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DEVELOPMENT OF AN INTELLIGENT TELEPHONE CHARGING SYSTEM (WITHOUT EXCHANGE FEEDBACK SIGNALS) AS A STANDALONE UNIT

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A meter capable of displaying a detailed and real-time telephone bill without the support of exchange feedback signals is a great demand of the local telephone subscribers. Such a unit is extremely useful in controlling the misuse of telephones and in preventing uneconomical charges due to the unit system. This can be used as a consumer product in household and public offices, and in private telephone booths. The Director General of Telecommunication discussed the importance of such a unit on several occasions.

The technique and the electronic circuitry to identify the caller's actual 'off hook' time was developed by the author and he obtained a patent for it under the title 'An Intelligent Telephone Charging System / Method' in 1993. The design of this charging unit was based on that patent. This unit was developed keeping the low cost of the product in mind.

The heart of the unit is a flash type micro controller that does all the Digital Signal Processing. We were able to develop a low cost Real Time Clock (RTC) also embedded into the micro-controller to keep a track of time even through power failure. This mechanism consumes less than 1mA current; thus it can be powered using 3 AA type batteries as a back up for the RTC. The batteries have to be replaced only after about 2000 backup hours. This unit has the feature to work with the normal Dual Tone Multi-Frequency (DTMF) Phone systems using a special key sequence.

Some of other features of this unit are:

- a) The call charges are user-updateable and they are stored in a flash ROM¹.
- b) The number called, duration of the call, cost¹ and the number of units² are displayed on a LCD (Liquid Crystal Display) panel while taking the call.
- c) Details of the last 10 calls can be displayed on the LCD panel or downloaded to a computer using a standard serial port (RS232).
- d) Hard-copy can be taken immediately after the call by connecting a standard dot matrix printer to the 25 pin D-type connector³.
- f) A remote display panel can be connected to the unit if the caller is away from the unit. (Ex: in the case of private call booths)³
- g) Provides line isolation with the telephone line.
- h) Simple connection to the telephone line (only a parallel connection).
- i) Can work with DTMF phones as well as pulse type dialling phones.
- j) Can work with or without exchange feedback signal.

Notes:

1. User can program the cost for any unit or price depending upon duration and the number dialled. (This feature is very impotent in private call booths)
2. Real unit costs can be calculated because the RTC can determine the time and day and charge according to appropriate prices i.e. peak, normal rates, etc.).
3. Under Development.