply, 7.5 V, 3 A for portable radios; and
- TOPA-SV-A07 if calibrating TOP-Axxxx-xx 66 -88MHz product.

Programming kit

The TOPA-SV-116 kit for programming Tait Orca 5000 radios contains:

- accessory connector to modular phone socket programming cable for connecting the radio to the programming lead (TOPA-SV-003G); and
- 9 pin RS232 to modular phone jack programming lead for connecting the programming cable to a PC (TOPA-SV-019); and
- TOP Programming Utilities (TPU) CD-ROM (IPN 406-00003-xx).

The Tait Orca 5000 series of portable radios

There are eight Tait Orca 5000 series portable radio products:

- Orca 5010/11 - low tier conventional
- Orca 5015 - mid tier conventional
- Orca 5020/21 - high tier conventional
- Orca 5030 - low tier trunked
- Orca 5035 - mid tier trunked
- Orca 5040 - high tier trunked

This manual includes information specific to all the Orca 5000 portable radios. As new features and enhancements occur, new revisions of this manual will be released.

The Tait Orca product code

The characters in the Tait Orca 5000 product code provide information about the radio's functional parameters and various hardware options, according to the scheme outlined in Figure A-1. For more information on available products, contact your nearest Tait dealer.

Figure A-1: Tait Orca 5000 Product Code Scheme

The Tait Orca Product Code has the following structure:

TOP-abcde-mn

where:

TOP	-	Family designator
a	-	Frequency band
b	-	Channel spacing/IFBW
c	-	User interface
d	-	Air interface
e	-	Compliance-relevant changes
m	-	Badging
n	-	Custom variations not affecting radio/EMC compliance

Notes:

1. The complete Tait Orca product code standard can be downloaded from the technical support Website:

   http://www.taitworld.com/support

2. In this manual, when the term TOP x is used (e.g. TOP A or TOP B), it indicates the specific frequency band. TOP A will therefore refer to an A band Orca, and TOP B to a B band Orca.

Operating instructions

A user's guide is available for each radio. Copies can be obtained through Technical Support.

Accessories

Table A-1 shows the accessories available for Tait Orca 5000 portable radios. Of these accessories, only the chargers are serviceable.

For more information on chargers, see *Part E: Battery packs and chargers*. The battery packs available for Tait Orca 5000 portable radios are also described in Part E.

New chassis

A new chassis and accessory connector have been introduced in September 2002. This provides greater strength to the accessory connector. Old accessories are however no longer compatible with the new chassis, nor will the new accessories fit the old chassis. See "Accessory connector compatibility" on page G-8. Information specific to the old chassis or accessories can be found in version M5000-00-103 of the Tait Orca 5000 service manual.

The new accessory connectors have a different shape quarter turn tip, no hooks on the locating posts and a green dot on the outside at the lower left corner

The new chassis has a different shape hole for the connector's quarter turn tip, and a green

seal behind. Figure A-2 illustrates the difference. Radios factory fitted with the new chassis also have a product code with the format TOP-xxxxx-Bx.

Figure A-2: Changed chassis hole

Fitting an accessory

To fit some accessories to the radio, you will need to remove the rear accessory cover. Remove the battery, then insert the end of a key underneath the bottom edge of the accessory cover. Lift to remove the cover.

When attaching or removing an accessory, ensure that the lever is in the upright position. Keeping the accessory connector parallel to the radio, engage the two posts at the base of the connector with the rear panel. Once the accessory is in position, rotate the lever 90 degrees counterclockwise to lock it in place. See Figure A-3.

Removing an accessory

When removing an accessory, press the lock spring tab before rotating the clip clockwise. See Figure A-4.

Fitting a non-Tait accessory

See *Part F: Accessories* for information on using non-Tait accessories with Tait Orca 5000 portable radios.

Figure A-3: Fitting an accessory with a D-Clip

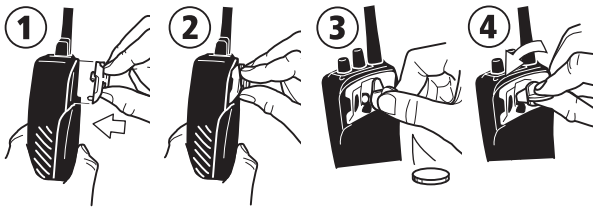


Figure A-4: Removing an accessory with a D-Clip

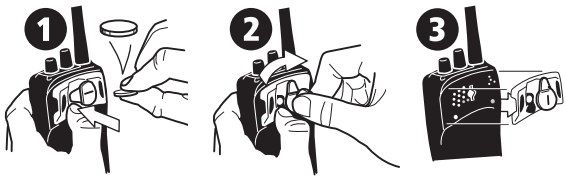


Table A-1: Tait Orca 5000 accessories

Type of accessory	Product code	Description
Antennas	TOPA-AN-101	130-230 MHz 3" helical
	TOPA-AN-102	336-540 MHz 3" helical
	TOPA-AN-201	136-340 MHz 6" helical
	TOPA-AN-212	400-940 MHz 6" wave whip
	TOPA-AN-203	896-941MHz 7" gain
	TOPA-AN-204	806-870M 1/2 wave gain
	TOPA-AN-205	896-941M 1/2 wave gain
	TOPA-AN-301	66-88MHz 10" helical
Audio accessories	TOPA-AA-001G	Speaker microphone, -10 to 60 °C, two function buttons
	TOPA-AA-002G	Speaker microphone, -30 to 60 °C, heavy duty, two function buttons
	TOPA-AA-003G	Speaker microphone, -30 to 60 °C, MIL spec
	TOPA-AA-004G	Speaker microphone, -30 to 60 °C, MIL spec, with antenna socket
	TOPA-AA-005G	7.5 mm accessory adaptor
	TOPA-AA-006G	Tait Orca accessory connector kit
	TOPA-AA-007G	Tait Orca RF accessory connector kit
	TOPA-AA-008	Speaker microphone, -30 to 60 °C, MIL spec, no function buttons, high/low volume*
	TOPA-AA-009	2-wire palm microphone and earphone, -30 to 75 °C*
	TOPA-AA-010	3-wire lapel microphone and earphone, -30 to 75 °C*
	TOPA-AA-011	Light weight single speaker headset with in-line PTT, -30 to 75 °C*
	TOPA-AA-012	Over-the-head headset with noise cancelling boom microphone, -30 to 75 °C*
	TOPA-AA-013	Behind-the-head headset with noise cancelling boom microphone, -30 to 75 °C*
	TOPA-AA-101G	Speaker microphone, -10 to 60 °C, two function buttons (with D-Clip)
	TOPA-AA-102G	Speaker microphone, -10 to 60 °C, heavy duty, two function buttons (with D-Clip)
	TOPA-AA-103G	Speaker microphone, -10 to 60 °C, MIL spec (with D-Clip)
	TOPA-AA-104G	Speaker microphone, -30 to 60 °C, MIL spec, with antenna socket (with D-Clip)
	TOPA-AA-106G	Tait Orca 5000 accessory connector kit (with D-Clip)
	TOPA-AA-107G	Tait Orca 5000 RF accessory connector kit (with D-Clip)
* For use with TOPA-AA-005G	T952-051	Earphone kit with coil cord and 2.5 mm plug, -30 to 75 °C (for use with TOPA-AA-003G, TOPA-AA-004G, TOPA-AA-008, TOPA-AA-103G & TOPA-AA-104G)
Batteries	TOPB100	1100 mAh NiCd battery pack
	TOPB200	1500 mAh NiCd battery pack
	TOPB200-IF	1500 mAh NiCd battery pack (intrinsically safe)
	TOPB400	1500 mAh NiMH battery pack
	TOPB500	2000 mAh NiMH battery pack
	TOPB600	1100 mAh NiCd battery pack (slim)
	TOPB700	1500 mAh NiMH battery pack (slim)

Type of accessory	Product code	Description
Battery chargers	TOPA-CH-100	Desktop trickle charger
	TOPA-CH-200	Desktop fast charger
	TOPA-CH-300	Six-way multi-charger
Plug packs (for TOPA-CH-200)	T952-012	Australia, New Zealand and China (230 V 50 Hz input; plug configuration: )
	T952-022	Singapore and Middle East (230 V 50 Hz input; plug configuration: )
	T952-032	Mainland Europe (230 V 50 Hz input; plug configuration: )
	T952-042	USA and Canada (115 V 60 Hz input; plug configuration: )
	T952-052	UK and Hong Kong (230 V 50 Hz input; plug configuration: )
Carrying accessories	TOPA-CA-001	Heavy duty carry case
	TOPA-CA-002	Heavy duty holster
	TOPA-CA-003	38 mm belt clip x 10
	TOPA-CA-004	Accessory port cover x 10
	TOPA-CA-005	55 mm belt clip
	TOPA-CA-006	55 mm belt clip x 10
	TOPA-CA-101	Heavy duty carry case (with D-Clip)
	TOPA-CA-102	Holster carry case (with D-Clip)
	TOPA-CA-103	Belt loop
	TOPA-CA-104G	D-Clip
	TOPA-CA-105	Handstrap

Warning!

The following accessories have the old accessory connector and are still available for purchase. These accessories only fit the older Tait Orca series portable radios. **Do not attempt to fit to the new chassis.**

Table A-2: Tait Orca 5000 portable radio accessories with the old connector

Type of accessory	Product code	Description
Audio accessories	TOPA-AA-001	Speaker microphone, -10 to 60 °C, two function buttons
	TOPA-AA-002	Speaker microphone, -30 to 60 °C, heavy duty, two function buttons
	TOPA-AA-003	Speaker microphone, -30 to 60 °C, MIL spec
	TOPA-AA-004	Speaker microphone, -30 to 60 °C, MIL spec, with antenna socket
	TOPA-AA-005	7.5 mm accessory adaptor
	TOPA-AA-006	Tait Orca accessory connector kit
	TOPA-AA-007	Tait Orca RF accessory connector kit

Important information

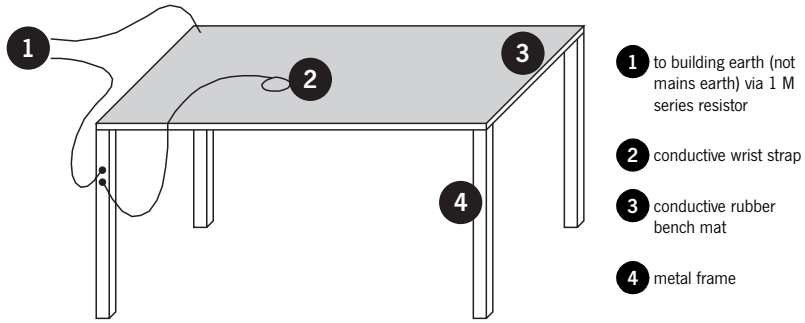
Basic servicing precautions

Tait Orca 5000 portable radios require specialised servicing techniques and should only be serviced at an approved Tait service centre equipped with the necessary facilities.

Standard anti-static procedures should be followed; a typical setup is shown in Figure A-5.

If in doubt, contact Tait Electronics Ltd or your nearest Tait dealer.

Figure A-5: Typical anti-static bench setup



Warning!

Repairs attempted with incorrect equipment or by untrained personnel may result in permanent damage.

Caution: CMOS devices

This equipment contains CMOS devices, which are susceptible to damage from static charges. Care when handling these devices is essential. For correct handling procedures, refer to manufacturers' data books covering CMOS devices, such as *Philips Data Handbook Covering CMOS Devices* or *Motorola CMOS Data Book Section 5 (Handling Procedures)*.

Screw head types

Torx recess head screws and Pozidriv recess head screws require the correct sized driver to achieve best performance. Most of the screws in Tait Orca 5000 portable radios are Torx head screws, and so a Torx T6 driver bit is supplied as part of the service kit. Some earlier radios have Pozidriv screws.

Torx head 1.8x5 mm screws should be removed using the supplied Torx T6 driver. When replacing these screws, set the driver to 2in.lb (0.23Nm).

Pan head Pozidriv M2x8 mm and M2x5 mm screws should be removed using a number 1 Pozidriver. When replacing these screws, set the driver to 2in.lb (0.23Nm).

Programming

For information on programming Tait Orca 5000 portable radios, refer to:

- the *Tait Orca Trunked Programming Application User's Manual* or the online help;
- the *Tait Orca Conventional Programming Application User's Manual* or the online help.

The User's Manuals are on the TOP Programming Utilities (TPU) CD-ROM, which is included, together with this manual, as part of the calibration service kit.

Calibrating

For information on calibrating Tait Orca 5000 portable radios, refer to:

- the *Tait Orca Calibration Application User's Manual* or the online help.

The User's Manual is on the TOP Programming Utilities (TPU) CD-ROM, which is included, together with this manual, as part of the calibration service kit.

Test facilities

Standard test facilities provide a way of testing the radio's functions independently of normal radio operation. See *Part C: Diagnostics and fault finding* for a description of the test facilities available for Tait Orca 5000 portable radios.

Basic maintenance

Your Tait Orca portable radio requires no regular maintenance other than ensuring that the battery has sufficient charge and that no damage has occurred to the antenna or the battery pack.

General care

- Wipe the battery contacts, accessory connector contacts and radio display with a dry lint-free cloth to remove any dirt, oil or grease.
- Use a cloth dampened with clean water to clean the radio's case and display lens, but do not immerse the radio in fluids.
- Do not allow the radio to come into contact with detergents, alcohol, aerosol sprays or petroleum-based products as they may permanently damage the case.
- Avoid high temperatures. If the radio overheats, it will cease to function. You will hear two short high-pitched beeps.

Troubleshooting

If you are experiencing difficulty operating your Tait Orca portable radio check the following items:

- Is the battery firmly attached to the radio?
- Is the battery sufficiently charged?
- Is the battery charger working properly?
- Is the antenna damaged?

If all appears to be in order but your radio still fails to operate properly, consult your local Tait dealer for assistance.

Servicing Intrinsically Safe radios

Intrinsically Safe radios

Intrinsically Safe (IS) radios are certified by a third party to be safe to use in particular hazardous locations.

Tait Orca 5000 IS portable radios can be identified by one or more of the following:

- Yellow labels
- IS circle logo
- FM diamond logo

A radio with any of these features must only be serviced by an agency certified by both the approval authority and Tait Electronics Ltd. Any unauthorised repair or substitution of parts invalidates the intrinsic safety rating and the third party IS approval.

IS PCB servicing requirements

Tait Orca 5000 IS portable radios must be returned to an authorised Tait branch or subsidiary for servicing. Any unauthorised repair or substitution of parts invalidates the intrinsic safety rating.

FM approval

Tait Orca 5000 IS portable radios and accessories are approved by Factory Mutual Corporation (FM) to the following ratings:

- IS/I/1/CD/T3C Ta=40°C
- NI/I/2/ABCD/T3C Ta=40°C

See Table A-3 on page A-12 for more detail on these ratings.

FM approved products

Radios with the following product code have FM IS approval:

- TOP-x24x0-B2
- TOP-x24x0-T2
- TOP-x25x0-B2
- TOP-x25x0-T2
- TOP-x26x0-B2
- TOP-x26x0-T2

For more information about the Tait Orca product code, refer to page page A-5.

FM approved accessories

The following accessories are approved for use with the Tait Orca 5000 IS portable radios.

- TOPB200-IF NiCd IS battery pack
- TOPA-AA-003G rugged speaker-microphone
- TOPA-AA-004G RF speaker-microphone
- TOPA-AA-005 adapter (required for use with TOPA-AA-012/013)
- TOPA-AA-012 heavy duty headset with noise cancelling microphone (over the head)
- TOPA-AA-013 heavy duty headset with noise cancelling microphone (behind neck)
- T952-051 rugged earphone kit (optional for use with TOPA-AA-003/004)

TOPB200-IF IS battery pack

The shift life of the TOPB200-IF IS battery pack may be reduced by up to 10 percent when compared to its non-IS equivalent.

The battery pack should not be charged in a hazardous location.

Table A-3: FM ratings

Approval	Class	Division	Group	Temperature Rating
Intrinsically Safe: The unit is unable to cause ignition under normal or abnormal operating conditions.	Class I: Gas or petroleum type environment.	Division 1: Hazardous mixtures are normally present.	Groups C & D: Ethylene and propane gases.	T3C: 160°C
Incentive: The unit is unable to cause ignition under normal operating conditions.	Class I: Gas or petroleum type environment.	Division 2: Hazardous mixtures are present abnormally.	Groups A, B, C & D: Acetylene, hydrogen, ethylene and propane gases.	T3C: 160°C