
Servicing Tait Orca 5000 handportables

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

The manufacturing process does not allow direct servicing access to components on the main PCB, although replacement PCBs are available on an exchange basis. Service repairs of Tait Orca 5000 handportables are therefore limited to key mechanical and ancillary devices associated with the main PCB. These include:

- the front panel assembly;
- the lens (Orca 5020, Orca 5035 and Orca 5040);
- the PTT keypad;
- the speaker;
- the keypad;
- the LCD display (Orca 5020, Orca 5035 and Orca 5040);
- the shield, complete with user interface PCB assembly and polyester dome (Orca 5020, Orca 5035 and Orca 5040);
- 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; and
- the auxiliary flexible PCB.

The repair of PCB-related faults is the responsibility of the Customer Services Division of

Tait Electronics Ltd. Detailed schematics and component location information for the main PCB may also be obtained from the Customer Services Division. 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>

At this site, you can send a request for support.

What does this manual contain?

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

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

What is included in the calibration service kit?

The TOPA-SV-117 service kit contains:

- calibration test unit (TOPA-SV-004);
- radio calibration cable for connecting the radio to the calibration test unit (TOPA-SV-007);
- 25 pin RS232 to modular phone jack

programming lead for connecting the calibration test unit to a PC (TOPA-SV-012);

- 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 handportables; 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-003); and
- 25 pin RS232 to modular phone jack programming lead for connecting the programming cable to a PC (TOPA-SV-012); and
- TOP Programming Utilities (TPU) CD-ROM (IPN 406-00003-xx).

Conventions

Throughout this manual, the names of software screen, field and menu names are

referred to in **bold sans serif font**. For example:

Check that the information in the **Radio Model** fields (**Specifications** screen) is correct.

The Tait Orca 5000 series of handportables

There are five Tait Orca 5000 series handportables:

- Orca 5010 - low tier conventional
- Orca 5020 - 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 handportables. As new features and enhancements occur, new revisions of this manual will be released.

The Tait Product Code Scheme

The digits 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. While Tait Orca products are designed for flexibility of application, not all Product Codes are available and hold regulatory compliance in your market. For more information on the products, contact your nearest Tait dealer.

Figure A-1: Tait Orca 5000 Product Code Scheme

TOP-abcde-mn	
Compliance Code (see note 6)	
TOP – Tait Orca Portable	
a - Frequency band:	c - User interface:
A 66–88 MHz	1 Orca Elan
B 136–174 MHz	2 Orca Excel
C 174–225 MHz	3 Orca Eclipse
D reserved	4 5010, 5030
E reserved	5 5035
F reserved	6 5020, 5040
G 336–400 MHz	7 RF Modem
H 400–470 MHz	} see note 3
I 450–530 MHz	
J 806–870 MHz Tx	d - Air interface:
K 851–870 MHz Rx	1 Conventional PMR
896–941 MHz Tx	2 MPT 1327 trunked
935–941 MHz Rx	e - Reserved for compliance-relevant changes:
	0 Initial default
b - Channel space/IFBW:	m - Badging:
1 12 kHz Medium IFBW (MB) -	C Tait Custom Product (TCI)
20/25/30 kHz Channel spacing	G Reserved
(Now obsolete - see note 1)	T Tait
2 10 kHz Universal IFBW (UB) -	V TEL (Argentina, see note 4)
12.5/15/20/25/30 kHz Channel	U Unbadged (see note 5)
spacing	Z Reserved
	n - Custom variations not affecting compliance:
	0 Initial default

Notes:

1. Information in italics refers either to planned new or obsolescent parameters which are not available at the issue date of this document.
2. This document does not address coding for packed ensembles of radio, battery, charger, antenna etc. These must be negotiated

- with TOP Logistics (refer to TMS document CS0003, TOP Package Code Scheme).
3. The 50xx numbers assigned to TOP5000 products are the name of each product, analogous to Elan, Excel and Eclipse. They are based on T2000/T3000 Product Codes for guidance as to what they do, but the functions are not identical to the T2000 or

T3000 product.

Orca 5010 and 5020 will have only 1 as an air interface code, and 5030, 5035 and 5040 will have only 2 as an air interface code.

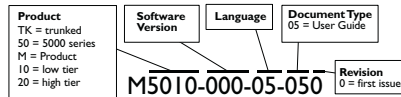
4. ‘V’ identifies TEL badged products for sale in Argentina, where the name ‘Tait’ is registered to another Company.
5. ‘U’ identifies accessories where an unbadged version has been produced for use with radios carrying a non-Tait badge.
6. The Compliance Code (underlined>) addresses regulator concerns that the full (3-group) code appearing on the product is not the same as the 2-group code under which Compliance was obtained. It appears only on the product label and some regulatory declarations.

For some regulatory areas, this permits the same Compliances to apply regardless of badging or minor custom variations expressed in the 3rd group. The first 2 groups of the Product Code may not necessarily be the same as the Compliance Code. This allows Compliance of TOP 50xx products to be extrapolated from Elan/Excel/Eclipse for some regulators.

Operating instructions

A user’s guide is available for each radio. Figure A-2 shows the naming convention for Tait Orca 5000 radio user’s guides.

Figure A-2: Naming convention for Tait Orca 5000 handportable user’s manuals



USER GUIDES

ENGLISH	FRENCH	LATIN SPANISH
M5010-xxxx-00-05x	M5010-xxxx-02-05x	M5010-xxxx-05-05x
M5020-xxxx-00-05x	M5020-xxxx-02-05x	M5020-xxxx-05-05x
M5030-xxxx-00-05x	M5030-xxxx-02-05x	M5030-xxxx-05-05x
M50TK-xxxx-00-05x	M50TK-xxxx-02-05x	M50TK-xxxx-05-05x
SIMPLIFIED CHINESE	TRADITIONAL CHINESE	
M5030-xxxx-09-05x	M5030-xxxx-10-05x	
M50TK-xxxx-09-05x	M50TK-xxxx-10-05x	

Accessories

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

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

Fitting an accessory (without D-clip)

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. 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 counter-clockwise to lock it in place.

Removing an accessory (with D-clip)

When removing an accessory with a D-clip, press the lock spring tab before rotating the D-clip clockwise. (To fit and remove a D-clip, see Figure A-3.)

Fitting a non-Tait accessory

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

Figure A-3: Fitting and removing a D-clip to a Tait Orca 5000 handportable

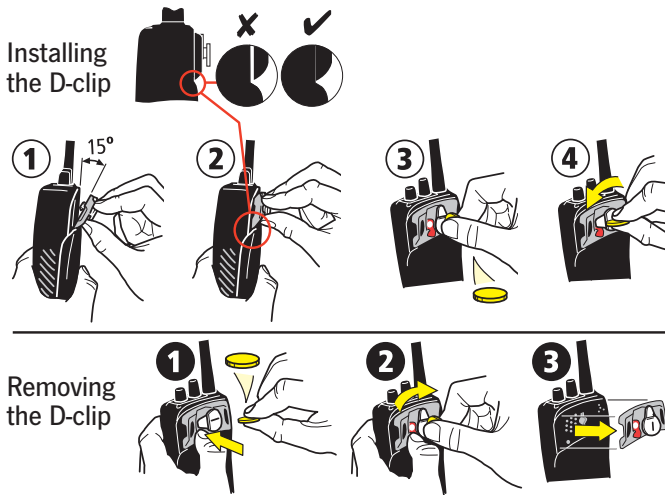







Table A-1: Tait Orca 5000 handportable accessories

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-202	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-001	Speaker microphone -10 °C, two function buttons
	TOPA-AA-002	Speaker microphone -30 °C heavy duty, two function buttons
	TOPA-AA-003	Speaker microphone -30 °C MIL spec
	TOPA-AA-004	Speaker microphone -30 °C MIL spec RF
	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
	TOPA-AA-008	Speaker microphone, -30 C MIL spec, no function buttons, high/low volume*
	TOPA-AA-009	2-wire palm microphone and earphone*
	TOPA-AA-010	3-wire lapel microphone and earphone*
	TOPA-AA-011	Light weight single speaker headset with in-line PTT*
	TOPA-AA-012	Over-the-head headset with noise cancelling boom microphone*
	TOPA-AA-013	Behind-the-head headset with noise cancelling boom microphone*
	TOPA-AA-101	Speaker microphone -10 °C, two function buttons (with D-clip)
	TOPA-AA-102	Speaker microphone -30 °C heavy duty, two function buttons (with D-clip)
	TOPA-AA-103	Speaker microphone -30 °C MIL spec (with D-clip)
	TOPA-AA-104	Speaker microphone -30 °C MIL spec RF (with D-clip)
	TOPA-AA-105	7.5 mm accessory adaptor (with D-clip)
	TOPA-AA-106	Tait Orca 5000 accessory connector kit (with D-clip)
	TOPA-AA-107	Tait Orca 5000 RF accessory connector kit (with D-clip)
	T952-051	Earphone kit with coil cord and 2.5 mm plug (for use with TOPA-AA-003, TOPA-AA-004, TOPA-AA-008, TOPA-AA-103 & TOPA-AA-104)
Batteries	TOPB100	1100 mAh NiCd battery pack
	TOPB200	1500 mAh NiCd battery pack
	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)
	Battery chargers	TOPA-CH-100
TOPA-CH-200		Desktop fast charger

* For use with TOPA-AA-005 & TOPA-AA-105

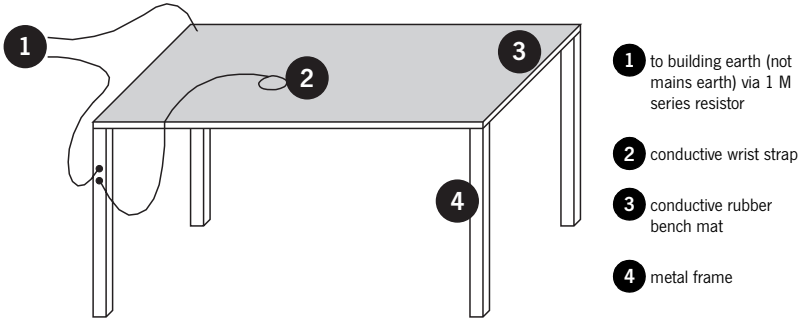
Type of accessory	Product code	Description
	TOPA-CH-300	Six-way multi-charger
Plug packs (for TOPA-CH-200)	T952-012	Australia, New Zealand and China (230 V 50 Hz input; plug configuration: )
	T952-022	Singapore and Middle East (230 V 50 Hz input; plug configuration: )
	T952-032	Mainland Europe (230 V 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-104	D clip
	TOPA-CA-105	Handstrap

Important information

Basic servicing precautions

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

Figure A-1: 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)*.

Standard anti-static procedures should be followed; a typical setup is shown in Figure A-1.

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

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 handportables 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 1.8*5 mm screws should be removed using the supplied Torx T6 driver. When replacing these screws, set the driver to 2 inch pounds.

Pan Pozi M2*8 mm and M2*5 mm screws should be removed using a Pozi 1 driver. When replacing these screws, set the driver to 2 inch pounds.

Programming

For information on programming Tait Orca 5000 handportables, 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 handportables, 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 handportables.

Basic maintenance

Your Tait Orca handportable 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 handportable 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 handportables 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 Limited. 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 handportables 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 handportables and accessories are approved by Factory Mutual Corporation (FM) to the following 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
Non-Incendive: 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

FM approved products

Refer Figure A-1. Radios with the following product code have FM IS approval:

- TOP-a2cd0-T2

FM approved accessories

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

- TOPB200-IF NiCd IS battery pack

- TOPA-AA-003 rugged speaker-microphone

- TOPA-AA-004 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.