SATELLITE DELIVERED TAG CHANGE SYSTEM

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REQUEST TELEVISION

ABSTRACT

Since the launch of regularly-scheduled satellite PPV on November 27, 1985, many cable systems have discovered that their in-place hardware presents obstacles to full participation in this potentially profitable revenue stream. Specifically, their addressable hardware does not allow them to show multiple events in a 24-hour period.

The problem is this: Billing systems rely on a tag or address to identify a program service so the customer can be billed properly. With a monthly pay service, this is not a problem. In fact, tag levels were initially designed to work with monthly pay services.

It's not so simple with PPV where each event must be considered a different service, and the tag or address must be changed for each. Otherwise, the customer would only be billed for one view but actually would be able to see the complete days' programming.

MULTIPLE EVENT SCHEDULE

TIME	TITLE	TIME	TITLE
9:00AM	TOP GUN	7:00PM	THE FLY
11:00AM	TOUGH GUYS	9:00PM	TOP GUN
1:00PM	THE FLY	11:00PM	TOUGH GUYS
3:00PM	LEGAL EAGLES	1:00AM	LEGAL EAGLES
5:00PM	TOUGH GUYS	3:00AM	TOP GUN

FIGURE 1

Since Request Television has ten showings a day (Fig. 1) of as many as four different movies, it is imperative that our affiliates, or for that matter any cable operator doing PPV, be able to bill their subscribers individually for each and every showing of a movie or event that a subscriber watches.

The challenge was clear: Simply change the tags before each event. The solution, however, was a little more difficult.

Before the satellite delivered tag switching system was developed, some eager operators positioned an employee in the headend to manually change their tags for each event. But it was costly keeping employees on, day and night, to manually switch the tag levels. Showing less than a full schedule of movies was not the solution either because that resulted in fewer movies sold to subscribers.

Other operators preset different encoders to different tag levels and then switched them in line with a clock-controlled video switcher for each event. But that wasn't cost-efficient either. Each encoder cost up to $2,000. There was the cost of the video switcher as well; and in the end, this approach too, was limited to only a few events.

A third route a system could take was to update to a new controller. However, it is hard to justify a $40,000 price tag just to bring PPV into the market when the older controller is already doing every other aspect of its job.

We found a better solution for all these operators. The answer was a separate system to do the switching; one that would be completely transparent to the cable operation.

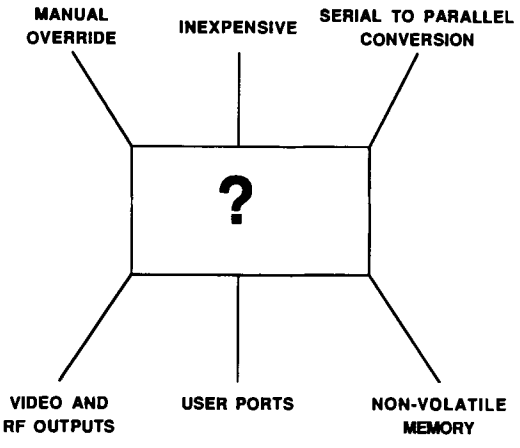

FIGURE 2

What components would be needed? (Fig. 2) The first requirement would be an intelligent device in each cable headend. The device would need the ability to accept a serial data string and convert it to a parallel output. It would also need a non-volatile memory and be inexpensive and reliable. A logical solution was the Commodore 64 Computer.

The Commodore 64 Computer comes equipped with the conversions that are required, plus an array of user ports. It's inexpensive, reliable, and best of all, should it fail, a quick trip to a local department store and a check for less than $200 would put the system back into operation.

With the aid of the game cartridge port on the computer, a prom could be programmed with all the information and look-up charts needed as well as a self-boot program for outage problems, all without fear of accidental erasure.

A means of communicating with each site would be needed. Telephone lines would be too costly, and a subcarrier on the satellite feed would not only be an additional expense but would take time to implement since each receive site would need a demodulator.

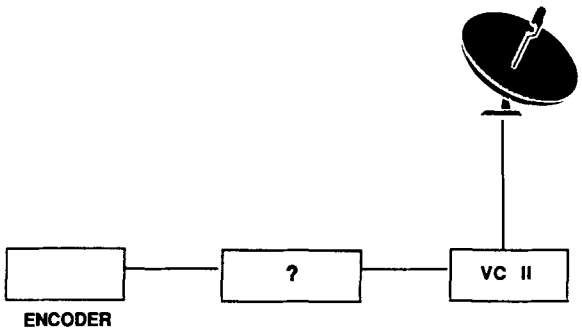

FIGURE 3

The videocipher scrambling system (Fig. 3), equipped with its data channel, provided an inexpensive path to each and every headend.

After testing, the data channel proved to be transparent under many adverse conditions, such as a high-noise ratio and terrestrial interference. A simple RS 422 to TTL converter was built and communication with the receive site was established.

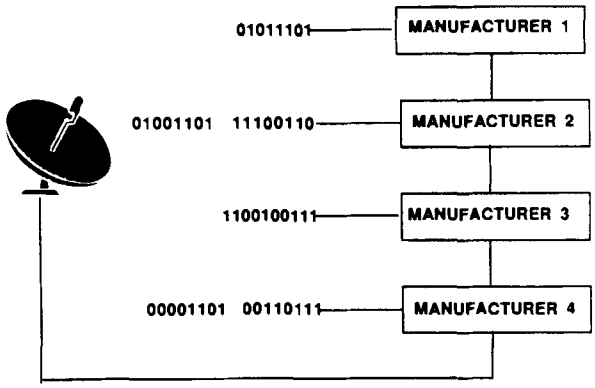

FIGURE 4

The Satellite Delivered Tag Change System was being designed to be compatible with encoders of different manufacturers (Fig. 4), and a simple means of communication was needed. Since each encoder uses a different means of changing tags, it would be impossible to send the individual set-up codes to each headend with 100 percent reliability. Instead, all of the set-up information was stored within the receive site program. In this way, only a generic signal (Fig. 5) needed to be sent. The generic signal would first identify a receive site and then instruct it to execute one stored tag.

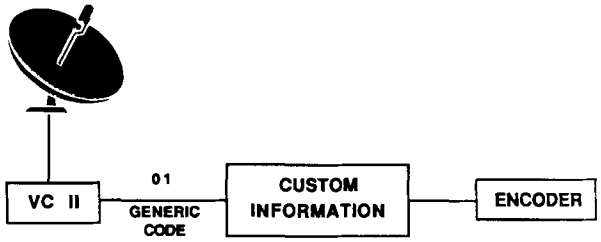

FIGURE 5

The set-up information stored represents the binary code for each tag and is arranged as a look-up table (Fig. 6). The look-up table is arranged in order of use, with the first code being assigned to the first event, regardless of time of day.

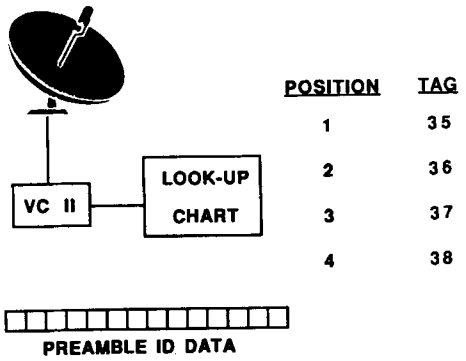

FIGURE 6

With this arrangement the host computer would need only send four sets of data: First, a preamble so the receive site would recognize this as incoming data; second, ID codes so that each system would recognize particular commands; third, a set-up command; and the fourth and final step would have all systems execute the set-up commands simultaneously. This final execution command, being separate of the set-up procedure, will allow the universe of sites to grow and still have them execute each command simultaneously. This also will allow for expansion into other controlling areas.

The functional procedure is to send the set-up code two minutes prior to the top of the hour, and to send the execution code at the top of the hour prior to the start of an event.

With this all firmly in place, a beta test was conducted. A Torrance, California system was chosen as the test site. On December 15, 1986, the equipment was installed and placed on-line.

Some shortcomings in the program were discovered which would not allow it to send the commands on time. The program was revised and a re-send of the last data option was added.

Another problem that appeared at the receive site was the accumulation of noise. The computer would collect noise as though it were data and store it until the buffer was full and then bomb out. The receive site program was revised so it would ignore all but recognizable data.

With these revisions in place, the Satellite Delivered Tag Change System was complete.

CONCLUSION

The Satellite Delivered Tag Change System allows a cable operator to enter the PPV business, operationally, without huge hardware upgrades and without additional manpower. It allows him to carry a full schedule of movies each day and to bill his subscribers according to which event they watch.

And perhaps most important of all, the Satellite Delivered Tag Change System operates independently and is transparent to the cable operator.

ACKNOWLEDGEMENTS

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