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H1R RBL
B7H HQX
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(56) Documents Cited:
EP 0980790 A
WO 2002/094614 A
WO 2001/058721 A
DE 004228605 A
WO 2002/096711 A
WO 2002/044646 A
DE 010118492 A
US 6279977 B

(58) Field of Search:
UK CL (Edition X) **B7B, B7H, B7J, G4A, H1R**
INT CL[7] **B60R, G06F**
Other:

(54) Abstract Title: **Vehicle-mounted computer**

(57) A computer is mounted in a compartment of a vehicle, e.g. one for holding for a radio, and is powered from the vehicle battery. The computer may comprise a motherboard 11 with a CPU 12, RAM 13, hard disc drive 14, DVD/CD drive 15 and 12 volt power supply 16 in a casing 10. The power supply may comprise a voltage regulator and shut down controller to suppress power surges. The computer may have a touch screen and a voice synthesis device for inputting commands. It may be connected to a global positioning system 27 and to the vehicle loudspeaker system.

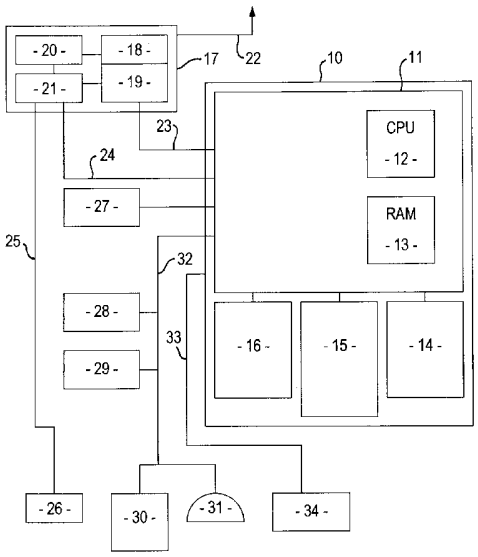

Fig 1

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

The claims were filed later than the filing date but within the period prescribed by Rule 25(1) of the Patents Rules 1995.

This print incorporates corrections made under Section 117(1) of the Patents Act 1977.

The print reflects an assignment of the application under the provisions of Section 30 of the Patents Act 1977.

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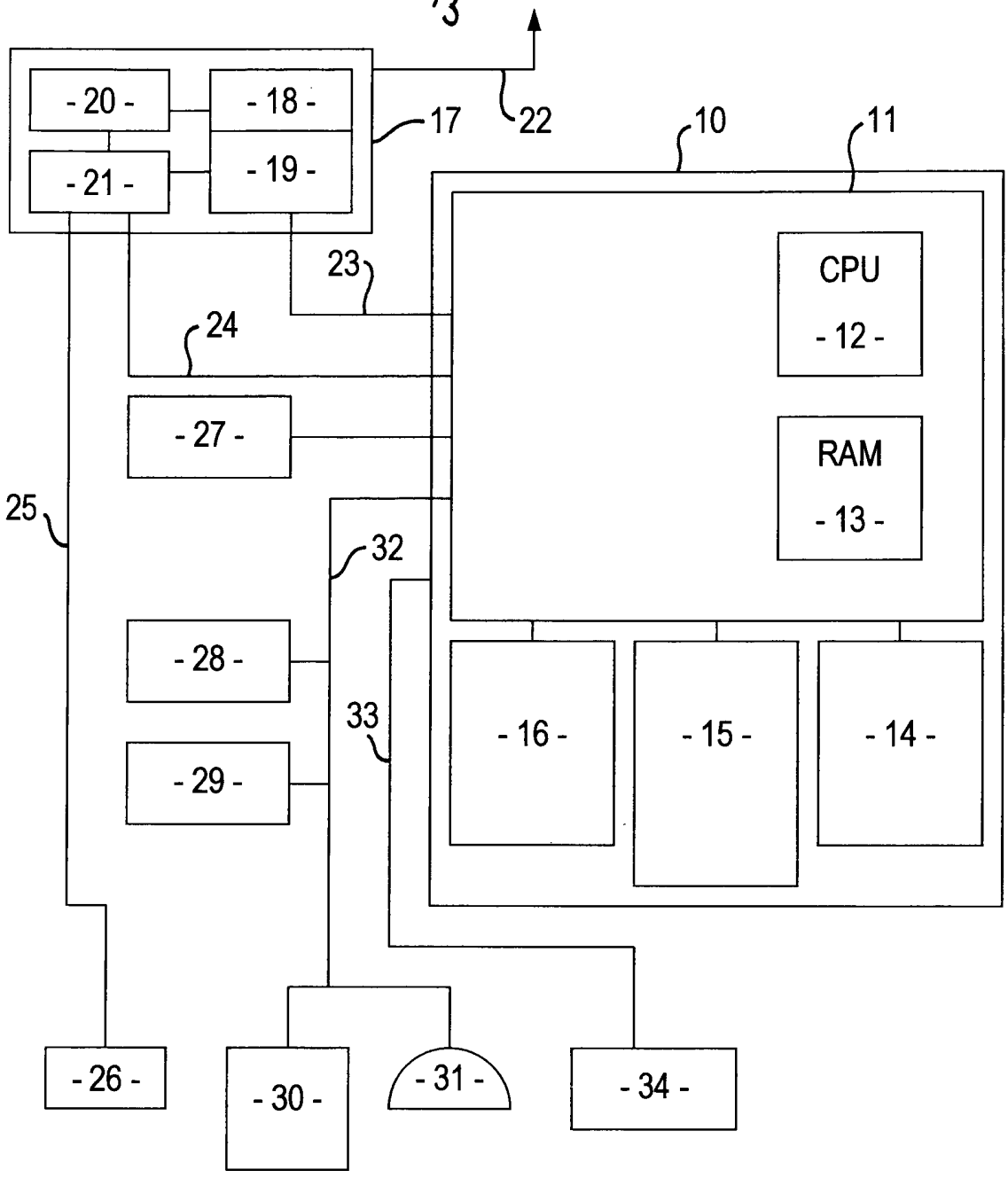
- 20 -
- 18 -
- 21 -
- 19 -
17
22
10
11
CPU
- 12 -
RAM
- 13 -
23
24
- 27 -
25
32
- 28 -
33
- 29 -
- 16 -
- 15 -
- 14 -
- 26 -
- 30 -
- 31 -
- 34 -

FIG. 1

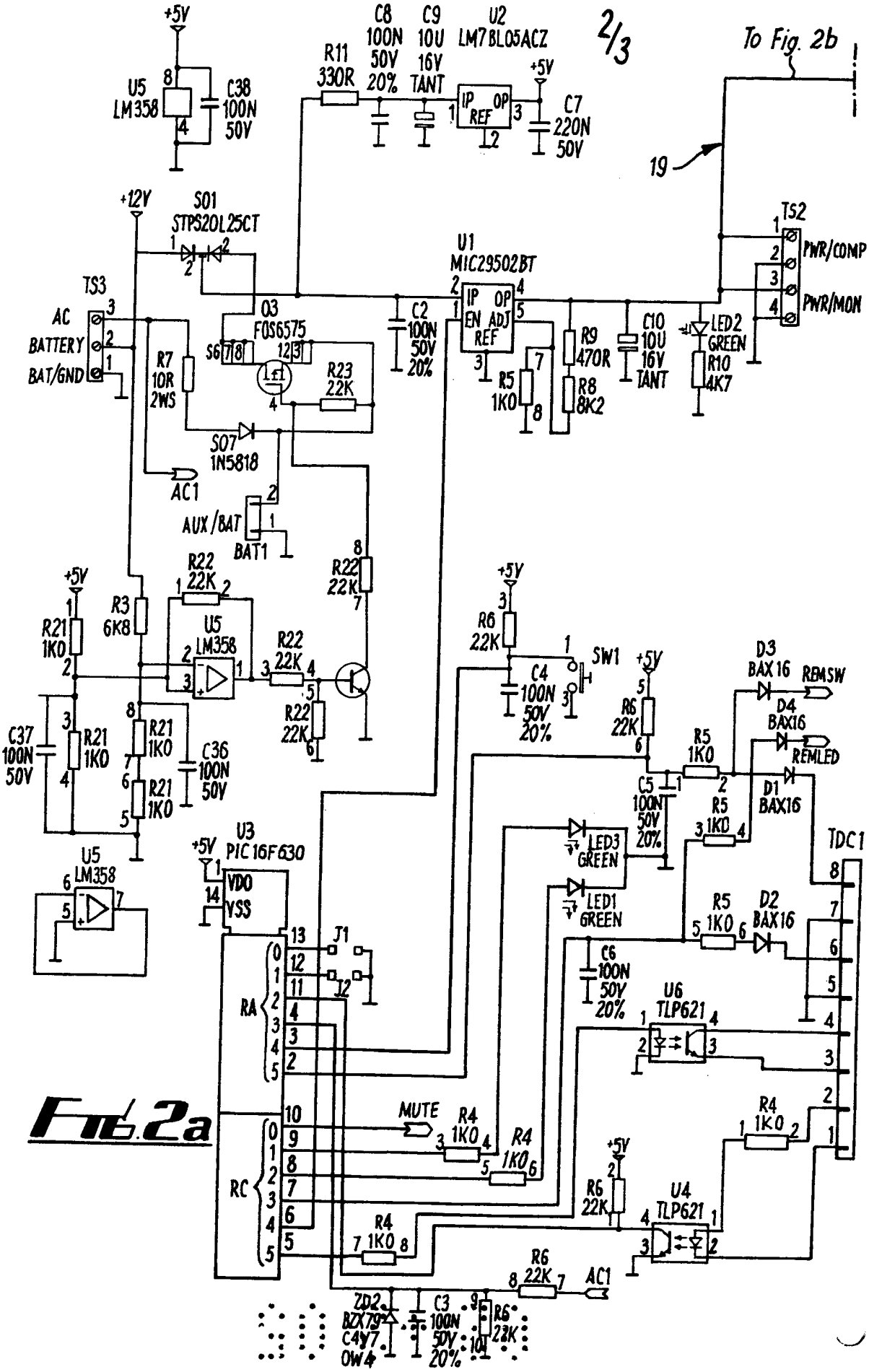
2/3
To Fig. 2b
19
+5V
+12V
U5 LM358
C38 100N 50V
C8 100N 50V 20%
C9 10U 16V TANT
U2 LM78L05ACZ
IP OP REF
C7 220N 50V
R11 330R
S01 STPS20L25CT
U1 MIC29502BT
IP OP EN ADJ REF
C2 100N 50V 20%
TS2
PWR/COMP
PWR/MON
TS3
AC
BATTERY
BAT/GND
Q3 FDS6575
R23 22K
R7 10R 2WS
S07 1N5818
AC1
AUX/BAT
BAT1
R9 470R
R8 8K2
R5 1K0
C10 10U 16V TANT
LED2 GREEN
R10 4K7
R22 22K
R3 6K8
R21 1K0
C37 100N 50V
C36 100N 50V
U3 PIC16F630
VDD
VSS
J1
RA
RC
R6 22K
SW1
C4 100N 50V 20%
D3 BAX16
REMSW
D4 BAX16
REMLED
D1 BAX16
C5 100N 50V 20%
LED3 GREEN
LED1 GREEN
D2 BAX16
C6 100N 50V 20%
U6 TLP621
U4 TLP621
R4 1K0
MUTE
ZD2 BZX79 C4V7 0W4
C3 100N 50V 20%
TDC1

Fig. 2a

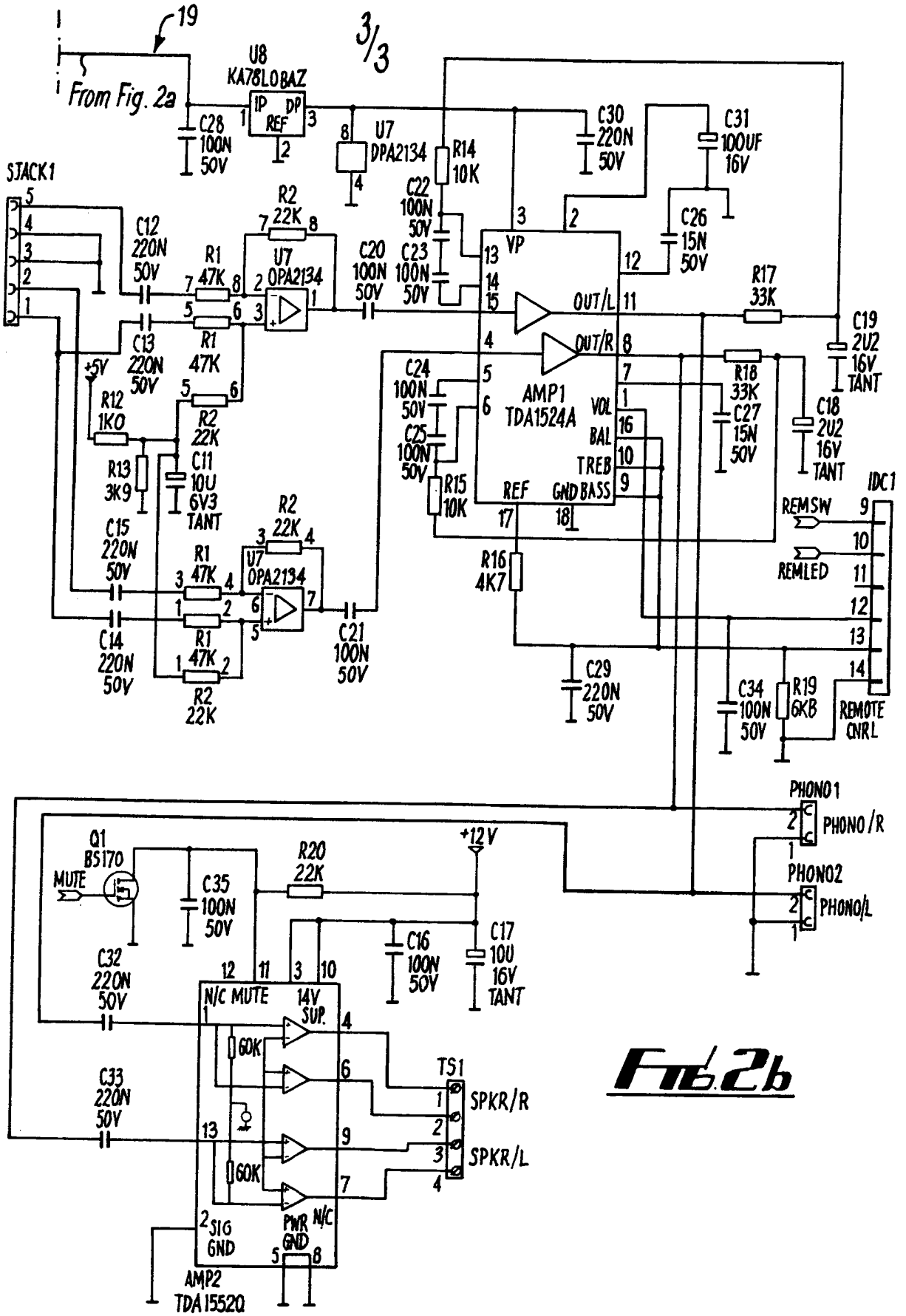
19
From Fig. 2a
U8
KA78L08AZ
IP
DP
REF
C28
100N
50V
U7
DPA2134
R14
10K
C30
220N
50V
C31
100UF
16V
C22
100N
50V
C23
100N
50V
C26
15N
50V
SJACK1
C12
220N
50V
R2
22K
R1
47K
U7
OPA2134
C20
100N
50V
VP
OUT/L
OUT/R
R17
33K
C19
2U2
16V
TANT
+5V
C13
220N
50V
R12
1KO
R13
3K9
C11
10U
6V3
TANT
C24
100N
50V
C25
100N
50V
R15
10K
AMP1
TDA1524A
VOL
BAL
TREB
BASS
REF
GND
R18
33K
C27
15N
50V
C18
2U2
16V
TANT
IDC1
REMSW
REMLED
C15
220N
50V
C14
220N
50V
C21
100N
50V
R16
4K7
C29
220N
50V
C34
100N
50V
R19
6K8
REMOTE
CNRL
PHONO1
PHONO/R
PHONO2
PHONO/L
Q1
BS170
MUTE
C35
100N
50V
R20
22K
+12V
C16
100N
50V
C17
10U
16V
TANT
C32
220N
50V
C33
220N
50V
N/C
MUTE
14V
SUP.
60K
TS1
SPKR/R
SPKR/L
SIG
GND
PWR
GND
N/C
AMP2
TDA1552Q

FIG. 2b

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VEHICLE MOUNTED COMPUTER APPARATUS

This invention relates to vehicle mounted computer apparatus.

Portable computer apparatus is known which may be operated in a vehicle, which apparatus is provided with its own built-in power supply which may require to be charged periodically. These are however standard portable apparatus such as lap-top and palm top computers which can be used anywhere and whilst they can be used in the vehicle, by a passenger or by the driver when stationary, they do not form any part of an installation in the vehicle. It is also known to use suitably programmed microprocessors, with appropriate sensors and read-outs and / or alarm devices to monitor functions of a vehicle such as tyre pressure and inform the driver of the current state of the functions concerned.

It is desirable to be able to provide an in-vehicle computer system which has full compatibility with free standing office and home personal computer systems, importantly but not exclusively, to provide facilities for travelling business people, and for the in-vehicle computer installation to be operable using the vehicle battery as a power source thus avoiding the frequent re-charging required for portable computer apparatus such as lap-top computers, palm tops, and other devices which may be regarded as sophisticated calculators rather than full computer systems.

It is an object of the invention to provide a vehicle installed computer apparatus, and the invention provides a vehicle installed computer comprising a processor, and associated components in a housing dimensioned to fit in an available compartment in the car, and adapted to be powered from the vehicle battery.

The housing may conveniently be adapted to be mounted in a compartment normally used to house a radio in the vehicle.

The power derived from the vehicle battery is notoriously subject to voltage surges or "spikes", particularly when opening or closing a circuit. With a typical 12 volt supply at 6 amps, a surge of a few volts applied to computer devices may represent sufficient excess voltage to impair the operation of the devices.

Accordingly, the computer according to the invention preferably includes a controller and regulator device to limit the voltage applied from the power supply to the computer apparatus.

The controller and regulator device may operate in response to an on/off switch and turn the main supply voltage on or off from the computer power supply in the correctly timed sequence.

The controller and regulator device may operate to apply a voltage of about 0.5v less than the input, to the computer, when the nominal 12v power supply is less than about 12.5v. If the input exceeds about 12.5v, then the regulator will limit the output to a maximum of 12v (I 0.6v).

A preferred embodiment of a vehicle installed computer will now be described with reference to the accompanying drawing wherein:-

Fig. 1 is a block diagram showing functional relationships of the components of the computer, and

Fig. 2 is a detailed circuit diagram of a shutdown controller and regulator forming part of the computer.

A vehicle installed computer comprises a casing 10 designed and dimensioned to fit into an existing compartment provided convenient to the driver's and/or front passenger's seat of a vehicle, such as the radio compartment provided in most vehicle designs. Casing 10 encloses a mother board 11, which mounts a processor 12 and a RAM 13, and also hard disc drive 14, DVD/CD drive 15, and a 12 volt DC power supply unit 16.

A power supply unit 17 encloses a voltage regulator 18, an ATX shutdown controller 19, auxiliary battery 20, and an audio frequency amplifier 21. The regulator 18 and controller 19 are connected by a line 22 to the vehicle electric system, including the vehicle battery, ignition system and car speaker system via a standard ISO adaptor, and also by line 23 to the power input of the mother board and also the power (on/off) switch of the computer and LED indicators for showing the status of the electrical systems.

The audio frequency amplifier is connected by line 29 to an audio output of the computer, by line 25 to a volume control 26, and the line 22 to the vehicle speaker system.

A GPS (global positioning system) receiver 27 is also connected into the computer to enable position information to be displayed in connection with route finding or mapping software to assist in navigation of the vehicle.

USB input ports are connected to an array of input devices, including a wireless LAN adaptor 28, a radio-frequency receiver antenna 29, a keyboard 30 and mouse 31, by a line or group of lines 32.

A final connection via line 33 is to a touch-screen 34 which functions both as a display, and as an input device.

Additional features may be included, although not shown, such as a voice-synthesis device for providing an audio-output in spoken word form, and a voice-recognition device as an input device for translating and inputting spoken commands. This latter may be important to provide a hands-free environment which can be used when driving.

Fig. 2 is a circuit diagram of the ATX shut down controller 19 which provides for overload protection to the computer hardware, particularly when switching the computer on and off.

The controller 19 includes circuitry which suppresses power surges in the battery circuit. A typical nominal battery rating is 12 volts. However, when switching on or off the power supply to the computer, or turning an ignition key to start the vehicle engine, voltage surges or "spikes" are common occurrences. The controller 19 clips these spikes and ensures that voltage surges are not passed to the components of the computer thereby protecting the components against burn-out or other damage, peak voltage being limited to say 12.5 volts.

Further, the circuit includes a delay circuit which maintains power for a predetermined time, say from 1 to 10 minutes when the vehicle ignition is switched off.

The computer apparatus of the invention enables a fully functional PC compatible computer to be installed in a vehicle for use in the vehicle, in a compact housing and with the vehicle's built-in power source being used to drive the computer.

It is of course to be understood that the invention is not intended to be restricted to the details of the above embodiments which are described by way of example only.

CLAIMS

1. A vehicle installed computer comprising a processor and associated components in a housing dimensioned to fit in an available compartment in the vehicle, and adapted to be powered from the vehicle battery.

2. A computer according to claim 1, wherein the housing is adapted to be mounted in a compartment normally used to house a radio in the vehicle.

3. A computer according to claim 1 or 2, wherein the computer includes a controller and regulator device to limit the voltage applied from the power supply to the computer processor.

4. A computer according to claim 3 wherein the controller and regulator device is operative in response to an on/off switch to turn the main supply voltage on or off from the computer power supply in a correctly timed sequence.

5. A computer according to claim 3 or 4 wherein the controller and regulator device operates to apply an output voltage in the order of 0.5v less than the input, to the computer and is adapted to limit the output to 12.0 volts.

6. A computer according to claim 1 wherein the housing comprises a casing which encloses a motherboard, the latter mounting a processor and a RAM, a hard disc drive, a DVD/CD drive and a DC power supply unit.

7. A computer according to claim 6 wherein the power supply unit encloses a voltage regulator, a shut down controller, an auxiliary battery and an audio frequency amplifier.

8. A computer according to claim 7 wherein the voltage regulator and shutdown controller are connected to the vehicle battery, ignition system and car speaker system, and to the power input of the motherboard and the power switch of the computer.

9. A computer according to any proceeding claim also comprising a global positioning system receiver connected to the computer.

10. A computer according to any proceeding claim comprising a touch screen which functions as a display and as an input device.

11. A computer according to any proceeding claim including a voice synthesis device and a voice recognition device as an input device to achieve hands free operation of the computer when driving.

12. A computer according to claim 7 wherein the shutdown controller includes a clipper or surge suppressing circuit to eliminate voltage spikes or surges in the power supply, and a delay circuit which enables the power to be maintained for a predetermined period when the vehicle ignition is switched off.

INVESTOR IN PEOPLE

Application No: GB0329263.8 **Examiner:** Alex Littlejohn

Claims searched: 1-12 **Date of search:** 15 April 2005

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	1,3-8, 10-12	EP 0980790 A (Johnson) see whole document, e.g. col 1 lines 37-39
X	1-8,12	WO 02/096711 A (Batolozzi) see whole document, e.g. page 5 lines 2-4
X	1-8, 10-12	WO 02/094614 A (Bosch) see whole document, e.g. page 7 lines 5-35 & US 2005/0018392
X	1,3-12	WO 02/044646 A (Calam) see whole document, e.g. page 18 lines 6-8 and page 20 lines 1-3
X	1-8, 10-12	WO 01/58721 A (Kim) see whole document, e.g. page 5 lines 1-3
X	1-8, 10-12	DE 4228605 A (Blaupunkt) see WPI abstract 1994-075387
X	1,3-8, 10-12	DE 10118492 A (Wilhelm Solutions) see WPI abstract 2003-020659
X	1,3-12	US 6279977 B (Chan) see whole document, e.g. col 4 lines 29-45

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^{X} :

B7B; B7H; B7J; G4A; H1R

Worldwide search of patent documents classified in the following areas of the IPC[07]

B60R; G06F

The following online and other databases have been used in the preparation of this search report

EPODOC, WPI