

## 1 Introduction

The Fastrack User Guide lists “peak” and “average” current consumption values, but gives no detail on the nature of the peaks.

This paper presents the results of some current measurements on a Fastrack modem at various supply voltages.

## 2 Reference

Please refer to the following Wavecom documents:

<b>Title</b>	<b>Reference</b>	<b>Rev</b>	<b>Date</b>
<i>Fastrack Modem M1306B User Guide</i>	WM_PRJ_M13_UGD_001	002	5 Apr 2005
<i>Fastrack Modem M1306B User Guide</i>	WM_PRJ_M13_UGD_001	003	11 Nov 2006

## 3 Disclaimer

The information contained herein is presented in the hope that it may be of some use; it is given “as-is” and entirely **without any warranty of any sort** – any use of it is **entirely at your own risk!**

In particular, note that these results represent only a few measurements on a single unit – no attempt has been made to investigate variations from unit to unit, or the effects of different operating conditions, etc.

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## 4 Test Setup

The measurements were made with a Fastrack M1306B Modem having the following version information:

<b>AT Command</b>	<b>Response</b>
at+whwv	Hardware Version 4.84
at+wdop	Production Date (W/Y): 47/2006
at+cgmr	657_09gg.Q2406B 1954500 102706 18:44

A UK Vodafone pre-pay SIM was used.

Current was monitored using a Maxim MAX471 current-sense IC to give a 2V/A signal to the oscilloscope; full details of this chip can be found at <http://www.maxim-ic.com>.

## 5 Data Call in Progress

### 5.1 Overview

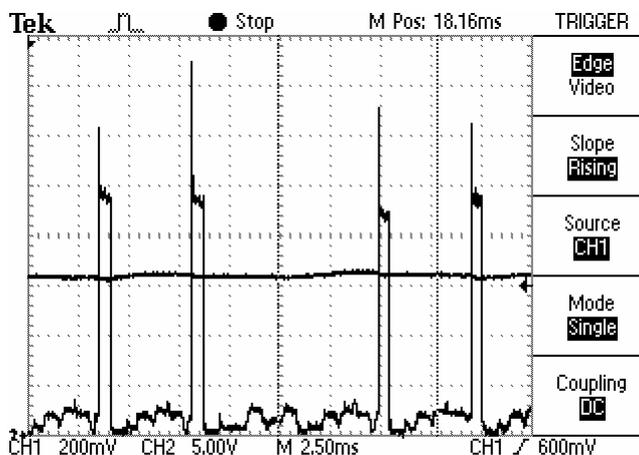
These traces show an overview of the current peaks during an established data call

CH1: Supply Current; 100mA/div

Instantaneous peaks of over 750mA;  
500µs peaks at about 460mA at intervals of 5ms or 10ms

CH2: Supply Voltage; 5V/div

16V nominal

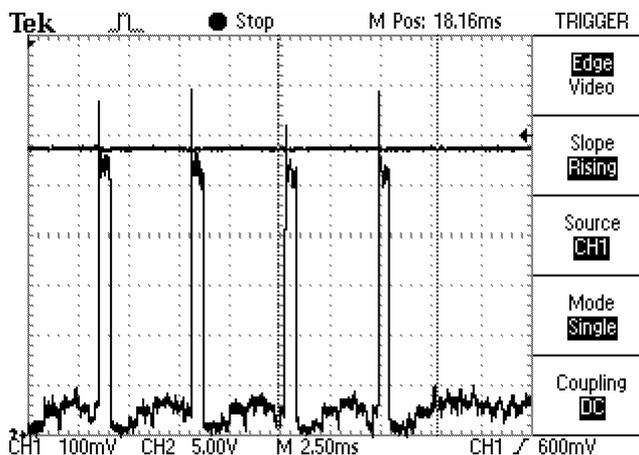


CH1: Supply Current; 50mA/div

Instantaneous peaks of over 350mA;  
500µs peaks at about 260mA at intervals of 5ms or 10ms

CH2: Supply Voltage; 5V/div

28V nominal



### 5.2 Detail

These traces focus on the detail of an individual current peak during an established data call

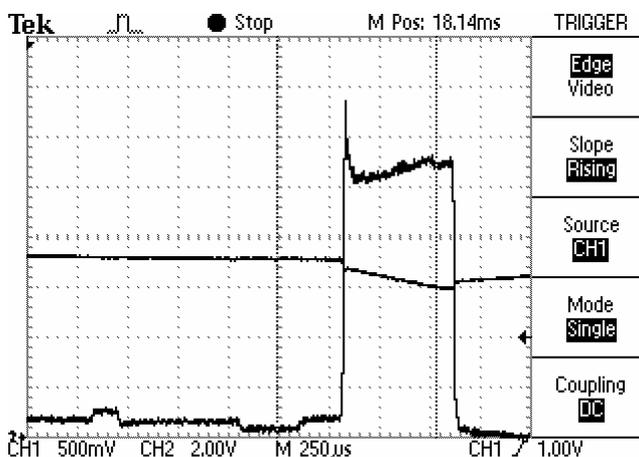
CH1: Supply Current; 250mA/div

An instantaneous peak of over 1.5A;  
500µs peak at about 1.3A;

CH2: Supply Voltage; 2V/div

7V nominal; droops to 6V during the current peak

At this voltage, note that there is a distinct rise in the current as the voltage droops;  
see also section 5.3, "Low Voltage Behaviour"

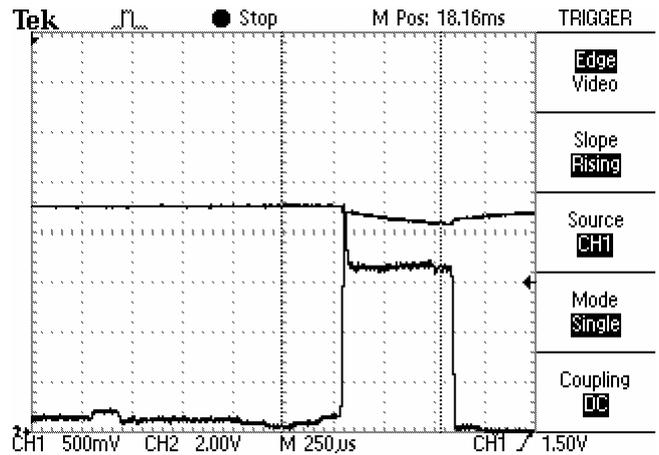


CH1: Supply Current; 250mA/div

An instantaneous peak of over 1A;  
500µs peak at about 760mA

CH2: Supply Voltage; 2V/div

8.4V nominal (NiMH battery); droops to 8V during  
the current peak

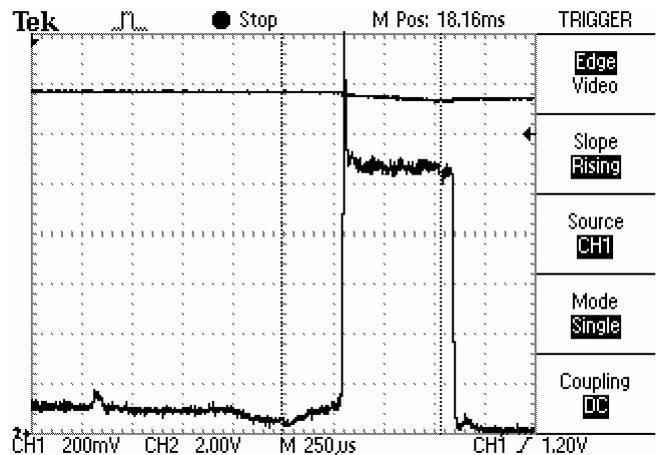


CH1: Supply Current; 100mA/div

An instantaneous peak of over 800mA;  
500µs peak at about 540mA

CH2: Supply Voltage; 2V/div

14V nominal; droops to 13V during the current  
peak

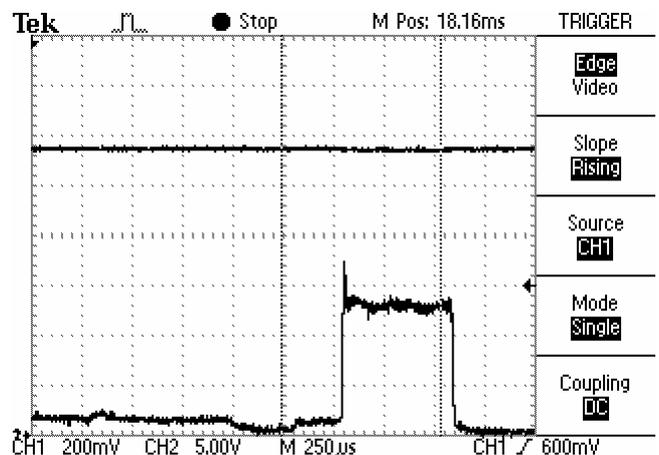


CH1: Supply Current; 100mA/div

An instantaneous peak of over 350mA;  
500µs peak at about 260mA

CH2: Supply Voltage; 5V/div

28V nominal; no noticeable droop during the  
current peak



### 5.3 Low Voltage Behaviour

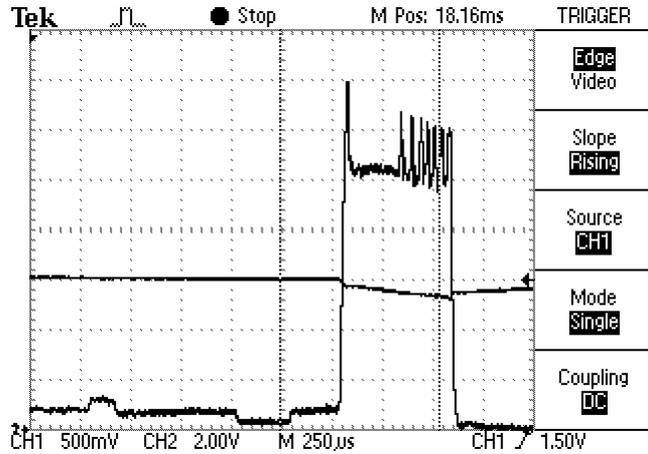
These traces show the effect on a current peak when the supply voltage is very close to the 5.5V minimum specification during a data call

CH1: Supply Current; 250mA/div

An instantaneous peak of over 1.75A;  
500µs peak at about 1.3A, with a burst of peaks  
to about 1.6A during the latter 250µs

CH2: Supply Voltage; 2V/div

6V nominal; droops about to 5.5V during the  
current peak



Note that the current becomes much more “spiky” as the supply voltage approaches the 5.5V minimum.

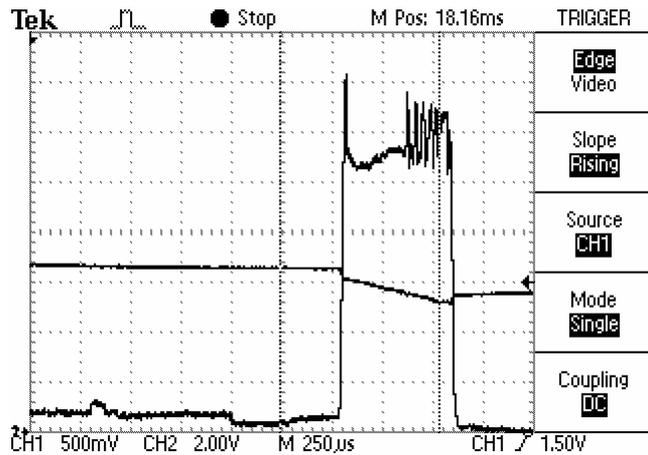
In the next case, the power supply reservoir capacitance was reduced to deliberately exaggerate the “droop” of the supply voltage. Note again how the current increases and becomes much more “spiky” as the supply voltage approaches the minimum:

CH1: Supply Current; 250mA/div

An instantaneous peak of over 1.75A;  
500µs peak at about 1.3A, with a burst of peaks  
to about 1.6A during the latter 250µs

CH2: Supply Voltage; 2V/div

6.2V nominal; droops nearly to 5.5V during the  
current peak



If the supply is allowed to droop below 5.5V, the current becomes unstable and the unit will reboot.

## 6 Incoming Call – Ringing

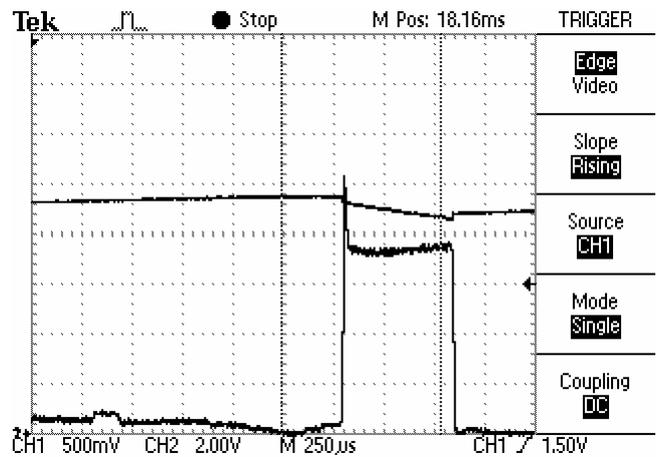
This trace shows the detail of an individual current peak at the start of an incoming call

CH1: Supply Current; 250mA/div

An instantaneous peak of over 1.25A;  
500µs peak at about 900mA

CH2: Supply Voltage; 2V/div

9V nominal; droops to about 8V during the current peak



## 7 Conclusions

- Although the peak currents quoted in the Fastrack User Guide may sound alarmingly high at over 2A, the peak-to-mean ratio is also very high, and the peaks are very narrow.
- At low supply voltages, great care must be taken that the voltage never falls below the 5.5V minimum at any point – especially during the current peaks!