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## Technical Note TN-689

### **New Fast Charger Firmware V3.09**

9<sup>th</sup> October 2001

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#### **Applicability**

This Technical Note applies to all variants of the TOPA-CH-200 fast charger series, TOPA-CH-300 6 way charger and the T3002 Fast Charger.

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## **1. Introduction**

#### **Background**

After an investigation into the current charging algorithms employed by the Tait produced Chargers, a number of changes have been made to improve the service life and shift life of the batteries.

The new charger firmware V3.09 was introduced into production on the 1<sup>st</sup> of October 2001. The first serial number of a TOPA-CH-200 to have the new firmware is **16100207**. The date code on the battery is **J01**. New TOPA-CH-300 and T3002 chargers are yet to be built, but any purchased after the date specified above will have the new charger firmware.

**Please note** that it still very much up to the user to maintain and use the battery correctly and for the customer to be sold the correct battery for their needs. If the customer is trained correctly and the batteries they are supplied with are suitable for their needs, you will exceed (and manage) their expectations.

Please refer to TN-688 for more battery use and maintenance information.

## 2. Modifications

### What are the changes?

The changes made to V3.09 fast charger firmware code are as follows:

1. Rest Period of 30 minutes added for the end of fast charge. This rest period will allow the cells to cool down before trickle charge begins. This enables the cell pressure to reduce before further charge injection, thereby reducing cell stress and helping to maximise service-life.
2. Trickle charge time reduced to from 90 to 60 minutes. This has been shown to be sufficient to achieve full charge following the rest period given that charge efficiency is higher with the reduced cell temperature. For NiMH packs the trickle charge current is also reduced from 115mA average to 50mA as NiMH packs are very close to full at the end of fast charge and they are more susceptible to damage from overcharge.
3. Standby charge time has been changed from indefinite to 12 hours and the charge rate reduced from 67mA to 50mA average. This maintains overnight “on-call” performance but prevents potential damage through indefinite charge at 67mA. After 12 hours the charge rate is dropped to 15mA average to prevent overcharge but compensate for self-discharge. This lower maintenance charge rate is well suited to applications where the radios and batteries are left on the chargers for a long length of time and must be ready to work (fully charged) at a moments notice (Civil Defence).
4. Trickle charge is bypassed if the pack temperature is above 40 °C at the end of the rest period. Whilst warm the charge efficiency is low; skipping trickle charge enables the pack temperature to fall thereby reducing stress on the pack and improving service life.
5. “Dead-flat” batteries often fail to charge on v2.07 or earlier chargers, the charger indicating a red-flashing LED after a few seconds of insertion. Sometimes these packs will commence charge after a number of insertions into the charger. V3.09 gives batteries up to 30s pre-charge, or until the voltage comes up, enabling dead-flat batteries to be charged. If the pack voltage does not come up within 30s the charger will indicate a fault (red flashing LED).
6. Charger version number can now be identified by number of red and green LED flashes. To show the version number, hold the discharge button then plug in the power lead.

### 3. Extra Warning

**Is your battery faulty or not?**

If the negative contact on the battery (or charger) is dirty, or the power supply from the plug pack is low, the charger will indicate a fault by flashing the LED (V3.09 flashing red, V2.07 flashing amber).

If your battery charger indicates a “1 sec on /1 sec off” red-flashing or orange flashing LED within 3s of the battery being put on charge then check the battery contacts. Clean the contacts if contacts are dirty or corroded, using a 4H or harder pencil, before attempting to recharge.

A power supply fault is indicated by a flashing LED with a duty cycle of 2 sec on / 1 sec off. (V3.09 flashing red, V2.07 flashing amber). The charger is actually trying to start charging, but keeps resetting with the above fault condition.

**If you observed this fault condition, please check the negative contact of the battery being charged and / or check the loaded voltage of the plug pack supply.**

**CSOs**

Please pass this information onto all technical and sales staff. Dealers will also need to be informed of the change to new charger firmware.

### 4. Issuing Authority

**Name and position of issuing officer**

Barry Crates  
Senior Customer Support Engineer