Re: *Timex M515 Heart Rate Monitor – Class 2 Permissive Change*
Subj: *Description of Changes*
Date: *December 10, 2003*

Prepared by:
John Davino
Timex Corporation
555 Christian Road
Middlebury, CT 06762

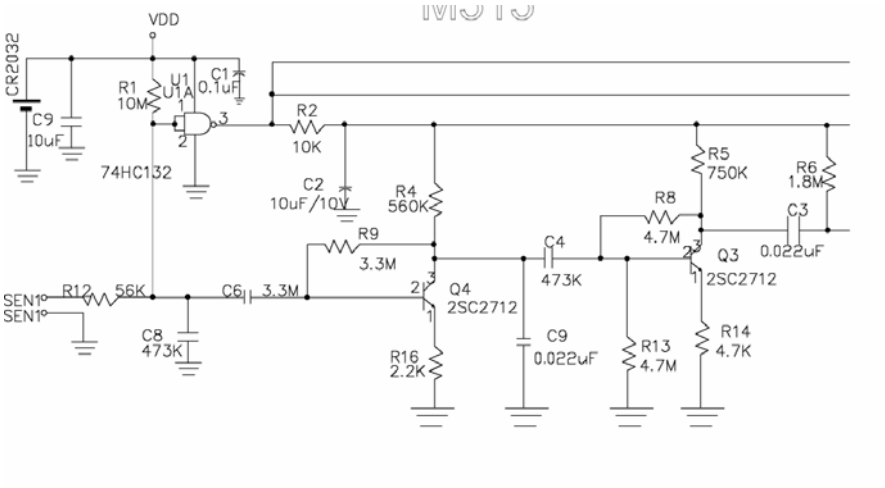
I. Front End Circuit Changes

Changes were made in the front-end circuit, used to pickup an electrical heart beat signal from a person's chest, in order to reduce noise and to provide a regulated supply voltage. Component changes were as follows:

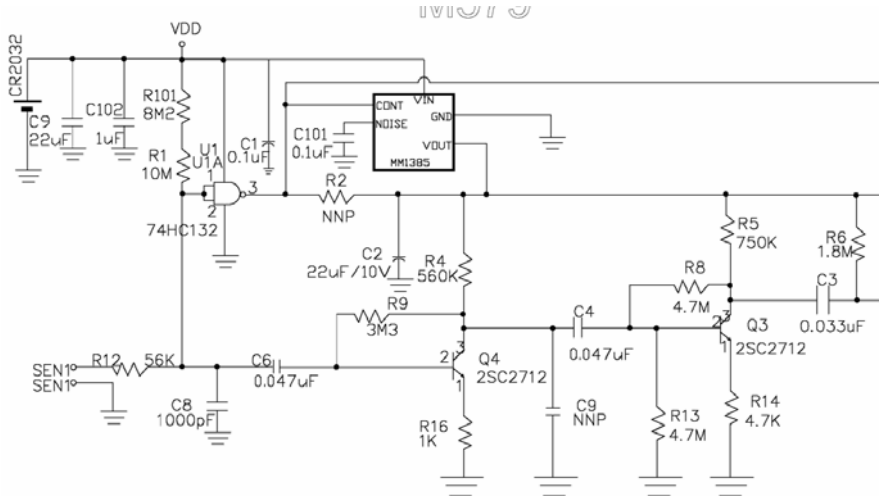
1. Increase the C9 from 10uF to 22uF in Vdd.
2. Add C102 1uF in Vdd.
3. A LDO MM1385 is added to supply 2.7V for the pickup circuit.
4. Reduce C8 from 0.047uF to 1000pF.
5. Change R16 from 2K2 to 1K.
6. Remove C9 0.022uF.
7. Change C3 from 0.022uF for 0.047uF.
8. Change R9 from 3M3 to 5M6.
9. Remove R2.

Schematics depicting these changes are as follows:

ORIGINAL



MODIFIED


VDD
CR2032
C9
22uF
C102
1uF
R101
8M2
R1
10M
U1
U1A
74HC132
C1
0.1uF
C101
0.1uF
CONT
NOISE
VIN
GND
VOUT
MM1385
R2
NNP
C2
22uF/10V
R4
560K
R9
3M3
R5
750K
R6
1.8M
R8
4.7M
C3
0.033uF
Q3
2SC2712
C4
0.047uF
SEN1
SEN1
R12
56K
C6
0.047uF
C8
1000pF
Q4
2SC2712
R16
1K
C9
NNP
R13
4.7M
R14
4.7K

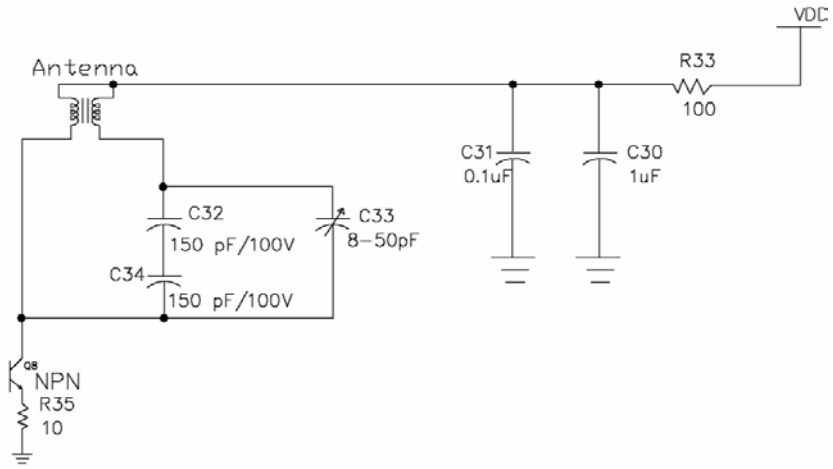
I. RF Circuit Changes

Minor changes were made in the RF Circuit to improve tuning. Component changes were as follows:

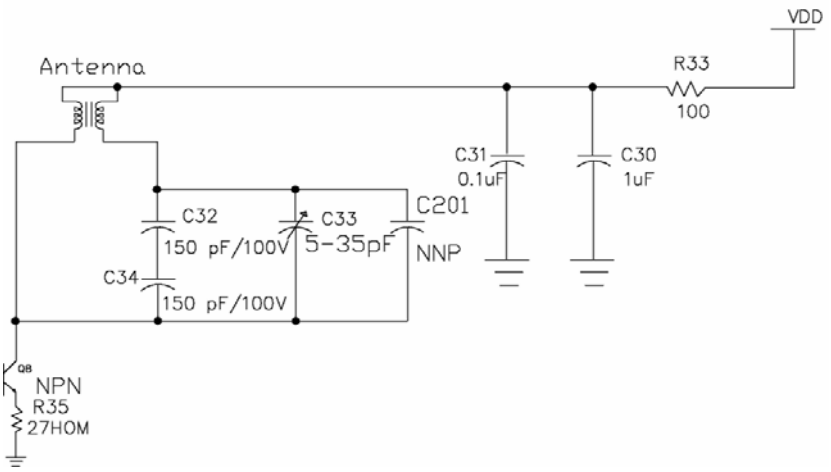
1. Change the resistor R35 from 10 ohm to 27 ohm.
2. Change the trimmer C33 from 8-50pF to 5-35pF.
3. Add the capacitor C201 for tuning.

Schematics depicting these changes are as follows:

ORIGINAL



MODIFIED



I. Other Changes

The following other minor changes were made to the product to improve performance and reduce cost:

- PCB layout modified (to accommodate circuit changes)
- Firmware algorithm modified (to improve performance/UI)
- Sensor pad material changed (to reduce cost)