

CUSTOMER SERVICE APPARATUS

The present invention relates to apparatus for customer service for operation in establishments where personal service is offered.

In restaurants, or similar establishments like bars, where personal service is offered, customers normally need to seek the attention of staff to request for service, order items from the menu, request for the bill or pay for services rendered. Often it is not commercially viable for restaurants to hire staff such that there is one to wait on each table in the restaurant. In such restaurants, customers have to catch the attention of waiting staff by attempting to establish eye-contact with them or raising/waving their hands. This task becomes cumbersome for customers of large restaurants, especially when business is particularly brisk or if they are seated at tables located in more remote areas of the restaurant.

It is an object of the invention to provide an apparatus to improve personal service in establishments where such is offered.

According to the invention there is provided customer service apparatus comprising :
a processor; a plurality of customer service request transmitters comprising means for generating customer service requests; a customer service request receiver for receiving each request and transmitting the request to the processor; at least one customer service request acknowledgement transmitter for receiving customer service request acknowledgements and transmitting each acknowledgement to the processor; and at least one display, responsive to

the processor, for displaying the requests and acknowledgements.

In the described embodiment, each customer service request transmitter is associated with a table of a restaurant preferably provided as part of a menu holder placed on the table. The transmitter includes a plurality of buttons each of which may be actuated to indicate a particular type of customer request such as a customer request for service, for a menu or for a bill. The menu holder further preferably includes part of a customer service request acknowledgement transmitter, in particular a reader engageable with an identification device which is carried by a member of staff of the restaurant and which includes an identification code. Preferably, further readers are provided at central staff locations.

With the described embodiment of the invention, customer service requests from all tables of the restaurant are centralised by the processor and displayed on the display in time order. A member of the restaurant staff actuates the customer service acknowledgement transmitter by placement of his or her identification device against a centrally located reader to acknowledge the customer service request. Upon servicing the request, the same procedure is used, this time with the reader at the table to indicate to the processor that the request has been serviced. In addition to providing the advantage of centralisation of customer service requests and the advantage of taking customer service requests in order of receipt, the described embodiment also provides valuable information to a manager concerning efficiency of staff since the time taken to acknowledge a customer service request and then to service that request as well as the member of staff performing the service, are all logged by the apparatus.

Further features of the invention are mentioned in the appended claims.

An embodiment of the invention will now be described by way of example in which :

Figure 1 is a block diagram of an embodiment of the invention showing data communication between a remote unit, a receiver unit, a smart key, smart key reader, a personal computer and its peripherals.

Figure 2 is a perspective view of a remote unit incorporated in a menu holder.

Figure 3 shows the composition of data streams used in some of the communication links.

Figure 4 depicts a monitor or screen connected to a personal computer used in an embodiment of the invention, at a particular time.

Figure 5 depicts a monitor or screen connected to a personal computer used in an embodiment of the invention, at a time subsequent to that in Figure 4.

Figure 6 shows how the receiver unit and smart key reader may be connected to the serial port of a personal computer.

In Figure 1, a remote unit (forming a customer service request transmitter) 20 communicates with a receiver unit forming a customer service request receiver 10 and a smart key 51 communicates with a smart key reader 11 (together forming a customer service request

acknowledgement transmitter). Receiver 10 and smart key reader 11 are associated with personal computer (PC) 12 and its peripherals, namely a monitor 13, a keyboard and a mouse input 14 and printer 17 as well as display screens 15 and 16.

Figure 2 depicts how remote unit 20, may be incorporated in a menu holder 60 normally placed on restaurant tables. Each table has its own remote unit 20. Each remote unit 20 is based on circuitry similar to a proprietary hand-held car remote control, for example one manufactured by SiliconTM Electronic Auto Accessories, and possesses a plurality of dedicated buttons in button panel 32 which may be actuated by a customer to request for a particular type of service from restaurant staff. Remote unit 20 preferably possesses at least three buttons; one button each to indicate a customer request for service, a customer request for a menu card and a customer request for a bill from restaurant staff.

When a customer seated at a particular table requires a particular type of service from restaurant staff, he/she actuates the appropriate button in button panel 32 on remote unit 20 placed on the table, thus commencing the cycle of a customer request. When a button in button panel 32 is actuated, a data stream is generated and is modulated by radio frequency modulator 34 and transmitted by radio frequency transmitter 33 in a conventional manner.

The data stream bears information indicating which dedicated button was pressed so that the type of service requested from staff may be ascertained. Each remote unit 20 is assigned a unique identification number. This unique identification number is also transmitted in the data stream and facilitates ascertaining from which remote unit 20 and hence from which table the customer request originated. Data stream 60, in Figure 3a, is an example of one such data

stream bearing synchronization bits, remote unit identification bits, type of service request bits and bits facilitating data communication.

The data stream transmitted by remote unit 20 is received by radio frequency receiver 52 in receiver unit 10 where it is demodulated by radio frequency demodulator 54. Receiver unit 10 then transfers another data stream to PC 12 through serial port 42. Data stream 62, in Figure 3b, is one such data stream bearing header bits, remote unit identification bits, type of service request bits and bits facilitating data communication. PC 12 runs software that retrieves information from the data stream received through serial port 42, notes the time at which the data was received and then displays the information on monitor 13.

The information appearing on monitor 13 is a sequential display of customer requests 001 to 009 based on the time at which the requests were made. In addition, monitor 13 also displays the type of customer request, for example whether service, menu or bill and the table number from which the customer request originated. Lines commencing with serial numbers 005 to 009 in Figure 4 depict what is displayed on monitor 13 when customer requests have just been made and have not yet been attended to.

Preferably a plurality of screens 15 and 16 linked to PC 12 and situated at various locations around the restaurant, display the same information as seen on monitor 13. The waiting staff of the restaurant may therefore determine, from screens 15 and 16, the status of customer requests from all areas in the restaurant.

Each member of the waiting staff is equipped with a smart key 51 forming an identification

device, which is part of a smart system, for example Touch Memory™ manufactured by Dallas Inc. When such waiting staff are available, they determine, from screens 15 and 16, which tables require attention and what type of service is required. Once a member of the waiting staff decides to respond to a customer request, he/she activates a smart key reader 11 with his/her smart key 51.

Smart key reader 11 is one of a plurality of similar readers placed at various locations in the restaurant which are easily accessible to waiting staff. When activated by smart key 51, smart key reader 11 transmits a data stream bearing an unique identification number assigned to smart key 51. Data stream 64, shown in Figure 3c, is an example of such a data stream bearing family code bits, smart key identification bits and error checking bits.

Each smart key reader, such as smart key reader 11, is linked to serial port 42 of PC 12. Figure 6 is an example of how receiver unit 10 and smart key reader 11 may be connected to the single serial port 42 of PC 12. Pins 5, 6, 7 and 8 of the nine-pin serial port 42 are wired to receiver unit 10 and pins 2, 3, 4 and 5 are wired to smart key reader 11. Thus the pins of serial port 42 are dedicated for data transfer from either receiver unit 10 or smart key reader 11. Software run on PC 12 is capable of by-passing the BIOS and retrieving information from the dedicated pins of the serial port 42 thereby avoiding data contention issues which may arise when both receiver unit 10 and smart key reader 11 transmit simultaneously.

Software run on PC 12 retrieves information from the data stream received from smart key reader 11 and notes the time at which the data was received. The unique identification

number assigned to each smart key identifies the member of the waiting staff who initiated the data transmission with a particular smart key 51. Software run on PC 12 then assigns the member of the waiting staff from whom the data transmission was received, to the table from which the earliest customer request originated. Monitor 13 and screens 15 and 16 then display the name of the member of the waiting staff who is responsible for attending to the customer request and the time at which he/she intended to take that action and this is shown in lines commencing with serial numbers 001 to 004 in Figure 4.

When PC 12 receives data from a particular smart key reader 11, software run on PC 12 stops retrieving more data which may be transmitted from other smart key readers for a presettable time interval. Retrieval of information by software run on PC 12 from other smart key readers is resumed only after the member of the waiting staff who initiated the first received transmission of data has been assigned to a particular table. This process ensures that not more than one member of the waiting staff is assigned to a particular table.

Once a member of the waiting staff has demonstrated intent to attend to a customer request by activating smart key reader 11 using smart key 51, he/she determines from screens 15 and 16 which table has been assigned to him/her and then approaches the assigned table to provide the required service. He/she then activates smart key reader 30 incorporated in remote unit 20 placed on the assigned table, using his/her smart key 51 after the required service has been provided.

Smart key reader 30 is linked to radio frequency transceiver 33 in remote unit 20 and transmits through it a data stream indicating that the customer request originating from a

particular table has been attended to and the service has been completed. Data stream 66, shown in Figure 3d, is an example of such a data stream bearing synchronization bits, remote unit identification bits, bits facilitating data communication and concatenated bits from data stream 64 containing smart key identification bits. This data stream is received by radio frequency receiver unit 52 and demodulated by radio frequency demodulator 54 in receiver unit 10 before being forwarded to PC 12 in another data stream through serial port 42. The data stream sent to PC 12 resembles data stream 68, shown in Figure 3e, and bears header bits, remote unit identification bits, bits facilitating data communication and concatenated bits from data stream 64 containing smart key identification bits. Software run on PC 12 retrieves information from the data stream and deletes from the display on monitor 13, and correspondingly from the displays on screens 15 and 16, the line corresponding to the particular customer request which has been attended to and has received appropriate service, thus completing the customer request cycle. Software run on PC 12 stores in memory the details of the deleted line and the time when service was completed for the corresponding customer request. The other customer requests are then rearranged by software run on PC 12 based on the time when they were made. Figure 5 depicts what is seen on monitor 13 and screens 15 and 16 after the customer request in the line commencing with serial number 001 of Figure 4 has completed its cycle.

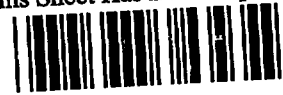
Information stored in memory on PC 12 may then be used as a database to determine the time taken to respond to a customer request, the time taken to complete service, peak business periods, efficiency of various waiting staff and equitable distribution of tips amongst staff. Required information may also be printed out through printer 17 linked to PC 12.

Keyboard and mouse input devices 14 may be used to change various settings of the software running on PC 12. Examples of such settings would include settings for the date, time, addition/deletion of remote units, addition/deletion of smart key readers, addition/deletion of smart keys and stop-retrieval time for data received from smart key readers.

The embodiment described hereinabove is not to be construed as limitative. For example, although shown employing remote units having three buttons in the button panel 32, more buttons may be added when the need arises. Furthermore, remote unit 20 and receiver unit 10 may be modified to transmit as well as receive data to resolve contention issues. In addition, receiver unit 10 and smart key reader 11 may be connected to the parallel port of PC 12. Receiver unit 10 and smart key reader 11 may also be linked to the serial/parallel port through a multiplexer. Moreover, although shown using a radio frequency link for communication, this may be substituted with hard-wired or infra-red links over all or some communication paths. The apparatus may also be used in a diverse range of establishments requiring personal service by making minor modifications such as including more buttons in button panel 32 and modifying remote units 20 so that they may be hand-held by staff providing service. Furthermore, members of the waiting staff may demonstrate intent to serve the table most accessible to them by activating the smart key reader 30 incorporated in the remote unit 20 of the intended table, rather than activating smart key reader 11 and waiting to be assigned the table from which the earliest request for service originated. As such it is to be understood that various modifications may be made to the embodiment described without departing from the scope of the invention.

**CLAIMS**

This Sheet Has Been Replaced



1. Customer service apparatus comprising :
a processor;
a plurality of customer service request transmitters each having means for generating customer service requests;
a customer service request receiver for receiving each request and transmitting the request to the processor;
at least one customer service request acknowledgement transmitter for receiving customer service request acknowledgements and transmitting each acknowledgement to the processor;
and
at least one display, responsive to the processor, for displaying the requests and acknowledgements.
2. Apparatus as claimed in claim 1 wherein each customer service request transmitter is associated with a said customer service request acknowledgement transmitter.
3. Apparatus as claimed in claim 2 wherein each customer service request transmitter is associated with a customer service location.
4. Apparatus as claimed in claim 3 wherein the location is a table of a restaurant.
5. Apparatus as claimed in any one of the preceding claims wherein at least one customer service request transmitter is part of a holder for printed information.



This Sheet Has Been Replaced



6. Apparatus as claimed in claim 5 wherein the holder is a menu holder.
7. Apparatus as claimed in any one of claims 1 to 4 wherein at least one customer service request transmitter is hand-held.
8. Apparatus as claimed in any one of the preceding claims wherein each customer service request transmitter comprises a plurality of user - actuatable selectors each capable of generating an information signal when actuated.
9. Apparatus as claimed in claim 8 wherein each of said selectors is associated with a different customer request.
10. Apparatus as claimed in claim 9 wherein said customer request is selected from :
a customer request for service,
a customer request for a menu or
a customer request for a bill.
11. Apparatus as claimed in any one of the preceding claims wherein the customer service request transmitter further comprises :
a modulator capable of modulating the information; and
a transmitter capable of transmitting the modulated information.
12. Apparatus as claimed in any one of the preceding claims wherein the customer service request transmitter is capable of receiving data.



This Sheet Has Been Replaced



13. Apparatus as claimed in any one of the preceding claims wherein said customer service request receiver comprises :

a receiver capable of receiving modulated information;

a demodulator capable of demodulating said information; and

means for transmitting demodulated information to said processor.

14. Apparatus as claimed in any one of the preceding claims wherein said customer service request receiver is capable of transmitting data.

15. Apparatus as claimed in any one of the preceding claims wherein each customer service request acknowledgement transmitter is identifiable by the processor.

16. Apparatus as claimed in any one of the preceding claims wherein each customer service request acknowledgement transmitter comprises an identification device containing an identification code and a reader engageable with the identification device for reading the code.

17. Apparatus as claimed in claim 16 wherein a plurality of said readers are each associated with a customer service location.

18. Apparatus as claimed in claim 17 wherein the location is a table of a restaurant.

19. Apparatus as claimed in any one of claims 16 to 18 wherein at least one said reader is associated with a central staff location.



This Sheet Has Been Replaced



20. Apparatus as claimed in any of claims 16 to 19 wherein each identification device is hand-held.
21. Apparatus as claimed in any of claims 16 to 20 wherein each identification device is associated with a member of staff of an establishment providing customer service.
22. Apparatus as claimed in claim 21 wherein the establishment is a restaurant.
23. Apparatus as claimed in any one of the preceding claims wherein at least one said customer service request acknowledgement transmitter is a keyboard connected to said processor.
24. Apparatus as claimed in any one of the preceding claims wherein the processor is a personal computer system.
25. Apparatus as claimed in any one of the preceding claims further comprising means for sorting customer service requests and customer service request acknowledgements.
26. Apparatus as claimed in any one of claims 1 to 24 further comprising means for sorting the requests in order of the time at which the requests were received.
27. Apparatus as claimed in any one of the preceding claims further comprising database means for storing the requests and acknowledgements indexed by time and identification of source.



This Sheet Has Been Replaced



28. Apparatus as claimed in any one of the preceding claims wherein at least some of said requests and/or said acknowledgements are transmitted and received over a wireless link.
29. Apparatus as claimed in claim 28 wherein said wireless link is a radio frequency link.
30. Apparatus as claimed in claim 28 wherein said wireless link is an infra-red link.
31. Apparatus as claimed in any one of claims 1 to 27 wherein at least some of said requests and/or said acknowledgements are transmitted and received over a hard-wired link.
32. A customer service request transmitter having means for generating a customer service request useable as part of the customer service apparatus as claimed in any one of the preceding claims.
33. An identification device containing an identification code useable as part of customer service apparatus as claimed in claim 13 or any claim dependent thereon.
34. A reader useable as part of customer service apparatus as claimed in claim 13 or any claim dependent thereon.
35. A customer service request acknowledgement transmitter useable as part of customer service apparatus as claimed in any one of claims 1 to 31.
36. A method of processing a customer service request comprising the steps of :



This Sheet Has Been Replaced



receiving and logging a customer request at a central location;
receiving and logging a customer service request acknowledgement made at a first location;
receiving and logging a further customer service request acknowledgement made at a second
location at the origin of the customer service request; and
centrally displaying the requests and acknowledgements.