AUTOMATIC COMMERCIAL INSERTION EQUIPMENT FOR THE UNATTENDED INSERTION OF LOCAL ADVERTISING

Bill Killion, President

CHANNELMATIC, INC., ALPINE, CA

BACKGROUND

Channelmatic was founded over a decade ago as a manufacturer of automatic machine control systems and accessories for the broad video industry. The first product shipped was a low-cost 3-VCR sequencer; thousands of similar systems have been produced by the company to date.

In 1979, Channelmatic produced the first automatic commercial insert system for satellite services. The initial system was installed in Hawaii; it inserted locally generated advertising into the local avail provided by NEWSTIME as part of its slowscan news service. The satellite cue tone prompted device controlled one Sony VCR on a hands-off, totally automatic basis. This product was the forerunner of all automatic commercial insert systems and was the first to use the innovative spot sequential (multiple spots per tape) approach.

Since only a few cable systems sold local advertising on NEWSTIME, the first inserter was a year or so ahead of its time. However, most of the insert systems available today from any manufacturer are utilizing the techniques proven by this initial design.

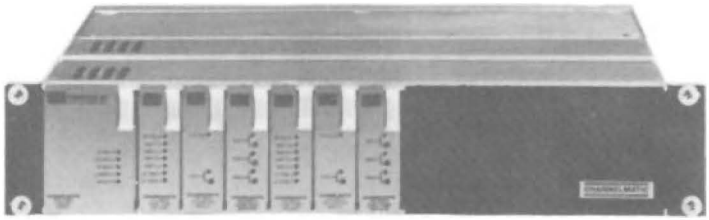
By the time CNN began offering local ad avails, thirty or so of these systems were in the field and most of them were changed over in advance to operate with the new CNN cue tones. Many of the systems inserted advertising in the very first avail offered by CNN.

This early experience has caused the manufacture of related equipment to be dominate in Channelmatic's sales. Accordingly, a constant research and development program is continuing to produce more effective and often less expensive equipment approaches to the commercial insertion problem.

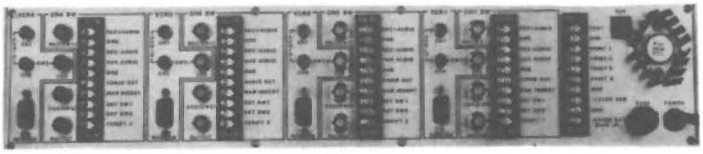
The following paper will discuss the many types of equipment and systems we manufacture for automatic insertion and related functions. Much of that described has been introduced in just the past few months. Several projects are in engineering currently, but are in very early stages and are not mentioned. Much research and software engineering time and effort has been spent on an elaborate Traffic Control and Accounting System, which is described briefly in this paper. Detailed information on all Channelmatic products is available upon request.

VCR-3004A SPOT INSERTER

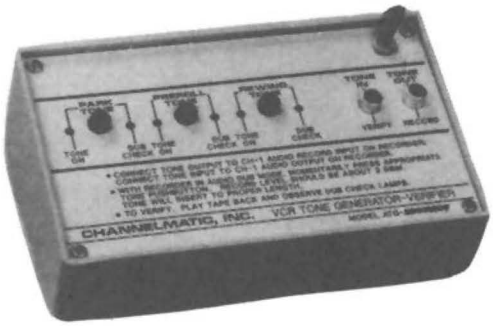
The VCR-3004A system is probably the most widely used automatic spot inserter in operation today. It is a slightly improved version of the first inserter and operates in a multiple spot mode. In a multiple spot system, all spots are recorded, in proper sequence, on a single tape. The system automatically plays back the next spot in the sequence each time a satellite insert tone is received. After the last spot on the tape has played, the VCR rewinds and additional satellite insert tones merely repeat the spots. The system, including the cue tone generator-verifier required to tone tapes, is shown in Figures 1, 2 and 3.



1. VCR-3004A Insert System, Front View

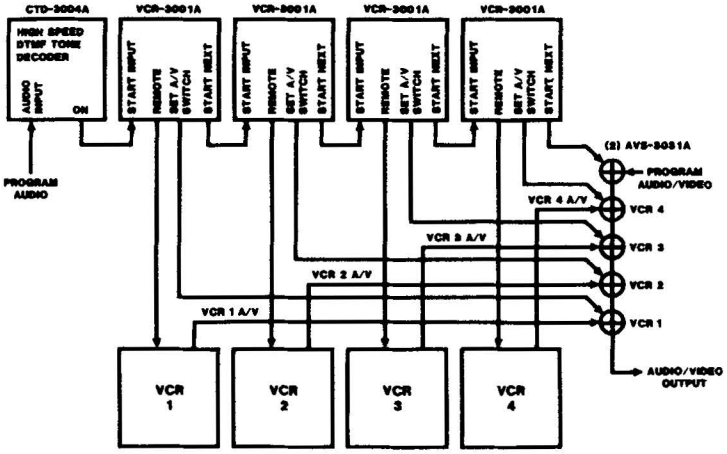


2. VCR-3004A Insert System, Rear View



3. VCR-3004A Tone Encoder

The most obvious advantage of this type of system is its relatively low cost, as it only utilizes one VCR per channel. A single channel price of approximately $4,600, with a VCR, and a four-channel price of about $10,000, with VCRs, makes it very appealing to most cable operators. Figure 4 is a simplified block diagram of a multiple spot system.

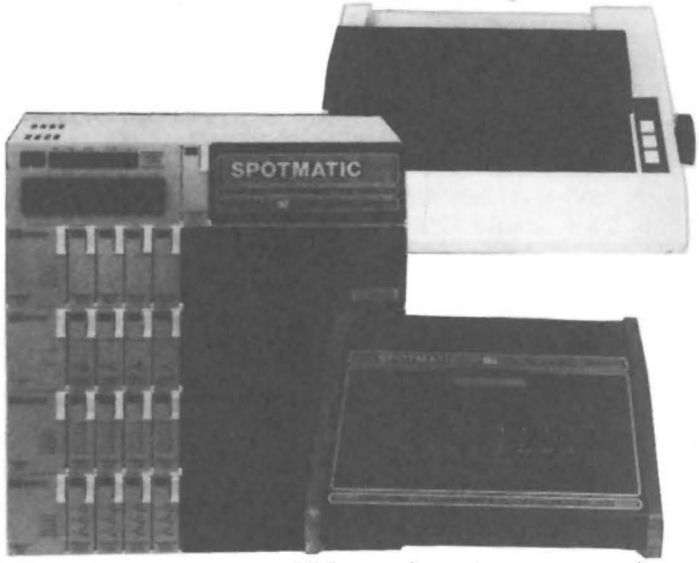


4. VCR-3004A Insert System Block Diagram

SPOTMATIC RANDOM ACCESS SYSTEM

The SPOTMATIC Random Access Commercial Insert System is designed to schedule and automatically insert local commercials into any length of available time slot on multiple channels of satellite service programming. SPOTMATIC locates, cues and inserts the proper commercials in the proper order from standard 3/4-inch videocassettes. Up to 100 randomly mixed commercial spots can be added to each cassette, greatly reducing tape and editing costs. In addition, it prints out a log of all switching functions as they occur and also prints out a daily advertiser-grouped listing identifying all spots inserted on each channel. Insertion is accomplished in a clean, broadcast-quality fashion.

The system also has the additional ability to control multiple VCR's in order to run multiple shorter spots back-to-back to fill longer satellite avails. With this feature, the cable operator may load each VCR with a duplicate of one tape and have complete freedom as to which spots are run back-to-back and in what sequence. More importantly, a commercial spot videocassette need only be edited once and no spots need to be edited back-to-back. Since editing time is cut drastically and simple machine-to-machine duping results in as many tapes as needed, the savings in time alone makes the higher price of a multiple VCR per channel random access system a worthwhile investment. (A typical SPOTMATIC system is shown in Figure 5.)



5. Typical SPOTMATIC Random Access System with Encoder and Printer

When specifying a system, it is a good rule-of-thumb to allow one VCR for each 30-second spot increment on a given channel; this will greatly minimize editing. For example, if the length of the longest avail on a particular service is 1 minute, then two VCR's should be assigned to that channel; if the longest avail is 2 minutes, then four VCR's should be utilized for the channel. Since most commercials are formatted in 30-second lengths, this approach will normally eliminate all editing required for grouping spots.

The SPOTMATIC system uses sophisticated multiple microcomputers to automatically locate an individual commercial spot on a videocassette, cue it in accordance with a satellite service's chosen preroll time and insert it upon receipt of the proper satellite cue tones. It may be configured to control from one to four VCR's per channel and to insert commercials on as many channels as desired, as long as the total number of VCR's to be controlled does not exceed 32. A built-in automatic logging feature gives the operator a hard copy printout of the times and contents of each commercial insertion.

To accomplish all of this, SPOTMATIC requires that commercial videocassettes be encoded with data which gives spot identification information and accurate spot location for automatic cueing. Included with the SPOTMATIC system is a Digital Code Generator which encodes this data on the unused audio track of a commercial videocassette. At the beginning of the tape, the DCG records a directory which lists each spot location by its control track count; the Microcomputer will later count track pulses to accurately locate each spot. Commercial and advertiser identification data is also added to the tape at the location of each spot for later printout.

The operator programs the Master Control Unit microcomputer by entering the channel number, service preroll time, insert times and the commercial numbers to be run during each insert. This is accomplished with simple front-panel keypad pushbuttons. Every entry step is prompted by a large 12-digit LED display mounted directly above the keypad on the front panel of the Master Control Unit. At the completion of programming, the entered data is routed to and stored by secondary microcomputers, each of which controls one VCR. This is accomplished by a one-pushbutton operation which also parks each VCR at the first spot for which it is programmed.

When the proper satellite cue tones are received and decoded, a commercial insert sequence begins. The VCR programmed to insert the first spot is started and, after the proper preroll time, the VCR audio and video is automatically switched on air. Video switching takes place during the vertical blanking interval of the satellite source to give a glitch-free, broadcast-quality transition.

If more than one VCR is assigned to the insert, the following VCR is started into preroll just before the prior spot ends and at the end of the spot, audio and video are automatically switched to the prerolled VCR. At the completion of the last scheduled commercial, the satellite source is automatically switched back on air and each VCR is automatically rewound, cued and parked at its next scheduled spot.

Stereo Processor Interface. The SPOTMATIC system has been designed to be totally compatible with all stereo processors on the market, enabling its use with such services as MTV and TNN.

No VCR Modification Required. The SPOTMATIC system has been designed to control all SONY Type 5 VCR's with no modification required. The HANDIMOD I is available as a simple and low-cost means of locking the VP-5000's so that vertical interval switching is possible; it merely inserts into the unused modulator cavity on the rear of the VCR.

Operational Modes. Because of program requirements, each of the satellite services schedule local avails differently. Some services adhere to a strict time schedule and provide time slots of a constant length. Some services provide constant length avails at random times. Still others, especially those offering live sports programming, vary both the time and duration of local availability periods. The SPOTMATIC system has the ability to modify its operational parameters to suit each individual channel that it controls.

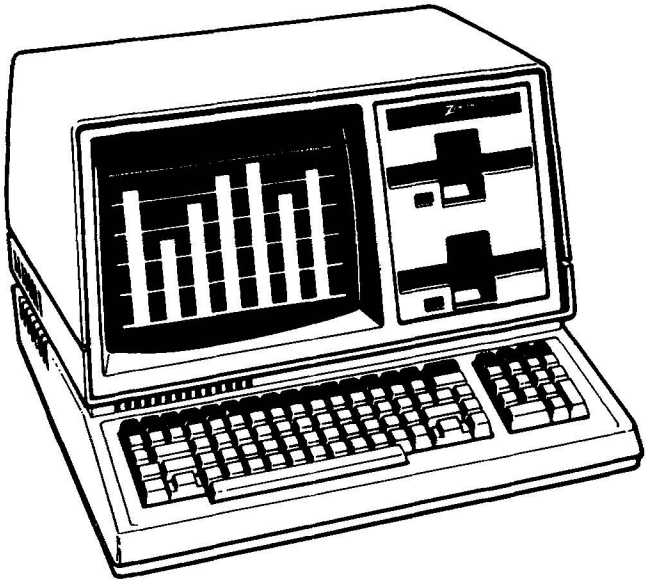
Each day, if need be, the operator may select from several operational modes (OPMODES) to fit each channel's requirements. Among other things, the OPMODE'S allow inserts on each individual channel to be performed (1) within time-blocked windows (if commercials must run at or near a specific time, or not at all); (2) in run-of-schedule (if commercials must run in a specific order regardless of time); (3) on a daily basis (if a service changes its availabilities each day); (4) on a repeating basis (if a service runs a similar schedule for more than one day). Other arrangements are possible, including almost any combination of those described.

In addition, the SPOTMATIC is operator programmed to each satellite service's allocated preroll timing. If this preroll time is ever changed by the service, a simple one-pushbutton program entry adapts SPOTMATIC to the new timing.

Spot Location Accuracy. SPOTMATIC's microcomputers locate and cue commercial spots by counting control track frame pulses. This method gives a plus-or-minus 2-frame accuracy (plus-or-minus tenth of a second) at a fraction of the cost of SMPTE Time Code methods.

NEW SPOTMATIC Z OPTION

The SPOTMATIC "Z" Computer Controlled Random Access Commercial Insert System has been designed to supplement all of the features found in the original SPOTMATIC Commercial Insert System with true computer control provided by a modified Zenith Z-100 Minicomputer. (See Figure 6.)



6. Zenith Z-100 Computer

The Z-100 offers a full, typewriter-style keyboard, twelve inch diagonal, high-resolution CRT display, and dual 5.25 inch floppy disk drives with a total disk storage of 640K bytes. The system is provided with plain english menus and displays to assist in the programming function. Communications between the commercial insert system and the computer result in quicker, easier and more complete event logging and verification. System diagnostics and malfunction logging are also included to simplify troubleshooting.

Scheduling is entered onto a floppy disk by date and retrieved automatically as needed by the SPOTMATIC system so that advance schedules are always available through the computer for inspection and editing as time sales are made.

The SPOTMATIC "Z" is available either as a complete system or as a field retrofit addition to any SPOTMATIC system now in operation. The over 100 SPOTMATIC systems now in operation will be made more effective, not obsolete, by this addition.

NEW FOR SMALL CABLE SYSTEMS

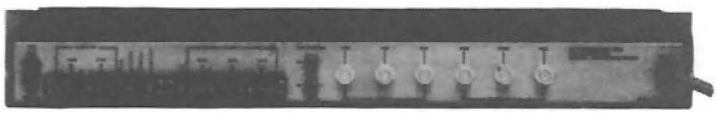
Since the vast majority of cable systems serve less than 5000 subscribers, Channelmatic has developed a second generation of products specifically for this market. Currently consisting of three products, the are the SPOTMATIC JR, the LOGMATIC JR and the ASS-1A Automatic Satellite Switcher. These devices are now in production and initial field reports indicate that their capabilities far exceed the expectations of most customers, particularly when price is a prime consideration. All have features far advanced of competitive systems and each is priced substantially less than its competition.

Ease of installation and operation by untrained personnel were also a primary consideration in design of the equipment. The products are all microcomputer based, withcost advantages due entirely to the larger production runs made possible by the under 5000 subscriber marketplace.

NEW SPOTMATIC JR

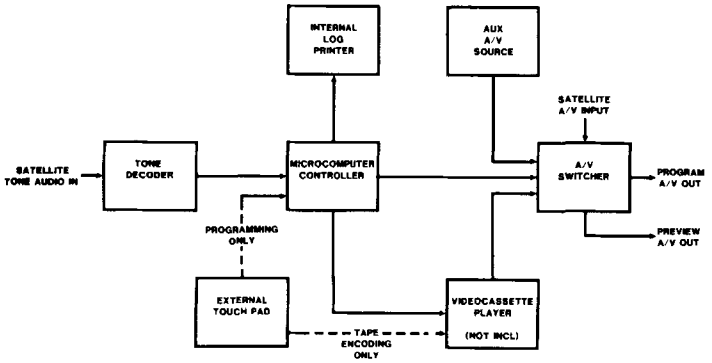
This unit provides a highly versatile, yet extremely cost-effective means of inserting local commercials into one channel of satellite programming. The micro-computer controlled unit performs all functions necessary to insert commercials in a broadcast fashion and is also equipped with a full-feature logging and verification printer. At $2150, it is priced far less than its nearest insert/logging competitor and has many features not found in even the most expensive systems. (The SPOTMATIC JR is shown in Figures 7 and 8.)

7. SPOTMATIC JR, Front View



8. SPOTMATIC JR, Rear View

In its simplest mode of operation, the unit is a basic multiple spot system and operates as previously described for the VCR-3004A system. However, since the unit is micro-processor based, by properly programming it with a tone pad it will also operate in either a "spot sequential mode" or an "automatic fill mode." Switching is performed in the vertical interval. (Figure 9 is a block diagram of the SPOTMATIC JR.)



9. SPOTMATIC JR, Block Diagram

Spot Sequental Mode. A commercial tape edited with back-to-back 30-second spots may be utilized. End of spot coding is ignored by the microcomputer and spots will be run until the satellite end of insert tones are received. The VCR will then be rewound slightly and parked at the beginning of the next spot on the tape which has not been aired. This feature allows any length of avail to be filled with the appropriate number of 30 second spots without extensive editing. A large window for error is incorporated to compensate for inaccuracies in tape editing.

Automatic Fill. If a commercial is run which is shorter than the available time slot, the system can automatically switch to an auxiliary audio/video source (such as a character generator) until the end of the time period. This allows a VCR spot to be automatically followed by a character generator spot.

Power And VCR Failure Protection. All power failures and VCR malfunctions are detected and logged, and automatic return to the satellite is always effected in event of such failures. A lithium battery maintains memory and allows the system to resume normal operation when power is restored. The battery is essentially permanent, in that it has the capacity to maintain the memory and timekeeping function for approximatelysix months without AC power applied.

Preview Feature. A preview function is included for monitoring the VCR commercial insert process without interfering with the satellite channel. When preview is selected, the satellite program remains on air and is not affected by the commercial insert function. Preview audio and video outputs are provided on the rear panel which allow monitoring of the satellite signal and the commercial insert function. This feature is particularly useful when performing system tests and for preview and test of commercial spot cassettes.

Logging And Verification. Program logging includes printouts upon receipt of cue tones with date, time and cue tone identification; switching changes with date, time and identification of input A/V source; data on the video tape identifying an advertiser and power failure ON/OFF date and time. The microcomputer can be programmed to modify the printouts to include information on satellite code setting, insert operation instructions and other information which has been programmed into the microcomputer itself. This allows the operator to verify every instruction he has given to the SPOTMATIC JR by means of hard copy printout.

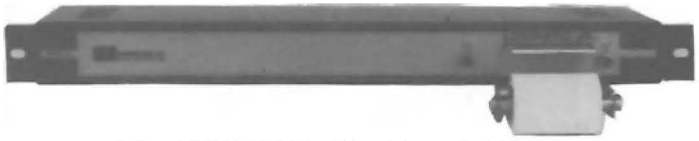
Auxiliary Functions. The system also has the capability of decoding program ON/OFF tones used by some satellite services and automatically switching to an auxiliary source for program fill during off-air periods or the replacement of services sharing the same transponder, but not used on the cable system.

The SPOTMATIC JR has a disable input which, when connected to ground, will disable the commercial insert function. This provision facilitates the connection of a programmable clock to allow insertion of commercials only during pre-programmed time blocks. A manual start input is also provided which, when taken to ground momentarily, will preroll the VCR and cause a commercial to be inserted in a normal fashion. An on air output is also provided, which goes low only during the actual time period a commercial is being inserted. These connections are also utilized to interface with stereo decoders used with some satellite services.

A satellite sync output is also provided for genlocking purposes. This signal is used to servo-lock the VCR to the satellite signal, thereby assuring vertical interval switching. A tone level indicator on the front panel facilitates proper adjustment of the satellite receiver audio output level. This feature assures that the correct satellite cue tone audio levels are applied to the SPOTMATIC JR.

NEW LOGMATIC JR

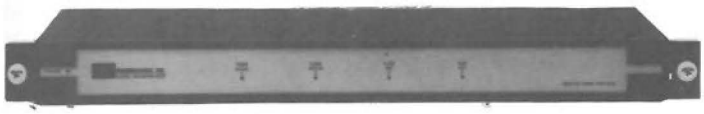
The LOGMATIC JR is a fully automatic four channel commercial insert logging system providing a printout of the time, date and channel identification of any insert along with encoded advertiser and spot information. A built-in real-time clock furnishes the time and date information, while advertiser and spot identification are read from DTMF data previously added to the unused audio channel 1 of the commercial videotapes. A portable DTMF keypad is used to both add the identification data to the tapes and to set the internal clock. LOGMATIC JR printouts are invaluable for both switch verification and billing preparation. The unit will operate with most commercial insert systems. (This unit is shown in Figure 10.)



10. LOGMATIC JR, Front View

NEW AUTOMATIC TONE SWITCHER

The ASS-1A Automatic Satellite Switcher provides a simple and inexpensive means of inserting local programming from an audio source and a character generator or other video source into satellite programming. It decodes the satellite tones which occur at the beginning and end of the satellite programming or local commercial insert period and uses the locally generated information to automatically fill the time period surrounded by the cue tones. (Figure 11 is a front view of the ASS-1A.)



11. ASS-1A Switcher, Front View

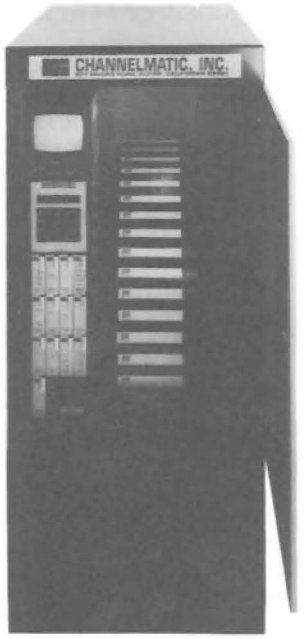
All switching is performed by integrated circuits and occurs during the vertical blanking interval for clean, broadcast-quality peformance. The microcomputerized tone decoding circuitry automatically tunes itself to the tone code of the satellite service to which it's connected. The unit is equipped with a lithium backup power supply for months of memory retention in the event of power failure.

A form-C (SPDT) contact, an open collector logic output and a reset/disable input are available from terminals on the rear panel. The reset/disable and logic output functions facilitate control by a time clock for blackout purposes and operation with stereo channels such as Nashville and Music TV. (The rear panel of the ASS-1A is shown in Figure 12.)

12. ASS-1A Switcher, Rear View

NEW BROADCASTER I

This unit is a precision 15-cassette changer mechanism which operates with one Sony Type 5 or BVU-800 VCR. It can be programmed to playback tapes in any sequence over a seven day schedule. With options, it can random access up to 100 spots on each of the 15 cassettes. Since playback can be started with an optional tone decoder or with a closure, this unit also lends itself for application as a stand alone commercial insert system. (The BROADCASTER I is shown in Figure 13.)



13. BROADCASTER I

The BROADCASTER I can also be added to a SPOTMATIC Random Access System, on one or more VCR's, to increase spot capability and flexibility. This allows any or all VCR's controlled by the SPOTMATIC to have automatic access to up to fifteen separate videocassettes.

This unit is provided with its own microcomputer and can be operator-programmed separately to allow last-minute spot changes and additions. Possibilities created by this interface include the immediate insertion of new commercials into the program schedule; furthermore, if BROADCASTER I units are added to each VCR position, almost complete freedom from tape editing is attained.

NEW FOR VCR AUDIO PROBLEMS

Sony VP-5000 VCR's (and others) have a high-impedance audio output and the level control is not user accessible. Each of these cause problems with level matching in a switching system. To solve these problems, Channelmatic has developed two devices: the UAA-6A Universal Audio Amplifier and the HANDIMOD I.

The UAA-6A (Figure 14) has six independent universal audio amplifiers, each with a level control; it can be used to match impedances and levels for up to six VCR's. The HANDIMOD I (patent pending) plugs into the existing modulator cavity of a VP-5000 and provides 150 or 600 ohm audio and a level control. (Figure 15 shows the HANDIMOD I installed in a Sony VP-5000 VCR.) The HANDIMOD I also adds the ability to lock the VCR to an external video signal for vertical interval switching.

Some means of matching audio impedances and levels must be used in any VCR installation; these units offer cost effective solutions.

FUTURE TRAFFIC CONTROL SYSTEM

Channelmatic is currently developing a traffic control system specifically designed for the unique requirements of CATV. The software-based system will provide a multitude of information related to spots inserted and current availabilities as well as rates and other advertiser related data. It will also have a full accounts receivable capability, including the ability to tabulate and invoice. It is designed primarily for use with a Zenith Z-100 Computer, but can be adapted easily to certain others, such as the IBM personal computer.

14. UAA-6A Universal Audio Amplifier

15. HANDIMOD I Installed in VP-5000

Channelmatic's Traffic Control package has been in software development for several months and will be available in late 1984.

SUMMATION

The equipment required for insertion of local commercials varies radically from system to system. No single insertion package can possibly cover the cost/performance requirements for all operators. Alternate approaches are necessary, as is the ability to expand easily to meet future requirements. Unique accessory items are necessary in some cases to perform the job well. Existing broadcast equipment and garden variety VCR sequencers are not suitable. A very broad product line is required and it must be designed specifically for the market.