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(54) Intelligent system of displaying controlled information in traffic lights

(57) The intelligent system of displaying controlled information in traffic lights is a system which transmits dynamic information through Internet in the thoroughfare and that, unfolded in a luminous exhibitor object (device), that presents the information using symbols, texts and animated graphics, it is shown to the users of the transit roads, exclusively during the red phases of the traffic lights crossings.

Handled from a Control Center, the information can at the same time be executed in multiple exhibition objects in points or remote sites of one or several cities of a country, and even of extra continental sites, lean those, indeed, to the traffic lights regulators of the transit to which they are serving then, or disposed in places near the sight line of the traffic lights.

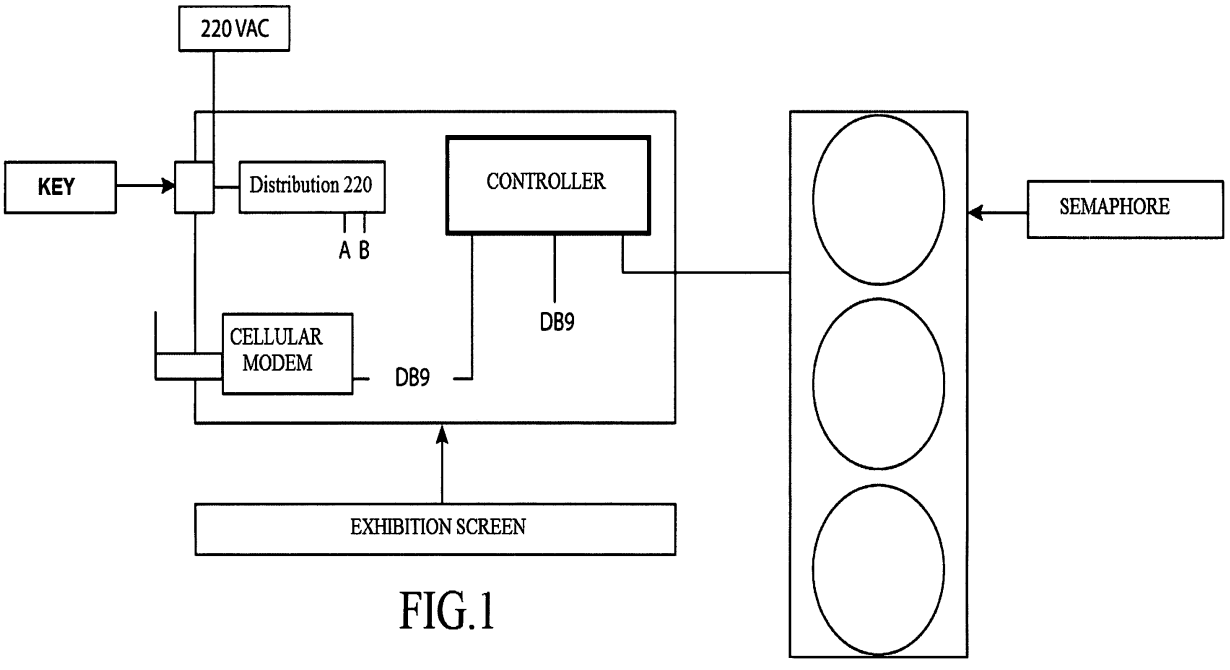

FIG.1

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Description

OBJECTIVE OF THE INVENTION

[0001] The Intelligent System of Controlled Information in Semaphores (SIICS) is a system which transmits dynamic information through Internet in the thoroughfare and that, unfolded in a luminous exhibitor object (device), that presents the information using symbols, texts and animated graphics, it is shown to the users of the transit roads exclusively during the red phases of the semaphores crossings.

[0002] Handled from a Control Center, the information can at the same time be executed in multiple exhibition objects in points or remote sites of one or several cities of a country, and even of extra continental sites, lean those, indeed, to the traffic lights regulators of the transit to which they are serving then, or disposed in places near the sight line of the traffic lights.

[0003] The system integrates elements (components) of Hardware and Software whose development has been orchestrated to control and order the following activities:

- The demarche, simultaneous, of a multiplicity of display objects without limitation of space or time;
- The concentration of the management and informative exhibition of the entire network in a single point (center) of administration;
- The wireless communication (using means of Internet), with all and each one of the exhibition objects;
- The temporary and geographic planning pertinent of the information to unfold;
- The automatic change of the information according to the programmed planning;
- The synchronization of the exhibition of information with the phase of red light of the traffic lights and,
- The service of direct communication and instantaneous update, offering varied information to the users of the transit roads.

[0004] The SIICS, as Technology of the Information and the Communication associated to the electronics, is developed and applied in the field of the communication in the thoroughfare, particularly the semaphore communication.

[0005] In this field are regislered: the posters of advertising information, those of tourist information and road information, and the posters of signaling for transit ordering, including the traffic lights.

ANTECEDENTS OF THE INVENTION

[0006] It is no necessary to mention the importance that Communication has, neither of reviewing the history of its evolution, nor of remembering the technological advances of the last times, or remarking the necessities that arise from the implementation of the technologies and the diffusion of the new knowledge. The communication is a basic necessity of people and any contribution to its diversification, extension or improvement, in whichever field that is, will be welcome.

[0007] The thoroughfare is a propitious field for the communication and it shows diverse means with different supports.

[0008] Although the technology of the communication has obtained unthinkable achievements never imagined long ago, in the thoroughfare novel methods of communication with application of new technology have not been developed. The billboard of advertising order, as well as the one of road ordering, has maintained its traditional characteristics except for some updates in its physical format.

[0009] The ones who present request of the present proposal, are titular's of a previous request (of date 11/04/97- Model of Utility, Act N° U-3508 and of the 6/06/03, Act N° U-3966). On this one has been worked in the past time of its use, in the development of technological methods and new technical elements that improve notoriously and extend the reach of the mentioned model, forming as a whole, an Integral System of Communication for use in the thoroughfare.

[0010] In effect, the mentioned model "connected luminous panel to traffic lights" widely describes the physical and technical characteristics of a leaned electronic panel to the regulating traffic lights of the transit and represents a "Model of Utility" created to improve and to extend the functions of the traffic light traditional, without obstructing the normal flows of the transit that circulates controlled by the lights of his one and associated to the referred model.

[0011] Although this constitutes a newness that was in its opportunity properly appreciated by the examining technicians of the diverse countries where also the model was asked for and that, in addition, was considered a novel element not only compared to the known elements of traditional use in billboard of the thoroughfare , such as could be posters of publicity or signaling and traffic lights, but also as opposed to other found antecedents, from the descriptions of the "connected luminous panel to traffic lights" exclusively comes off the utility of a model with certain and own physical and technical characteristics that does not represent then, by itself, which within the framework of the new request is the invention which today we propose like "Intelligent System of Controlled Information in Traffic lights" (SIICS).

[0012] In order to form the SIICS, according to what was previously mentioned, new made to size components are integrated, specifying (since it is made more

ahead) own characteristics of each one and that, associated to an exhibitor object installed in the traffic lights, constitutes as a whole the invention.

[0013] The new request today pretended refers then to a System of Communication nonexistent in the thoroughfare until the moment.

[0014] To the effects of location of the present invention, we defined traffic lights like communicational elements or means of service for transit order, that act on the road intersections establishing a communication that is transformed in a unidirectional message towards the receiver of, that is to say, the user, is this one conductor, companion or pedestrian.

[0015] The administration of the service, that is to say, the message control of the traffic lights, is carried out by the Municipal or Ministerial Authority of each region or city (according to the case) and its handling is restricted to each urban and suburban configuration.

DESCRIPTION OF THE INVENTION

[0016] The public road is a mean in which there exists a big concentration of users that circulate in it permanently, converting by this reason in objective of several interests. Such interests motivate the development of determined activities in search of reaching success of its own and particular objectives.

[0017] Between those objectives (aims), for example, we mentioned the one of the authorities entrusted and responsible for the maintenance of the entire infrastructure that constitute the scope of the road or public circulation and that, by itself represents a great and expensive activity, the same if we speak of vehicular or human circulation.

[0018] The objective that takes to an activity that also is carried out by the responsible authorities within the state organisms and that, we emphasized like specially tied to the scope of performance of the SIICS, is the one of the Ordering, Information and Traffic control in the public thoroughfare, where for the achievement of those objectives (aims), the resource of the communication with the users of the transit routes is used.

[0019] For this aim, necessary a fluid and effective handling of the system of signaling control as well as the effect or turn out of its application is on the routes of vehicular circulation, way of which the corresponding authority can offer a service more competent than the present one, of easy handling and greater reaches, without generation of risk nor loss of time for the users of the transit routes.

[0020] It is as well required to arrive, more and more, with a message format that contributes, not only a basic code of road circulation, but ampler and more elaborated elements of intellectual interpretation, that improve the psychic state of the conductor and be prone to a positive attitude, calmed, prudent, indispensable attitudes to develop with a greater security in the transit.

[0021] The other heading of activity to emphasize that also ties to the SIICS in the public thoroughfare is the one that unfolds the publicity, activity that consumes enormous economic resources and uses diverse means or supports for the accomplishment of its assignments.

[0022] It has not taken place in these mentioned fields, an invention able to contribute a novel and useful tool to improve the services of communication with his objective public (the users) and that results, therefore, in a benefit as much for the ordering of the transit like for the advertising information in the public thoroughfare.

[0023] The SIICS is a novel system of communication in public thoroughfare that, through specific elements of Hardware and Software (which are explained more ahead), provides a tool of transit Control and Communication that does not have precedents in the industry (history)

[0024] Their main components are; an electronic mechanism of control developed to size and installed in each one of the multiple devices or luminous exhibitioners, that orders and gathers together in the memory of its electronic circuit the animated information generated and planned previously, according to the demand, by an Administrator Program also developed custom-made of the invention, that is sent soon from a Server towards the diverse exhibition objects, without limitations of geographic location or temporary space.

[0025] The electronic Controller detects the changes of green-red, red-green phase and orders the unfolding of the information in the corresponding exhibitioner during the red phase and according to the planning programmed from the Power station.

[0026] In addition, the system has created a mechanism of Consultation of the activities of the diverse exhibitioners that, through a specific Program, offers the users of the system, are these clients private public or, an additional monitored service by which they can visualize, in real time, its own animations contracted and unfolded in the different exhibitioners.

[0027] The general mission of the SIICS, Intelligent System of Controlled Information in Traffic lights, is to provide to the control system of present transit, of a technological model that allows to maintain a constant communication in line with all and each one of the road intersections, controlling a system of billboard with information animated from the traffic lights or their environs and, to offer to the public of transit and the enterprise corporations, dynamic informative means of ample cover, that does not have answer in existing means at the present time.

The specific objectives of this invention are

- The constitution of a network of information dissemination on the thoroughfare, commanded from a Control center, connected with the competent authority and yet another client of the informative diffusion;

- The handling and Planning of the Information to un-

fold in the public road through a Program of Administration, centralized commanding all the system;

- The creation and the handling of an historical file of the developed activities in the network for benefit of the administrators of the information and the users of the service, to which it is possible to be resorted at any time from an Inquiry program.

- The use of wireless mass media for the instantaneous transmission of the data, from the Power station to the diverse points of exhibition and the receipt confirmation from those points;

- The use of the same mean of Communication for the constant and permanent monitoring, through Internet, of the state and situation of all the exhibitors of the network;

- The use of electronic luminous exhibitory Objects leaned to the traffic lights ordering of the transit, and formed to unfold the information planned from the Program of Administration;

- The definition of a visible format of the exhibitory Object in the thoroughfare, suitable to the specific location for its functioning

- The creation of a communication channel with the clients of the information service, or is the authorities responsible for the operation of signaling to vehicular as well as particular institutions or companies,

- An electronic mechanism of interface with the traffic light, defined to synchronize the exhibition with the red light of the same one

- The configuration of the same electronic mechanism of control of the exhibition, to unfold it in the exhibitor object according to an hour planning and of categorization programmed and ordered from the Power station.

- The same electronic mechanism of control of the exhibition, formed to suspend it in case of flaws of local order or in the line of communication;

- A mean of permanent control of the activity of the exhibitory objects like also of the traffic lights to which they are leaned, to detect possible irregularities in its parallel operation communicating it to the Control center;

- An electronic mechanism associated to the luminous source of the exhibitory object, formed to regulate the emission of its light according to the luminosity of outer environment.

DESCRIPTION OF THE DRAWINGS

[0028] The present descriptive memory is complemented, with illustrative planes of the preferred example and never limited of the invention.

Figure 1 represents an example of accomplishment of a schematic representation of the connection between the traffic light, the screen and the controller.

Figure 2 represents a scheme of the circuit corresponding to figure 1.

Figures 3a and 3b represent the totality of the circuit and its connections. Figure 3a represents a first half of the circuit and figure 3b represents the other half of the circuit. Both parts are connected to each other by the bullets

PREFERENTIAL ACCOMPLISHMENT OF THE INVENTION.

[0029] According to the objectives previously mentioned, we NEXT made a description of the general system and its components, accompanied by drawings and schemes, as a way to illustrate on a preferred way of practical solution of the invention, that later or more early it could be implemented by experts in the office,
deciding on the advisable variants according to its knowledge and to the experience generated in the practical application of the same one.

[0030] In the system are conjugated well-known elements and developed elements as they do to the newness and they constitute the invention as a whole:

Elements of hardware:

[0031]

- A network of exhibition objects or luminous screens
  The devices that compose the network of exhibitory objects, are electronic luminous posters and can be whichever of the electronic posters with led's technology, that are used with diverse aims in the commercial area. Preferably it is considered apt for the aims of the system, the Utility Model "connected luminous panel to traffic lights" mentioned in chapter Antecedent, whose characteristics arise widely descriptive from the file of "divisional patent".
- An electronic controller
  The controller module consists of a hardware component made according to the invention, annexed to each exhibitory object or luminous screen. The controller includes the following functionalities:

  o Reception of the information

  o Programming of the luminous screen

o To make the interface with the traffic light

o To extinguish the screen when there is no red light

o To release duration of the lights to send the information to the server

Is composed by:

o Interface electronics with the traffic light (with galvanic isolation)

o Programmable electronics to control the screen and to administer the communication with the server

o General switch

[0032] Within the cabinet the 220V feeding is distributed to the MODEM and the screen by means of 2 independent feedings, A and B.

[0033] The controller connects itself to the MODEM and the screen with cables DB9 that transports as much feeding 12v to the controller like the signals of communication RS232.

[0034] The Micro- controller makes the logic of intelligence. The MODEM GPRS is formed so that it can autoconnect with the server by a port TCP. In this way, every package sent by the server will be transmitted by the MODEM y all the information received by Rx will arrive to the server inside a TCP package.

[0035] In effects of the micro-controller or the screen, it is as if they were connected directly with the Server.

[0036] The interface module is the one that transforms the signal of the red light (22ov) into TTL.

[0037] The controller must engage in a dialog with the server to manage the transference of animations and to send the information of light duration.

[0038] By the other side, a communication between the server and the exhibitory object for the shipment of the blocks settles down that compose the animation.

[0039] This communication is habilitated with signals that by logic doors unite the transmission of the exhibitory object with the reception of the MODEM and the transmission of the MODEM with the reception of the exhibitory object.

[0040] In a regime state, a signal solely activates the communication between the micro-controller and the MODEM. The transmitted information by this one does not arrive at the exhibitory object as well as the information that can be sent by the exhibitory object does not arrive at the MODEM either.

[0041] In this state, the controller can inform to the server its own state, duration of red light, etc. The server will be able as well to inform to the controller what banks of animations must show the arrival of the red light. In a parallel way, the micro-controller pays attention to the red light to make the changes of Banks already programmed.

[0042] The state corresponding to the load of animations activates the corresponding signals to allow the flow of information between the exhibitory object and the MODEM (connected to the server). The signal by the exhibitory object is also processed in the micro-controller to know in what moment the transmission finishes and to return to the regime state. The signals are generated by the micro-controller.

- A Cellular MODEM
  For this application a MODEM was searched with the following characteristics:

  Protocols: GSM/GPRS

  Bands: GSM850, EGSM900, DCS 1800, PCS 1900

  Feeding: 5-9V

  Operation range: -20oC...60oC

  Unlike a standard MODEM the connection is made wirelessly to a direction IP.
  The MODEM is handled with AT commands. An interesting characteristic of this MODEM is the possibility of auto-connection.
- A sensor of light
  Electronic device connected to the circuit of leds to regulate the light of the screen according to the outer luminosity
  The sensor takes the light from the outer environment and defines, within a preestablished rank, the maximum extreme light that must be in the screen of the exhibitory object. This allows diminishing the dazzling possibility during the night and increasing the visibility in a day of extreme luminosity.

Elements of Software:

[0043] For the application of the system, a Software that handles the set and allows to operate it was implemented. It is a development made according to the invention. It consists in the following Modules:

- Module of service /Transmission
  This module is a transparent application for the users but handles the communication with the exhibitory objects. It is the one in charge to execute the planning in the server.
  The service reviews the data base periodically to verify if planning exists to send. When it finds them, it initiates the communication with the exhibitory object in order to send the information. The shipments become under the form of Dumps and Sequences.
  Each planning can include the programming of up

to 4 banks of animations.
These can be used in hour strips (up to 4 hour strips) or in auspice animations (it does not have an appearance schedule and can be used altogether with shipments of text message)
A planning is the effective one for an exhibitory object, from its execution to the execution of a later planning for the same exhibitory object.
When the date from execution of a planning (for ex. Arrives at 3:00 a.m. of the indicated day), a Dump is sent including the animations of all the banks including in all the blocks.
The shipment of dump implies a transmission of several hundreds of kilobytes (depending on the planning), therefore the shipment of dump takes some minutes.
When the hour arrives to change a bank from an hour strip to the following one, the service sends a Sequence to the exhibitory object so that this one changes the bank that is happening. This shipment is very small and the time of transmission is despicable.
The exhibitory object also sends information to the service. This is made periodically by a LIVE message. The service keeps the received information in a file, generating a new registry whenever changes in the sent information.

- Administration /Control Module
  Is client-server application who must execute itself in the same local network that the servant.
  The application serves to administer the system, allowing:

  o To handle the Configuration

  o To handle the general information (streets, cities, etc)

  o To handle to the organizations (clients, Intendance, exhibitors)

  o To create planning

  o To send manual sequences with text messages

  o It allows sending text messages

  o It allows extinguishing the exhibitory object

  o It allows changing the active bank by outside the planning

  o It allows combining several banks

  o To visualize reports

- Monitoring/East Module
  Consultation module is a designed application to be distributed to clients and Intendance, as well as to be used internally by the Control center.
  The application is designed in 3 layers:

  o Layer of data (in the servant)

  o Layer of businesses (in the server)

  o Layer of presentation (in Intendance, clients and exhibitory objects)

  The application communicates with the server by Internet.
  It allows visualizing the screen of the exhibitors with the information received by such, including the file.
  In addition it allows visualizing the animation programmed for the moment in the exhibitory object.
  It also allows, to the users of Intendances, to send messages to the users of the company to unfold in the exhibitory objects.

Claims

1. Intelligent System of Controlled Information in Traffic lights, constituted by a network of electronic exhibitors of information on the public road, installed in posts of the traffic lights or zones bordering these, linked to a Central Server, controlled by a general Administration Program installed in a processor that, by wireless technology and through Internet develops and executes all the informative activity in the exhibitors network, yet being this local, regional or international, being the information, unfolded in the devices instantaneously or deferred according to a planned order, shown to the users of the transit roads exclusively during the red phases of the semaphore crossings.

2. Intelligent system of Controlled Information in Traffic lights, according to claim n°1, **characterized by** the management and control of a multiplicity of exhibitory objects through the application of a General Program, constituted by the following modules of command with specific execution functions: Service, Administration and Monitoring.

3. Intelligent System of Controlled Information in Traffic lights, according to claims 1 and 2, constituted by a Program or Module of Service **characterized by** the development of an application in charge of reviewing periodically the data base in search of new planning, initiating, if there is, the communication with the exhibitors and sending them to those, installed in the transit routes.

4. Intelligent system of Controlled Information in Traffic

lights, according to claim n° 3, constituted by an application of the same program of Service **characterized by** the information registry that is sent by message LIVE from the exhibitors to the service, keeping the information received in a file.

5. Intelligent System of Controlled Information in Traffic lights, according to claims 1, 2 and 3, constituted by a Tranmission Module **characterized by** the application of a developed program to send, through Internet and using the wireless communication, the information generated in the Control center.

6. Intelligent system of Controlled Information in Traffic lights, according to claim n° 1, constituted by a Program or Module of Administration **characterized by** the development of an application to create the planning: to order the general, temporal and geographical information and according to the demand; to manage the organizations (Intendance, clients); send text messages and visualize reports.

7. Intelligent System of Controlled Information in Traffic lights, according to claim 1 and 2, constituted by Module of Control **characterized by** the application of a developed program to make a periodic monitoring of the exhibitors network, sending alerts by found problems and checking the individual operation of the different exhibitory objects.

8. Intelligent System of Controlled Information in Traffic lights, according to claims 1, 2 and 3, constituted by the Consulting Module, de **characterized by** the application of a developed program to accede, from Internet, to the visualization of the animated sequences active in the exhibitors, on the part of the clients of the service.

9. Intelligent System of Controlled Information in Traffic lights, according to claim n° 1, **characterized by** the constitution of Network of hardware units (exhibitory Objects), leaned to the traffic lights ordering of the transit or installed in visible places near to these, formed to unfold information transmitted from the Server.

10. System of Controlled Information in Semaphores, according to claim n° 9, **characterized** for physically having an adequate format adapted to the specific location determined for its operation.

11. System of Controlled Information in Semaphores, according to claim n°1 and following, **characterized by** the control and centralized command of the informative exhibition whichever being the geographic location, the temporal space or the amount and variety of the unfolded information.

12. System of Controlled Information in Traffic lights , according to claim n°1 and following, **characterized** to have, connected to each exhibitor, an electronic mechanism of interface with the configured traffic light to synchronize the exhibition with the red light of the same one.

13. System of Controlled Information in Traffic lights, according to claim n°12, **characterized** for the same electronic mechanism configured for controlling the ordering or hour planning of the information in the exhibitor, programmed from the Administration Module.

14. System of Controlled Information in Traffic lights, according to claims 12 and 13, **characterized** to be configured to suspend the information and the light of the exhibition devices in case of any flaw in the network or detachment of the communication with the Server of the system.

15. Intelligent system of Information Controlled in Traffic lights, according to claims 12, 13 and 14, **characterized** to be configured to periodically release the duration of the lights of the traffic light, being reported it to the. Server.

16. Intelligent system of Information Controlled in Traffic lights, according to claim n° 1 and following, **characterized by** an electronic mechanism associated to the luminous source of the exhibitory object, configured to regulate the emission of light of the same one, according to the luminosity of outer environment

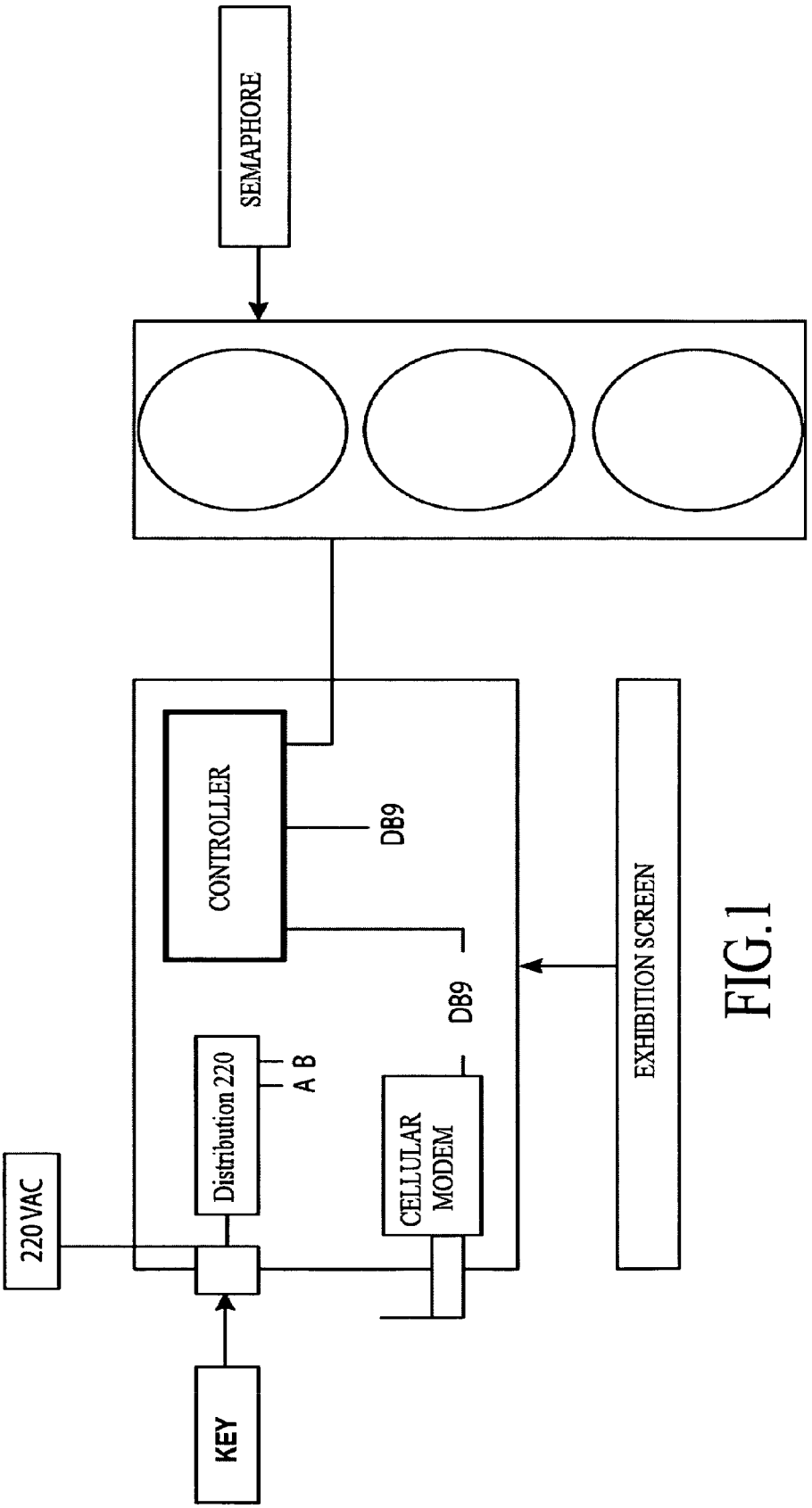
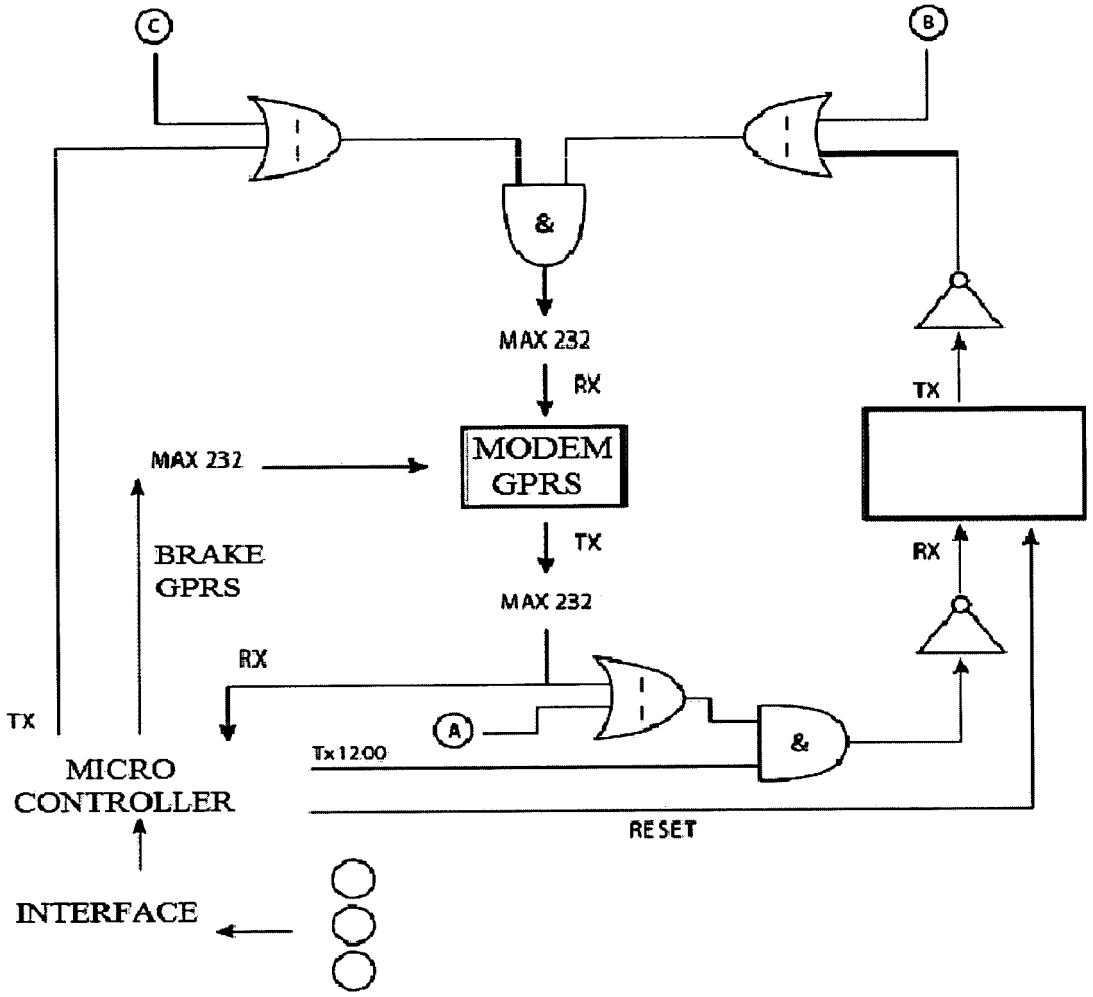

SEMAPHORE
CONTROLLER
DB9
DB9
EXHIBITION SCREEN
Distribution 220
A B
CELLULAR MODEM
220 VAC
KEY

FIG.1


C
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MICRO
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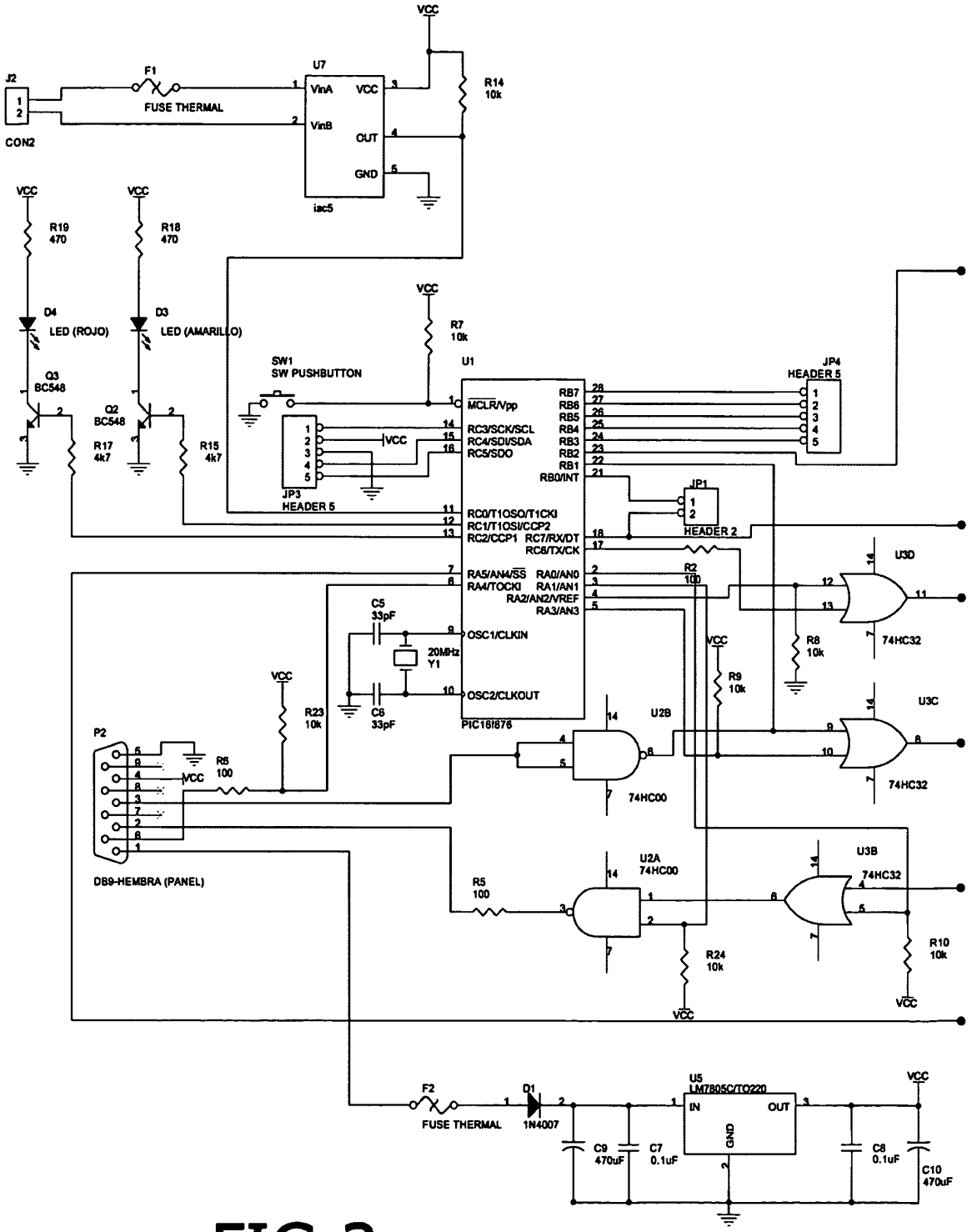
RESET
INTERFACE

FIG.2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Q2
BC548
R17
4k7
R15
4k7
SW1
SW PUSHBUTTON
R7
10k
U1
JP3
HEADER 5
JP4
HEADER 5
JP1
HEADER 2
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RC2/CCP1
RC7/RX/DT
RC6/TX/CK
RA5/AN4/SS
RA4/TOCKI
RA0/AN0
RA1/AN1
RA2/AN2/VREF
RA3/AN3
R2
10
C5
33pF
C6
33pF
20MHz
Y1
OSC1/CLKIN
OSC2/CLKOUT
PIC16f876
R23
10k
R8
10k
R9
10k
U3D
U3C
U3B
U2B
U2A
74HC32
74HC00
P2
DB9-HEMBRA (PANEL)
R6
100
R5
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R24
10k
R10
10k
F2
FUSE THERMAL
D1
1N4007
U5
LM7805C/TO220
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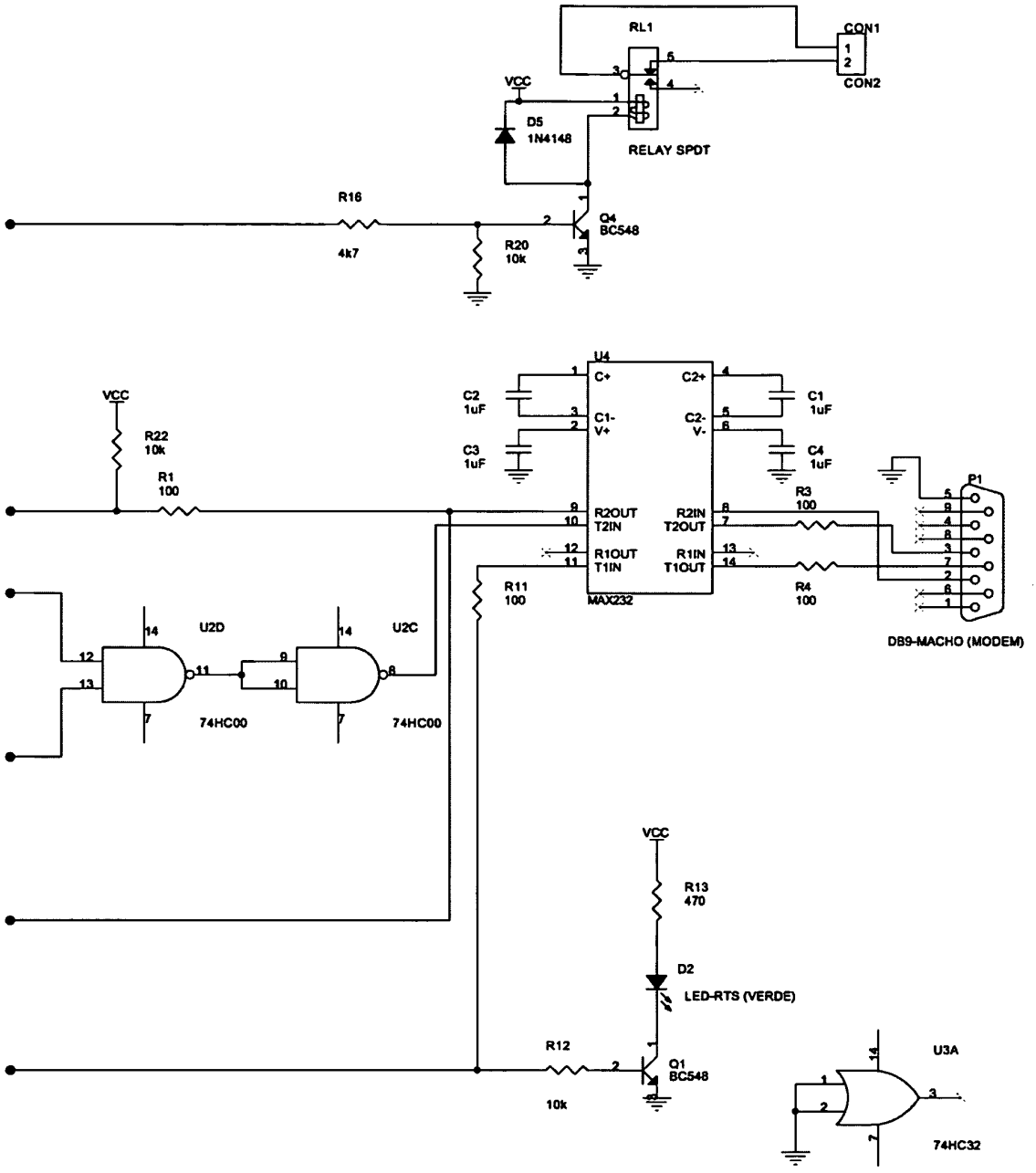
FIG.3a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V+
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V-
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D2
LED-RTS (VERDE)
R12
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74HC32

FIG.3b