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(54) Household oven interactive control and selection system.

(57) The system provides for oven control allowing the carrying out, both manually and by selecting preset recipes, of the different stages involved in cooking. Interactive selection allows programming thereof to carry out recipes automatically once the same is selected or activating the various types of oven according to the user's selection.

To such end, the system is provided with two functionally linked cards, a MASTER card (1) dealing with system control and a SLAVE card (2) basically aimed to try and represent the information on a CRT display (28) interacting with the former.

Especially to be noted within the power supply (3) is the presence of a mains fault detector circuit (38) and a mains-battery/battery-mains switching circuit (39), so that the structure and processes that can be carried out allow oven control and interaction with the user through a selection keyboard 912) and the CRT display (28).

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HOUSEHOLD OVEN INTERACTIVE CONTROL AND SELECTION SYSTEM

SPECIFICATION

OBJECT OF THE INVENTION

The instant invention relates, as mentioned in the title to this specification, to an interactive control and selection system for household ovens enabling the user to carry out, both manually and by selecting preset recipes, the different stages involved in cooking.

BACKGROUND TO THE INVENTION

It is a well-known fact that household ovens are usually provided on the one hand with means for selection by means of push-buttons allowing the desired options to be defined to the extent that the appliance allows, and, on the other, adequate indication through lights for the stage that is being carried out at that very moment.

Furthermore, some ovens allow recipes to be selected by reading a bar code and viewing the same on displays.

Any of the former systems require that the user know the different ingredients and amounts thereof, as well as the various times required for suitable cooking in order to be able to prepare the oven according to the needs required to such end. The user is compelled to read complicated manuals, whose complexity increases hugely as new improvements are added to the oven, for instance different ways of cooking (convection, microwaves, and so on), different temperatures or deferred starting. Selection can in these cases be so bothersome that the user would wish to have an easy and at the same time accurate means to be able to carry out the selection process rapidly and without having to refer to any manual.

No oven fulfilling these requisites is known to have achieved the user-oven interaction levels set forth herein.

DESCRIPTION OF THE INVENTION

The interactive selection and control system for ovens is fitted with means for, on the one hand, being able to select all data by hand (convection, microwaves, temperature, cooking time, and so on) and, on the other, to select the recipes submitted to the user by means of menus and provided with all necessary data so that once selection is completed, cooking can take place with the user only having to intervene to control the oven.

To such end, the system has a card, so-called MASTER, with a microprocessor and program and data memories as well as memories containing the cooking recipes. To assist the microprocessor in reading such memories, a logical circuit is provided for access to find the addresses of the data required for the recipe selected by the user. This selection is carried out by such user by means of a keyboard and replying to the various data and messages that appear on a CRT display. In order to relieve the microprocessor of its functions, there is a keyboard controller, which element specialises in the detection and coding of keys. Another specialised element, a device controller, deals with the signals that arrive from and for the microprocessor from the power or signalling elements.

A card, so-called SLAVE, with another microprocessor and the relevant program memories, preferably deals with functions regarding the CRT display. It is provided with a CRT controller that localises the characters, which are subsequently sent through an interface that prepares the video signal. Furthermore, and from the actual CRT controller through a synchrony logic circuit, both horizontal and vertical, and mode (inverse video, bold characters, and so on), the signals are assembled by means of the synchrony and video logic to be sent to the video card and from there on to the CRT display.

The system power supply has two controls at six and twelve volts and is provided with a mains fault detector circuit, and a mains-battery/battery-mains switching circuit for supply to the essential elements in order to resume the program if the mains are restored within a set time-period.

This oven's interactive selection allows it to be programmed to carry out recipes automatically once the same has been selected or to activate the different types of oven according to user's selection.

In the automatic recipe mode, the machine/user dialogue allows the user to select one of the recipes stored in the memory; know the ingredients and amounts thereof required to prepare the same; change the number of diners obtaining an immediate update on the amounts of ingredients, indicate the weight of the main ingredient according to which we would get the number of diners and the weight of the updated ingredients. Once the oven is activated, the system controls correct operation thereof according to the selected recipe, activating and deactivating elements, monitoring sensors and interacting with the user by means of written messages on the display and sound and light signals.

The so-called manual mode allows all the functions available in the oven to be selected by inserting, using the keyboard, all the parameters defining such functions, according to the sequence followed to request the same by means of messages on the monitor display. Furthermore, it allows several functions to be linked that are carried out successively with no interruption so that the user can thus generate an endless number of combinations of programs as he shall see fit. As in the case of the automatic mode, once the oven is activated, it controls the operation and interacts with the user.

It also allows other heating and defrosting modes, it being possible in this latter case to select the defrosting time or merely indicate the weight and food type. Upon activation, it operates as in the foregoing cases.

In all the above modes there are many aspects that we have not described and that directly result from what an interactive oven such as the instant one allows to be done. We could, for instance, point out extra time, maintaining heat while food is being handled, preheating the oven and so forth.

It also allows programming for deferred activation, in both the automatic recipe mode and the manual mode.

Emphasis should be placed on the dialogue that exists between the user and the machine hence expediting selection of the various options allowing the oven to be programmed, such as the exact knowledge of the phase in which it is and the handling that must be carried out at each time.

DESCRIPTION OF THE DRAWINGS

In order to provide a fuller description and contribute to the complete understanding of the characteristics of this invention, a set of drawings is attached to the specification which, while purely illustrative and not fully comprehensive, shows the following:

- Figure 1.- Is the block diagram of the control system.
- Figure 2.- Is the block diagram of the so-called MASTER card.
- Figure 3.- Is the block diagram of the so-called SLAVE card.
- Figure 4.- Is the electronic diagram of the mains fault control circuit.
- Figure 5.- Is the diagram V = f (t) in the event of mains fault whereupon the circuit subject of the previous figure starts to work.

PREFERRED EMBODIMENT OF THE INVENTION

In the light of these figures, it can be seen that the interactive control and selection system for household ovens subject hereof comprises a MASTER card (1) and a SLAVE card (2) linked with each other, in addition to a power supply (3).

The MASTER card (1) carries a microprocessor (4) and program (5) and data (6) memories as well as a recipe memory bank (8). To assist the microprocessor (4) in reading such memories, there is a logic circuit (9) for access to the required data of the recipe selected by the user, comprising a LATCH (10) and decoders (11). This selection is made by the user by means of a keyboard (12) replying to the data and messages that appear on the CRT display. In order to relieve the microprocessor (4) of its functions, there is a keyboard controller (13), which element specialises in detecting and coding keys. Another specialised element, a device controller (14) deals with the signals arriving from and for the microprocessor (4) from the power or signalling module (15) through the signalling interface (16) constituted by two integrated circuits (17).

The SLAVE card (2) carries another microprocessor (18) and a program memory (19) that preferably deals with the functions concerning the CRT display, as well as a data store (20). It is provided with a CRT controller (21) that localises in an EPROM character memory (22) the characters that are subsequently sent to a video interface (23) that prepares the video signal. Furthermore, and from the actual CRT controller (21) through a mode and synchrony logic circuit (24), comprising two integrated circuits (25-25'), signals are assembled together with the synchrony and video logic (26) and are sent to the video card (27) and from the latter to the CRT display (28).

Within the SLAVE card (2) there is also a temperature module (31) provided, as most significant elements, with a temperature sensor (32) , a variable resistance (33), a digital/analogue converter (34) and an operational amplifier (35) as well as a group of four transistors (36) that change a signal from level 0-5V to a level of 0-12 V.

The power supply (3) is provided with the mains lead (37), a mains fault detector circuit (38) and battery supply (39) with the elements required for mains-battery/battery-mains switching, to be described hereinafter.

Hereunder is a description of the processes that, linked in program-defined sequences, allow the user to select the different options and the device to select the control functions to put such selection to a good use and cook at the user's will.

In order to set up screens, the screen to be set up is formed reading the relevant data from the recipe memory (8) and is configured in the MASTER's RAM data memory (6) in the form of ASCII code for each character comprising the message, as well as control characters that could accompany the same (to obtain underlining, inverse video, bold characters and so forth) and in the position to be taken up by the CRT. The RAM (6) memory always has a full screen configured, continuously transmitted to the slave microprocessor (18).

After conforming the full screen, the latter is transmitted by the MASTER (4) to the slave (18) that places the same in its RAM (20) memory. This memory always has two screens: one received from the MASTER (4) and another sent to the CRT controller (21) row by row. The CRT controller (21) has two BUFFERS, each with capacity for a whole row, so that while one row is being transmitted to the monitor, the other is being simultaneously received from the RAM (20). A whole row is deemed to be a character string, as many as have been defined within the possibilities of the CRT display (28), counting spaces between each word.

Until now, the character is a BYTE with zeros and ones according to a code chosen by means of a programme, usually ASCII or HEXADECIMAL, and must be turned into signals understood by the monitor. Such conversion is carried out by the CRT controller (21) as follows: each character is defined in the RAM memory (20) so that the code used to define such character is related to its address in the character store (22). The full address is formed by the CRT controller (21) with eight bits that identify the character and a further four bits, added on the right of the foregoing to identify one of the dotted lines making up the character. The different characters are defined according to a rectangular matrix fixed in a character file and comprises sixteen lines with eight dots -PIXELS- per line, in this specific embodiment, but which may vary within the range of possibilities of the CRT controller (21).

When the CRT controller (21) has the characters that make up a whole line, these are localised in the character store (22) according to a sequence that reads first of all the first line of all the characters comprising the row, then the second line and so on until all the lines making up the characters of a row have been completed. As each datum is read in the character store (22) it is transmitted through the outputs thereof to the integrated circuit (23) inputs, this being a shifter bar that acts as a dynamiciser transmitting through one of its outputs a sequence series that, together with the signals from a further four outputs and treated by the part (25) of the video and synchrony conditioner (24) the first two and by (25') the second two, that define the control characters (for underlining, inverse video, and so forth), make up the video signal received by the CRT (28). The horizontal and vertical synchronism signals are respectively obtained from two of the CRT controller (21) outputs and through a synchronism conditioner (24) from four of the outputs thereof. These outputs are joined two by two and have breakers that allow the synchronisms suited to different CRTs to be conditioned. As to the keyboard controller (13), in order to detect a key

that has been pressed, it places a signal at either two of its outputs. These outputs select two sets of eight keys each, which number is sufficient for the needs foreseen. The keyboard controller (13) allows up to four different sets to be selected by means of another two outputs thereof.

Having selected the set of keys, the keyboard controller (13) sweeps its inputs to see which is receiving the signal placed at the respective outputs. If it does not receive it at any, it deduces that no key has been pressed. If, on the other hand, it receives the signal through one of those inputs, it recognises the relevant key and loads it in its buffer translated to a code, normally ASCII that the microprocessor (4) can understand. The keyboard controller (13) then interrupts the master (4) which carries out the routine that corresponds to such interruption advising the keyboard controller (13) to send the key contained in its buffer through the data bus to continue the program thereof.

The keys can also be detected by the actual microprocessor (4) by means of a routine of its program that would have to be carried out continuously. This would overload the master (4) with a program of greater complexity depriving the same of time to carry out other processes and, therefore, hindering its primary functions.

Furthermore, the use of a specialised component as a keyboard controller (13) allows other uses to be obtained that would, in the event of having to be programmed in the master (4), in addition to the complexity thereof, overload the same dangerously. Therefore, the keyboard controlling element (13) also deals with treating the possible rebounding signals that could arise so that they are not taken into account, and, therefore passed to the microprocessor (4). Similarly, discrimination takes place if a key is pressed continuously, interpreting the configuration as if it arrived repeatedly over a long interval as a sole configuration and not as a sequence of key configurations. If two keys are pressed at the same time, the keyboard controller (12) takes the first configuration that reaches it invalidating the rest until the latter disappears (the respective key is no longer pressed), and the buffer is emptied.

As to detections, open port detection is established by means of a microswitch, probe detection by means of a microswitch and by means of a circuit centralised in a multiplexer digital/analogue converter (34) that has three inputs that can be selected by means of the configuration of three of the inputs thereof joined to three microprocessor (18) outputs. The first detector to measure the oven temperature is a thermocouple, the second one to measure room temperature is an NTC and the third to measure probe temperature is another NTC, all of them connected to pines of the relevant connectors. The NTCs have a linearization circuit because the ratio temperature-resistance is not linear for this type of components.

The detection process begins when the configuration defining the detector that is to be measured reaches three pines of the A/D converter (34) from three pines of the slave microprocessor (18), which implies taking into account the respective signal.

As supply to both the temperature detection circuit and the actual A/D converter (34) takes place at 12V and the microprocessor (18) at 5V, it is necessary to condition the signals that must reach the A/D (34) converter from the microprocessor (18). To such end, four transistors are provided acting so that they invert the signal reached at that time from (18) and change the level of such signal from 0V-5V to 0V-12V so that it can be understood by the A/D converter (34). Furthermore, the variable resistance (33) permits a lower voltage and not the 6V to be taken as lowest reference value (room temperature), wherefore the range of temperatures that can be detected is even larger.

After defining the input, the A/D converter (34) waits to receive the signal from the microprocessor (18), whereupon such converter allows a condenser connected to one of its pines to be discharged, generating an impulse in another one when such discharge ends. The higher the temperature, the higher the difference in potential and the more the measurement converter of the A/D converter (34) is charged. Upon receiving the microprocessor (18) signal, the A/D converter (34) allows the converter to discharge, this latter doing so in a time proportional to the voltage applied. when discharge is completed, the A/D converter (34) generates an impulse through the relevant output.

When sending the signal, the valve microprocessor (18) begins an internal count that now terminates when the signal arrives, from the relevant output of the A/D converter (34) to another input thereof. The amount of this count defines the temperature measured for such slave microprocessor (18).

The fact that temperature detection is carried by the valve microprocessor (18) is because the latter has a smaller programming. Reading does not take place by means of an interruption, since these interruptions carry out a primary function which is refreshing the CRT display (28). Although these interruptions are very frequent, they scarcely last long and therefore there is enough time between each interruption to read the temperature measured.

The NTC room temperature detector also acts as a safety element, for if a temperature above a given value is detected (defined by software) the system stops and warns of the anomaly whilst keeping the refrigeration fan going, thus acting as safety element against overheating.

In order to read memories, the relevant program memory terminal is always activated. Selection from the RAM data memory (6) takes place through one of the decoders (11) that receives from one of the relevant microprocessor (4) outputs a configuration of impulses at three of the outputs thereof, which configuration, once decoded, generates an impulse at three of the outputs thereof, depending on which is the chip that is to be activated, RAM memory (6), keyboard controller (13) or device controller (14), respectively.

In the case of recipe memories (8), as many memory addresses have to be defined, the microprocessor (4) cannot possible handle as many as are required. This implies that the memory addresses must be divided into bands of ranges so that some of these ranges are common to several of the memories. This means to say that all the recipe memories have the same memory addresses.

It is hence necessary to define first of all which of the recipe memories is really to be read since the address itself does not suffice since it is common to them all. This is dealt with by one of the decoders (11). The microprocessor sends the recipe memory that it wants to read in the first place to an integrated circuit that is a decoder (14) which according to the memory to be read configures two of the outputs thereof that are connected to the relevant decoder (11) inputs, which decoder, together with the heaviest bit taken from the address bus through one of the inputs thereof and after decoding this set, generates an impulse at one of the outputs thereof that activates the memory selected.

Memory selection is moreover complemented with the integrated circuit (14), with the level of one of its pines that is connected to all pines corresponding to the data banks. According to such level, access to the selected memory will be to one of the two halves into which they are divided and that each correspond to a group of recipes.

The address of the memory cell to which one wants to have access is formed taking the impulses from the data bus (eight bits) by means of the LATCH (10) inputs that shall place the same through its A0 to A7 outputs to the address bus (sixteen bits) if this is ordered by the microprocessor (4) generating an impulse from a pin connected to the LATCH (10) input, thereby to obtain the eight lightest bits in the address bus. The lightest bits are those furthest on the right. As the address bus is made up of two bytes, the lighter ones and zeros are those of the first byte.

The address is completed by means of the impulses that the microprocessor (4) generates through eight of its pines, thereby completing the sixteen bits of the address bus.

Access is gained to the microprocessor program memory (18) in a manner similar to the master, though the fact that the CRT controller (21) always has to have a character row configured in its BUFFER obliges the microprocessor (18) to a very rapid reading of the RAM memory (19) and that the former cannot meet. In order to overcome this difficulty, the microprocessor (18) is assisted by a logic circuit that allows the data to pass simultaneously both to the actual microprocessor (18) and to the CRT controller (21), without the microprocessor (18) having to actually send the same upon receipt. Such logic circuit is connected directly to the CRT controller (21). The logic circuit and the CRT controller (21) therefore together allow direct passage from the data bus of the RAM memory (20) screens without the actual microprocessor (18) having in fact to do so and therefore allowing the CRT controller (21) buffer to be filled with the necessary speed so as to always be able to have (refresh) the CRT screen 928), for the CRT controller (21) would otherwise stop the whole process.

Control of the power elements is carried out by the device controller (14). This allows that from a set of impulses launched from the microprocessor to the relevant bus, three sets of ports can be made available with twenty-four outputs in all.

The first eight pines, together with two of the second set, are in charge of providing the impulses that will activate/deactivate the power element assigned to them and that will be connected through a circuit to the relevant terminals. The power element is controlled by a relay since the triacs are not operative at the working temperatures of the oven and with the currents that must be handled. The other pines will be connected to the set of inputs of an amplifier whose outputs are provided with signalling elements, both LEDS (lights) and a buzzer, to the relevant terminals.

Another amplifier like the foregoing is provided with its inputs connected to four of the device controller (14) outputs. This affords the possibility of having new stand-by connections in case it should be necessary to use new signalling elements.

The power supply (3) has two controls, a twelve volt control for the video card (27) and CRT monitor (28), as well as for the temperature detector circuit and the digital-analogue converter (13) and a six volt control (the main one) supplying through a diode D_1 located in the mains-battery switching circuit shown in figure 3, this lowering the level to five volts, both in MASTER (1) and SLAVE (2) cards and in the rest of the circuitry.

The fault control circuit in the mains (38) detects a drop in the power supply in the part of the circuit where the voltage is stable. Fault detection therefore takes place once the power supply has begun to drop and must be sufficiently efficient to detect the fault before the supply voltage drops considerably. Speed is essential in detection because the microprocessor must execute several instructions before going into the IDA stage, and such instructions must be read on the EPROM program (5) before supply thereto stops.

This power will in principle come from the supply. Before the latter goes down to unacceptable levels, a battery starts to work providing energy for some time to the system elements that are being powered expecting the mains to be restored in that time-period. If this does not happen, the process stops for good and the battery is disconnected.

Mains fault detection is based on the fact that the condenser C1 will discharge very slowly through the resistance R4, i.e., said condenser will maintain the value of the voltage stable for a long time after the latter drops. The operational OP1 detects when the stable output voltage drops under the voltage at C1. When a fault occurs in the mains, the stable voltage starts to drop rapidly and when its value is lower than the voltage at C1 (which is kept up) the operational OP1 swings, whereupon the interruption signal occurs.

Figure 5 analyses the evolution of the voltage when a mains fault occurs. The mains fault occurs at To and is detected when the initial VCC voltage (5V) has dropped down to V (0.1 V) whereupon, T1, the operational OP1 is triggered and warns the master (4) for it to start to carry out the input routine in the IDLE stage before the power voltage has dropped to VD since the master (4) program memory (5) containing the instructions to be carried out will by then be inoperative through insufficient power supply. By then, the master (4) will be powered by the battery.

It is important that T0(T0 = T1-T0) is small so that T1(T1 = T2-T1) be as broad as possible for there to be enough time for the input routine instructions to be carried out in the IDLE stage.

When the interruption signal occurs, the microprocessor (4) MASTER proceeds to stop the process and remains in the so-called IDLE stage maintaining the essential data to resume the process where it stopped if the mains are restored. In this state, the microprocessor (4) and the RAM (6) are powered by a battery that supplies energy at that time of low consumption. If the mains are not restored within a certain time-period, the process stops for good.

If, in fact, the mains are restored, the slave microprocessor (18) carries out a reset followed by the necessary initialization and, moreover, sends a character by line series to the master microprocessor (4) generating an interruption that takes the same from its IDLE stage, restoring its functions. This is necessary since the master (4) is never reset once it starts to work for the first time. A reset can in fact be carried out with an external switch, handled by an operator, but this should only be done under extreme abnormal working conditions.

The battery power circuit (39) allows the components that must remain active to be powered even in the event of mains fault. Switching thereof is automatic. Under normal operation, the transistor TR1 collector and emitter are at the same voltage and the said transistor TR1 does not conduct and, therefore, the batter BAT is not delivering energy.

In fact, the operationals OP1 and OP2 are always powered by battery BAT but consumption thereof is very small (some 0.2 mA). This power supply continues even after powering of the MASTER microprocessor (4) and the RAM (6) thereof is cut.

The operational OP2 output is at a low level and the condenser C2, connected to the 12V source, is loaded.

In the event of mains fault, the collector voltage drops saturating the TR1 transistor and allowing emitter-collector conduction placing energy at the output that powers the master microprocessor (4) and the RAM (6) and the decoder (11) that selects the RAM (6) itself as actual memory. In this situation, the condenser C2 is discharged through the resistance R5 slowly so that it keeps the operational OP2 voltage V- above V+ connected to the battery so that the output of such operational OP2 is at a low level. As the condenser is discharged, there comes a time when V-is lower than V+, whereupon the operational OP2 swings placing its output at a high level interrupting conduction of the transistor TR1 and powering of the MASTER microprocessor (4), the RAM (6) and the decoder (11) finally stops. The time of discharge of condenser C2 is such that it does not allow the battery to become exhausted for if this happened it would be rendered useless for good. This battery is rechargeable and under normal operation is continuously charging (continuous charge modality).

We feel that the device has now been sufficiently described for any expert in the art to have grasped the full scope of the invention and the advantages it offers.

The materials, shape, size and layout of the elements may be altered provided that this entails no modification of the essential features of the invention.

The terms used to describe the invention herein should be taken to have a broad rather than a restrictive meaning.

Claims

1. Household oven interactive control and selection system, aimed towards allowing the carrying out, both manually and by selecting preset recipes, of the different stages involved in cooking, essentially characterised in comprising the functional layout of a MASTER card (1) and a SLAVE card (2); such MASTER card (1) carries a microprocessor (4) and program (5) and data (6) memories, as well as a recipe memory bank (7), containing such recipes' ingredients, as well as their different amounts with regard to a given number of diners, the text explaining how to prepare the recipes and the different fields of controls in respect of the same, a logic circuit (9) comprising a LATCH circuit (10) and two decoders (11), allowing the microprocessor access to the recipe memory bank (7) by means of a keyboard (12) drive, which keyboard is connected to a keyboard controller (13), such microprocessor (5) being further assisted by a device controller (14) to allow the same access to a power module (15) and to signalling elements through a signalling interface (16) for suitable control of the cooking progress; the said SLAVE card (2) carries a microprocessor (18) and a program memory (19) preferably dealing with functions relating to a CRT display (28) with a large visual display capacity, and a data memory (20) besides a CRT controller (21) which localises on the one hand in an EPROM character memory (22) containing the design of all the characters used for visual display of texts and special symbols, which characters are subsequently delivered to a video interface (23) and on the other hand, through a synchrony and mode logic circuit (24), prepares signals that are joined by the synchrony and video logic (26), with which they come from the video interface (23), and sent to the video card (27) and from there on to the CRT display (28), the SLAVE card (2) being completed with a temperature module (29); all of this with the assistance of a power supply (3) fitted with a mains lead (37), mains fault detector (38) and battery supply (39).

2. Household oven interactive control and selection system, according to claim 1, characterised in that the microprocessor (4), as a controller, with the assistance of the recipe memories (8), the program memory (5) and taking into account user data input through the keyboard,

draws up the full configuration of each screen to be seen on display in the RAM memory (6).

3. Household oven interactive control and selection system, according to previous claims, characterised in that the microprocessor (18), together with the RAM memory (20) provided in the SLAVE card (2) where each character to be represented is defined, relates such character's code with its address in the character memory (22), making up the full address with the eight bits that identify the character and a further four bits added on the right of the foregoing identifying one of the dotted lines that make up the character.

4. Household oven interactive control and selection system, according to claim 1, characterised in that the link between the microprocessor (18) and a LATCH circuit (29) allows data to go from the RAM memory (20) to the CRT controller (21) without going through the actual microprocessor (18).

5. Household oven interactive control and selection system, according to claim 1, characterised in that the microprocessor (4), with the assistance of the LATCH circuit (10), allows the recipe memories (7), whose addresses overlap, to be read selecting, first of all, the bank (8) and then the high or low part of the memory selected and finally the whole address, transmitting the octet from the data bus to the address bus to form the low part of such address.

6. Household oven interactive control and selection system, according to claim 1, characterised in that within the temperature module (31) there is a 0-5 volt to 0-12 volt level signal conditioner comprising four transistors, that invert the signal reaching the microprocessor (18) at the same time as they condition the level, which transistors, together with such module's resistance (33) allow the measurement margin to be increased.

7. Household oven interactive control and selection system, according to claim 1, characterised in that the mains fault detector circuit (38) basically comprises a condenser C1 and an operational amplifier OP1 that allows the microprocessor (4) to carry out some instructions read from the program memory (5) before the latter is left with no supply, to go into the IDLE state.

8. Household oven interactive control and selection system, according to claim 1, characterised in that the mains-battery/battery-mains switching circuit (39) basically comprises a battery BAT, a slow discharge condenser C2, an operational amplifier OP2 and a transistor TR1 that maintains supply to the MASTER (1), RAM (6) and decoder (11) for some time whilst the mains supply is restored and stops the same for good if after such time-period such supply is not restored.

9. Household oven interactive control and selection system, according to previous claims, characterised in that the structure claimed and the processes it may carry out, in addition to achieving full control over the oven, together allow interaction thereof with the user through the selection keyboard (12) and the CRT display (28).

10. Household oven interactive control and selection system, according to claims 1 and 9, characterised in that the control system is fitted with means, through interaction, to update the control and recipe parameters according to the selection of the number of diners and the weight or amount of the main ingredient that the user makes through the keyboard, displaying such updates.

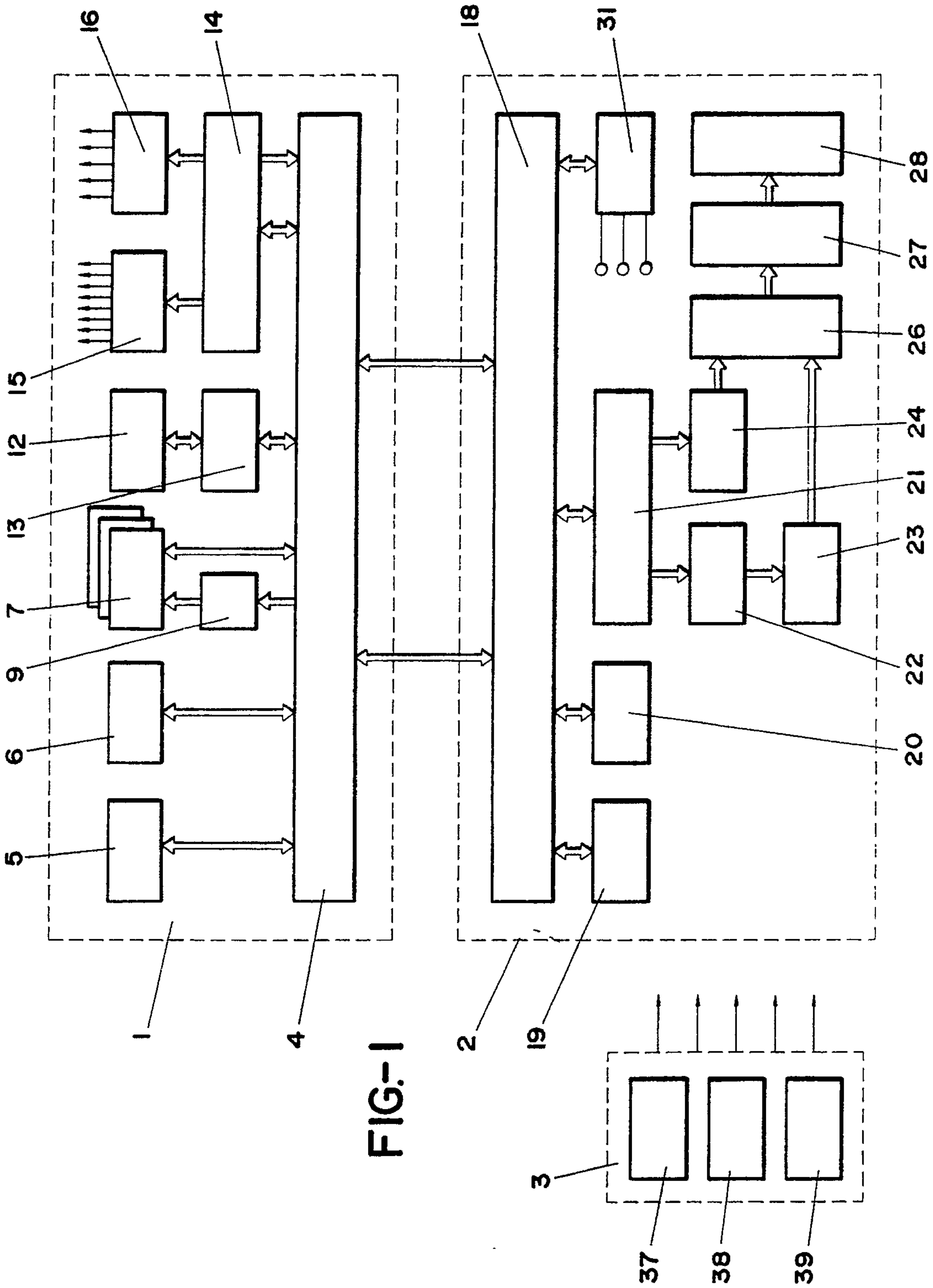

FIG-1

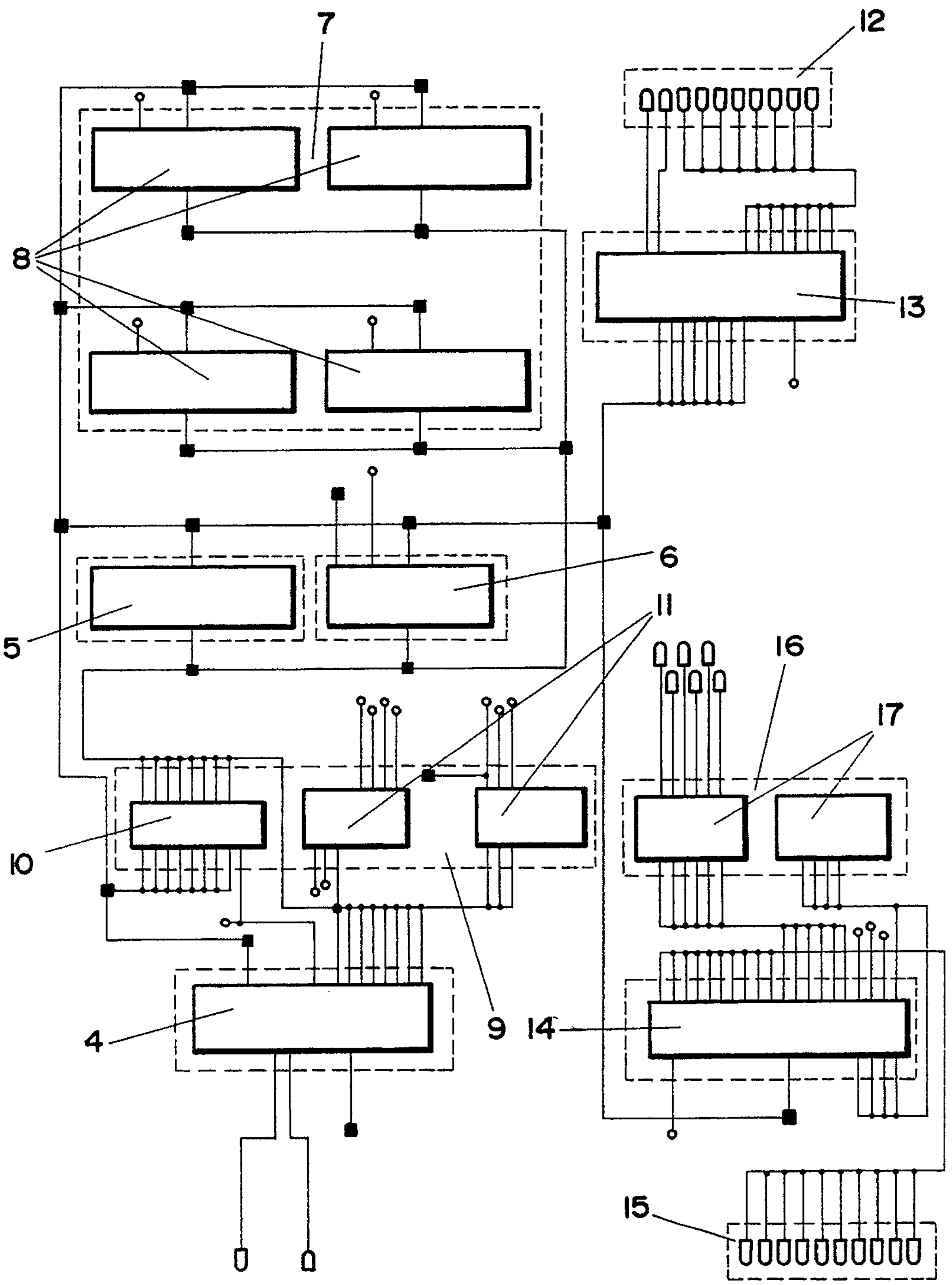

FIG.-2

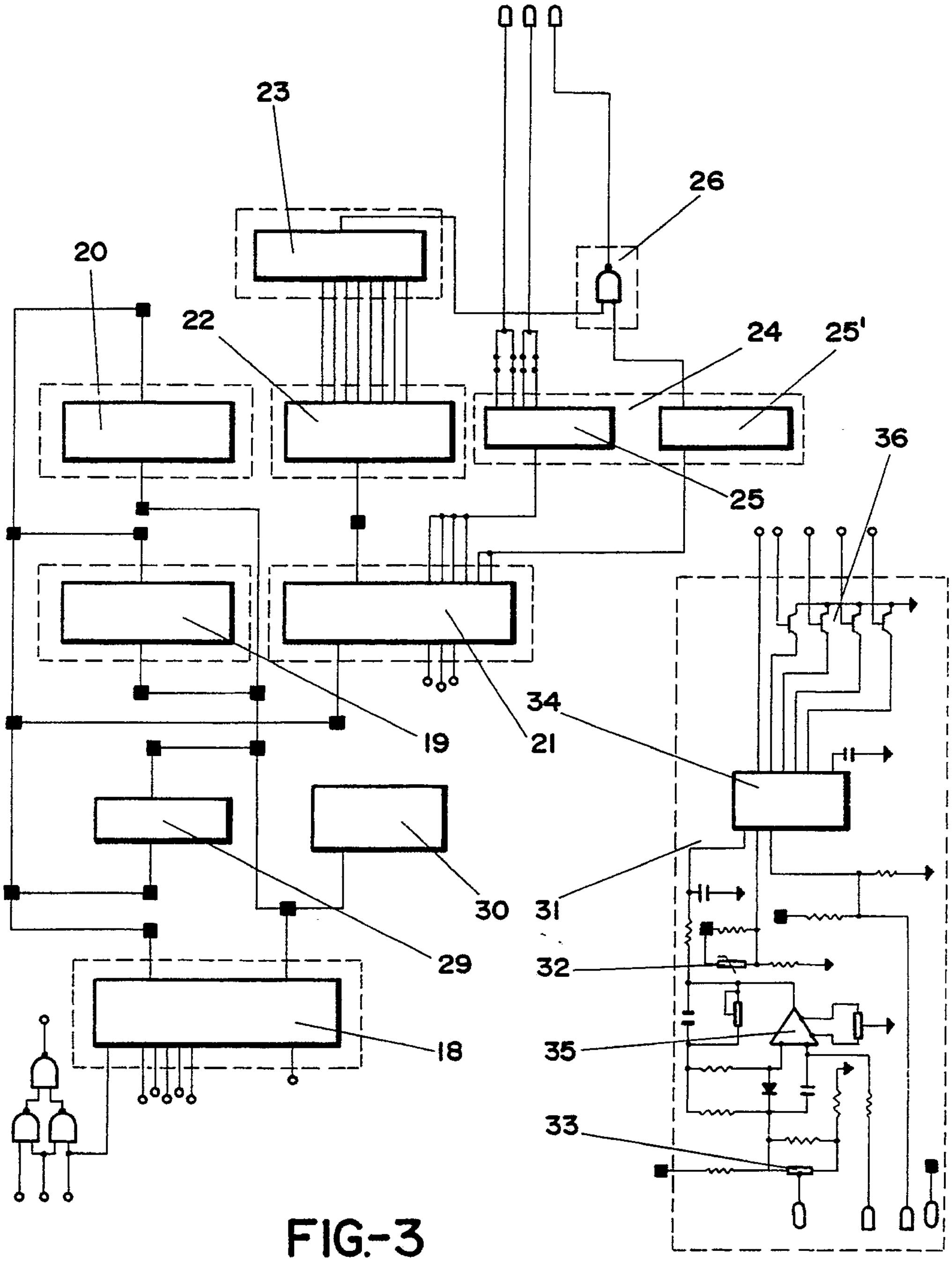

FIG.-3

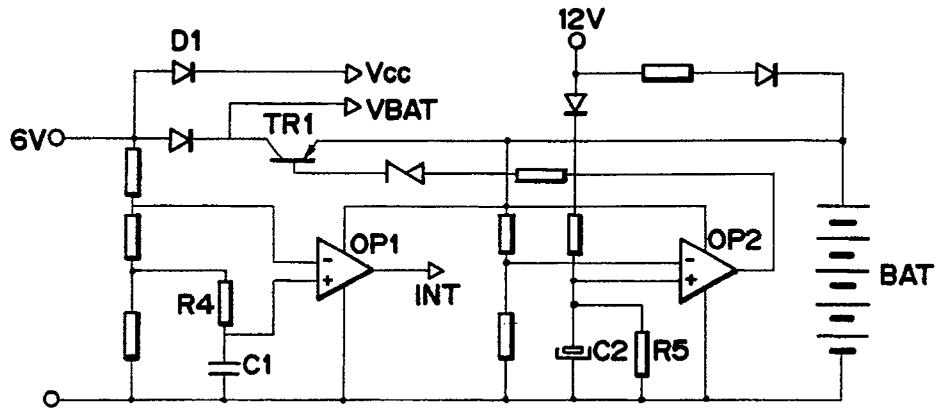
D1
Vcc
VBAT
12V
6V
TR1
OP1
OP2
INT
R4
C1
C2
R5
BAT

FIG.-4

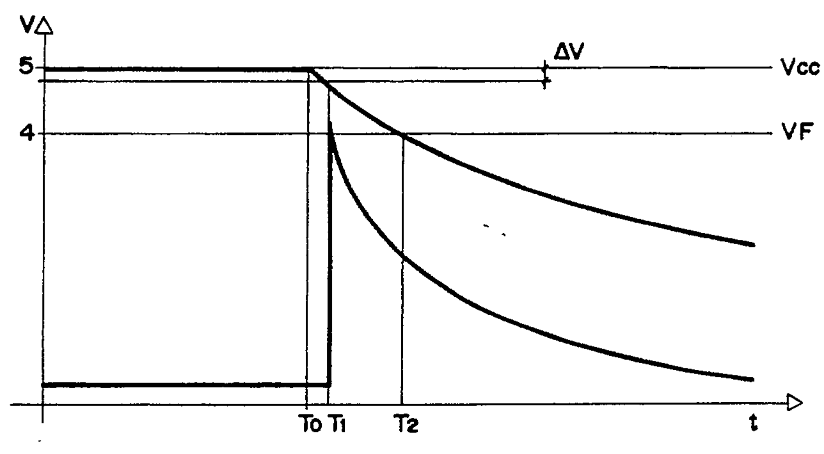
V
5
4
ΔV
Vcc
VF
To
T1
T2
t

FIG.-5