SYSTEM 90

PROGRAM AUTOMATION

The Control Console

Programming and operation of System 90 are handled from a single console that may be located up to 150 feet from the rest of the system. The console also provides continuous displays of important operating functions.

Alarm / Error Beeper
Sounds a pleasant, subdued "beep" when system is in an alarm or error condition.

NEXT/EDIT Display (LED)
- **Next Mode** - Indicates event number and source, shelf or function numbers, of next program event to go on the air.
- **Edit Mode** - Indicates any selected event, along with the source and shelf or function programmed for that event. Used while making program changes. Indicates digits for numeric logging encoding and verification. Indicates event addresses programmed in the jump table memory.

Digital Clock Display (LED)
Continuous display of real time in hours, minutes and seconds, with AM or PM.

Compare Time Display (LED)
Continuous display of when next system time correction will take place. Assures program accuracy without precise timing of material. Display is also used to edit all time entries in the compare time memory.

Key Lock
Disables entire keyboard.

Mode Control Keyboard
Used to determine what data is to be entered (time, event, jump table, set clock, log encoding, etc.) In the computer. Also used for remote control (start, stop, fade, etc.).

Data Entry Keyboard
Used for entering all instructions into the micro-computer.

Status (LED) Lights
•**Alarm** - "On" when transmitter is off the air, or when two successive sources are not ready and the automatic music deck is used. or when there is a logging printer failure •**Busy** - "On" when console is in use and system is being addressed •**Ready** - "On" when next source to play is ready to be aired •**On-Air** - "On" when a source is on the air •**Error** - Flashes when keyboard switches are improperly operated or when attempt is made to enter erroneous data •**Lock** - "On" when console key lock is disabling keyboard panel.
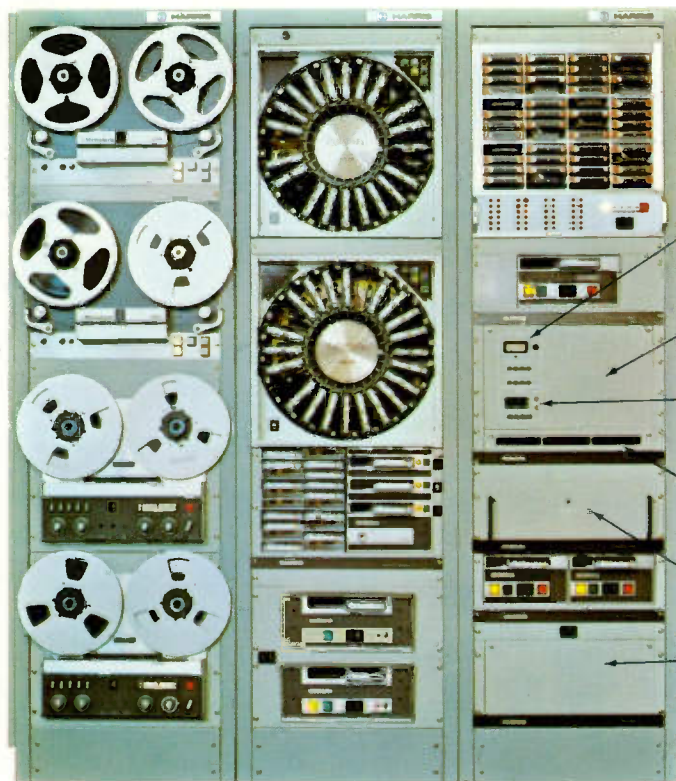
The Control Electronics

The Control Electronics
The other major components of System 90 are located with the audio sources, and take less than one-half of a standard rack for mounting.

Monitor Facility Panel
Has four monitor modes for each of four inputs.
Modes: 1. Sum, 2. Null, 3. Left, 4. Right.
Inputs: 1. Program, 2. Audition, 3. External #1, 4. External #2.

System Memory and Micro-Computer Electronics

Emergency Operation Panel
Permits bypassing micro-computer for source and shelf selection under emergency conditions. Also, source "start", "stop" and "fade control" are provided.

Solid-State Audio and Control Switcher
Houses source modules for up to 16 sources, dual silence sensors, program amplifiers and fade out control.

Numeric Logging Printer (Optional)

Computer-Grade Power Supply

HARRIS COMMUNICATIONS AND INFORMATION HANDLING

SYSTEM 90

The Advanced Way to Simplify Your Broadcast Day

System 90 is a complete program automation controller offering the very latest in technological advancements. This unique system is designed to meet the modern broadcaster's demands for flexibility and simplicity in programming, for reliability of the highest order, for expandability to meet the needs of a growing station, and for ease of maintenance--all at a reasonable and competitive price.

To meet these demands, System 90 offers such state-of-the-art features as micro-computer design for wide flexibility, and ease in system expansion and updating.

System reliability has been greatly enhanced by maximizing the use of digital integrated solid-state circuitry, and by centralizing the system control equipment.

For the broadcaster's convenience, all programming of System 90 is handled from a single portable console, which contains all operator controls, and which also provides a continuous display of vital system conditions. This console may be located up to 150 feet away from the program automation system--in the manager's office, in the program director's office, in the live control room, etc.--and may be moved from one area to another!

System 90 handles up to 16 sources standard, and may be expanded, as your needs grow, to a 32 source capability. The memory stores up to 1200 events--with easy expansion to 3700 events! Also, a unique "main format/sub format" concept allows you to make more effective use of the program events available.

The advanced memory design provides complete flexibility for programming a wide range of formats, from a fast-paced contemporary, with a heavy commercial load, to a relaxed "beautiful music" sound. And System 90 adapts readily to any change in format.

Harris' System 90 program automation is readily adaptable to the needs of every type of radio station...AM or FM...large, medium or small...and offers a realistic means of achieving a more successful operation through the building of a superior and more saleable program product, without the addition of a large, expensive staff.

Now, let's take a closer look at System 90's components, and some of the important features that make this the most advanced program automation control system available today.

System 90 Components

The entire control system consists of only four major units:

1. The electronic housing unit, where the micro-computer and its associated circuits are located. Monitor and emergency control are located with this housing, on a swing-down front panel. The entire housing mounts in the automation system's control rack.

2. The solid-state audio and control switcher, housing up to 16 individual source cards. The switcher mounts in the control rack below the micro-computer housing.

3. The heavy-duty computer grade power supply, with fuses and test points conveniently located behind the hinged front panel. The power supply mounts at the bottom of the control rack.

4. The attractively styled portable console that carries the operator's instructions to the computer, and displays the operating status of the system. This console may be located up to 150 feet from the computer housing.

In addition to the standard System 90 components, many options are available to add to the convenience and flexibility of the control system.

System 90 Features

- All programming, operator control and display of system operating status is centralized in a single, small portable console.

- Micro-computer uses firmware logic--a safeguard against System 90 obsolescence. When advanced operating techniques are developed in the future, your System 90's firmware instructions can be conveniently changed by changing plug-in IC's. A hardwired logic system would require rewiring--if it could be changed at all. Don't risk obsolescence.

- Expandable as your needs expand. A complete line of options and peripherals are available at minimum price. These include memory expansion, source expansion, automatic memory load and dump capability, additional control consoles, and automatic logging. Additional options are also under development to further expand and update your System 90.

- Unlimited flexibility in programming, without compromising your established format. Your format may be changed at any time, and System 90 will easily accommodate it.

Features (Cont.)

- Your choice in programming the memory as sequential or "main format / sub format". Both methods are standard with System 90.

- Random access capability in all memory events--permits easy last-minute changes and program variations. Indexing of random access sources is completed considerably ahead of "on-air" time.

- Network join included. Fade-out and back-timed control are standard. You can join a national network, a state network, a local studio, or even a remote broadcast, easily and conveniently, on time.

- Automatic voice tracking for musical intros, etc. Programmable link and fade control between talk tape and sources to insure their playing on the air, at the proper audio mix.

- Time announce control built in--simply add two standard cartridge playbacks--nothing else--and you have an audio clock. No expensive optional time announce control to add.

- Exclusive time compare memory simplifies your time instructions. Time entries to perform a system action are simply entered directly into the compare time memory and that is it. No need to juggle your program events around to make room for that time entry. Time entries can be entered once and caused to occur each hour (repetitive entries). Or specific entries can be made to occur at an exact second of a specific hour (hourly entries). Your choice.

- Automatic self-correcting restart following power failure--the panic and confusion of getting the system back into operation is eliminated.

- Remote control is standard for full system and memory use with a live DJ. He has convenient access to all system sources, plus tray / shelf selection. The DJ can also program events to play automatically, if he wishes to leave the control room for brief periods. No additional remote control is required--the portable console handles it all!

- Sum channel mono output is standard (combined left and right) for convenience in AM simulcasting.

- Harris' exclusive "error sensing" prevents System 90 from accepting any data from the operator that is not valid. This means there is no danger of invalid data causing system failure.

- One-time bulletin insertion is easily accomplished, without altering the memory sequence. There is nothing to correct after insertion--System 90 automatically takes care of it.

- Built-in monitoring system with single VU meter accuracy. All levels are set to exactly the same standard--use for source level adjust, alignment and phase check. Provides for continuous on-air phase checking of stereo source inputs.

- Individual 25 Hz sensing with stop delay is now built in on each reel-to-reel source card. No optional, expensive add-on 25 Hz detectors are required.

- Emergency panel allows bypassing the micro-computer for source and shelf selection and operation. This is another exclusive feature from Harris.

- Clear Text and Numeric high-speed verified logging systems are available as options. With either system, every on-air event is logged--as is every event that was called on, but did not play! Each non-play event also prints a special character that tells you why it did not play.

- System 90 may be integrated into automatic billing and accounting systems.

- Stereo configuration is standard for System 90 control, with costs equivalent to mono. No expensive stereo conversions required later on.

- Solid-state audio, logging and control switching eliminates all pops during the starting and stopping of sources.

- Dual silence sensors for system and transmitter monitoring.

- Multiple consoles may be employed to provide convenient system control points throughout the station.

- Time entries are entered in any order. The compare time memory automatically sorts and selects the entry that is to occur next according to the digital clock. This is the first simple, straightforward approach to flexible time entries. Now you can review and edit only time entries, without getting confused with source entries.

- Up to 3700 events and 32 source inputs--with 1200 events and 16 source inputs standard. Fifteen sources can be random accessed!

- Simple digital clock setting by keying correct digits directly into the display.

- System 90's lights and displays use long-life solid-state LED lamps--no filaments to burn out.

- System 90--designed, built and serviced by the Broadcast Products Division of Harris Corporation. This is your assurance of value, reliability and 100% company support. With System 90, Harris leads the way.....again.

HARRIS COMMUNICATIONS AND INFORMATION HANDLING

SYSTEM 90 Console

The smartly styled System 90 console is the operator's control point, and can be conveniently located up to 150 feet away from the system. The console requires only four wires (standard audio cable is ok) for connection to the micro-computer. Telephone extension-type wall sockets can be strategically located throughout the station, so that the console can be moved from one location to another. The console may be connected and disconnected without upsetting the operation of System 90.

Also, additional consoles may be ordered, and located at various points within the station. Each console is equipped with a keyboard lock to avoid accidental use of it's keyboard.
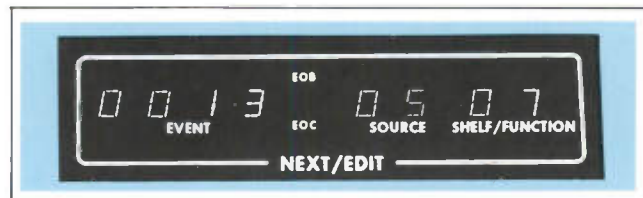
In addition to centralizing operator controls, the console also displays the system's important operating data, so that you know at a glance what is going on.

Console Displays

Digital Clock Display

The clock's time is a continuous display, and shows hours, minutes, seconds and either AM or PM. Accuracy is within one second per month and a crystal oscillator is used as the frequency standard.

Setting the clock display to correct real time is accomplished by simply keying in the appropriate digits. The setting of an automation system clock has never been simpler.

Next/Edit Display

This is a multi-purpose display used for editing the program sequence (including last minute program changes), and normally displays the NEXT program event to be aired. It is also used for temporary display of logging digits and jump table addresses.

Program Events: This display consists of a four-digit EVENT number, identifying the event's location in the program sequence; two digits identifying the SOURCE to be played; and two digits for a SHELF or FUNCTION number. A function number may be used to accomplish some of the special features, such as linking two sources, or automatic "fade-under", or to jump to a specific location in the memory. The EOB (End-of-Block) or EOC (End-of-Cluster) indicators will show if the displayed event is to be the last event of a program block or the last event of a program cluster (when using the "main format/sub format" method of programming).
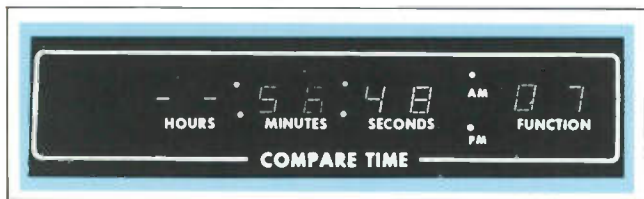
Editing Program Events: The NEXT/EDIT display is also used for editing any program event or when entering data in any program event. The display will show the same information described above.

Logging Digits: A third use of this multi-purpose display is for showing the six digits used when encoding or decoding tapes with the optional numeric logging system. A six-digit logging code is keyed into this NEXT/EDIT display and then encoded onto the cue track of the tape. Logging codes on previously recorded tapes can also be numerically verified. Furthermore, complete encoding and decoding can be done at any time while the system is in full operation, without disturbing the on-air program.

Jump Table Addresses: Another use for the NEXT/EDIT display is for editing event addresses in the "jump table". It is this unique jump table that

Console Displays (Cont.)

gives System 90 the capability of jumping to any specific event in the memory. This feature might be used to jump to different formats for different parts of the day. The jump table can be accessed by a time entry or an event entry. There are eight positions in the jump table that can be programmed with event addresses. This jump table provides true programming convenience.

Compare Time Display

The time that the next system time correction will take place is continuously displayed in hours, minutes, seconds, AM or PM, along with a function number. The function number represents what will happen when the indicated time reaches coincidence with the digital clock. There are eleven possible system actions, in addition to eight jump table locations, that can be programmmed on a time basis by using the appropriate function number. The function numbers represent such system actions as automatic system start (01); automatic system shut off (02); start back-time for net join (07); leave network (09); and selection of a new format from the jump table (F1 through F8). In addition, four function numbers (12 through 15) are reserved for your use in automatic starting of cartridge tape recorders, turning on warning lights and bells, etc., all on a time basis, and external of System 90.

The compare time display is also used to edit and review time entries coming up later in the day.

Status Light Display

This display consists of six LED indicators showing system status.

Alarm: Indicates when the off-air silence sensor detects failure of audio from your transmitter; or when System 90 has attempted to start two consecutive non-ready sources, and has placed a music fill deck on the air; or when there is a problem with the numeric logging printer. An external closure is also provided by the alarm condition for use in controlling an external alarm device.

Busy: Indicates to all consoles connected to System 90 that one of them is in use and addressing the computer.
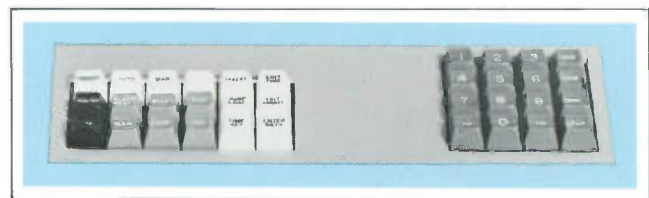
Ready: Indicates that the next source to play on the air is ready to play. This light is particularly beneficial to the live DJ for remote system operation, as he might not be able to see the system.

On Air: Indicates that a source is on the air.

Error: Indicates improper operation of the mode keyboard, or that the operator is attempting to enter erroneous information into the computer's memory. This "error sensing" is an exclusive feature with the Harris System 90, and assists the operator in avoiding many common operator errors.

Lock: Indicates the console keyboard panel is locked and cannot be operated. This feature prevents accidental or deliberate tampering with the system's operation.

Console Keyboard Panel

Mode Control Keyboard

This keyboard provides manual control of the automation system. Such controls as start next source, stop system, and fade out of on-air source are available at this keyboard.

This keyboard is also used to determine what data is to be entered into the computer, or edited. Such data as a compare time entry, a source and shelf entry, a jump table address, or a logging code are selected at the mode control keyboard. Encoding and verification of tapes for the numeric logging system are handled here, and the clock is set by use of this keyboard.

Data Entry Keyboard

This keyboard is used for entering the actual data into the computer's memory. It consists of numbered keys, along with AM, PM, EOC, EOB, SKIP and FUNCTION keys.

SYSTEM 90

Monitoring, Emergency Operation and Switching

Monitor Panel

System audio monitoring is accomplished at this panel. VU metering, audio level control and the single channel monitor amplifier provide monitoring for either stereo or mono audio from one of four inputs. These are: 1) the program output; 2) the audition buss; 3) an external input (EX 1); and 4) a second external input (EX 2). One of the external inputs might be used for monitoring off the air. Each of the four inputs can be monitored for left channel audio, right channel audio, sum audio (combined left plus right), and null combination (combined left minus right), used when making stereo phase adjustments.

The VU meter may be used in the audition position for making source level adjustments and for checking the 25 Hz tone levels from reel-to-reel sources.

The "program" and "sum" positions are the normal monitoring selections, providing an immediate aural indication of stereo phase problems. The test and maintenance capabilities of the monitor panel are the result of its flexible design.
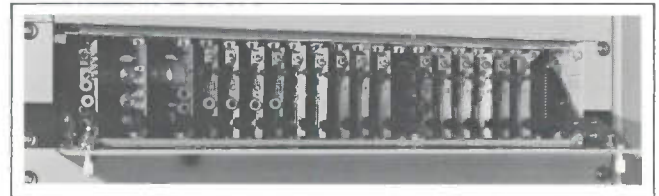

Emergency Panel

Many broadcasters are concerned with what to do should a problem develop with the automation system's micro-computer. Even though every effort has been made in the design of System 90 to provide the highest degree of reliability, it is possible that someday its computer might malfunction.

Should that occur, you will find the emergency panel provides for convenient manual system operation. This panel bypasses the computer and provides for the selection and starting on the air of any system source. The audio from an on-air source may be dumped off the air with the STOP switch, or it can be faded out by the FADE switch. Even shelf selection for a multiple cartridge source is included. Simply select the source, along with the desired shelf, then press the LOAD switch. That is all there is to it--a straightforward, logical approach to emergency operation.

Solid-State Audio Switcher

All audio and control switching is solid state. The compact switcher enclosure can house up to 16 source cards and also includes a dual silence sensor card, a fade-out control card, and a dual-channel line amplifier card. A module extender card is also provided and is stored in the switcher housing.

The solid-state switcher features EOM (End-of-Message) controlled overlap when switching from source to source to produce that live sound.
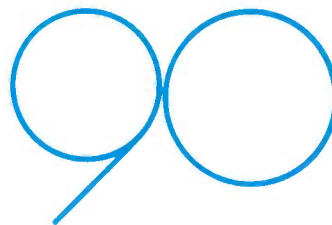
Reel-to-reel source cards include 25 Hz tone sensing with adjustable stop delay. No expensive optional 25 Hz sensors are required. All source cards include an audition switch and an LED on-air indicator.

The dual silence sensors are for monitoring the system audio and the transmitter audio. When the system sensor detects silence it will start the next source. When the transmitter sensor detects silence it will turn on the system alarm indicator and beeper.

Solid-state program channel fade-out circuitry is included in the switcher. The same circuit card includes the 25 Hz active filters, designed to minimize phase shift errors and improve the low-frequency roll-off characteristic.

The dual-channel program line amplifier provides up to + 18 dBm peak audio level for the left and right outputs. A sum-channel output is standard.

System 90 incorporates a solid state memory of 1200 program events, which can be expanded easily to 3700 events. This unique memory can be programmed by the "sequential" method for ease and simplicity or by the "main format/sub format" method for flexibility and convenience. Any combination of the two methods is also possible since it is entirely up to you how this unique memory system is used.

A large number of memory events is significant only when using the sequential method of programming. An example would be where fifty events are to be programmed each hour for twenty-four hours. Of these fifty events, thirty might be format events, and the remaining twenty, commercial events. During twenty-four hours of programming, the "sequential" method will require 1200 events, while the "main format/sub format" method will require only 510 events for the same number of on-air events!

Several program formats may be stored in System 90's memory and recalled one by one at specific times during the day. Programming can even be prepared days ahead of time (optional) on either magnetic or paper punch tape and then *automatically* entered into System 90's memory by means of a time entry.

System 90's memory can easily be edited and programmed at any time without disturbing the on-air program. Each memory event can be programmed with a shelf address or with a function number for special execution.

Sequential Programming

The sequential method of programming is used when a repetitive format cannot be employed or when music is to be played from random accessed cartridges. The sequential method is normally used by stations programming a contemporary format, popular country format, or any of the other popular formats where the music is played from random accessed cartridges. Such formats require changing only a few music selections each day simply by changing a few cartridges. The sequential method also allows for heavy repeat play of certain music selections, and makes it easier to alter the music play sequence. If the above describes your format, System 90's sequential method of programming is ideal for you.

The hour-by-hour sequential program is entered into System 90's memory directly from your program schedule, event by event. Each program event is entered into the memory in exactly the sequence you want it to play. This simple sequential method assures strict control of your format. Everything plays in the exact sequence you entered it. Nothing is left to chance.

Once the entire day's program sequence is in the memory, only a few changes are required for the day-to-day operation. These daily changes will normally be the commercials and the random accessed

music. The changes are then made either manually from System 90's console, or automatically from the optional magnetic or paper punch tape.

Main/Sub Format Programming

You may intend to use one of the many excellent program services available that offer high-quality, live-sounding formats. Most of these formats provide the music on reels of tape, and the use of reel-to-reel means the format usually repeats a program sequence hour after hour. With such formats, generally only the commercials and PSA's are random accessed, and varied from hour to hour and day to day.

The program service format can be conveniently entered into System 90's memory once and then called on to repeat each hour it is to be used. This format has availabilities in the program sequence that says a commercial cluster can be played here. The entire day's commercial load is then sub-programmed into System 90's memory. For example, the repetitive format might use the first 100 memory events that will be repeated hour after hour, leaving 1100 events for the day's commercials.

This convenient "main/sub format" method of programming saves many memory events, and just as important, it saves much time in programming your system. It also provides for simplicity in editing. The commercial events can be edited one at a time without being confused with format events. And the format events can be checked and edited separately. Furthermore, several formats can be programmed and called up at predetermined times. System 90 can jump back and forth between formats at any desired time should your programming require it.

Real Time Corrections

After entering all of the program events into System 90's program memory, the time entries will normally be entered next. Determine when the system needs a time correction to take place according to the program format, and simply enter that time and a function code representing the desired system action in the compare time memory. That's all there is to it.

The compare time memory is an exclusive feature with System 90. As an example of how it may be used, let's suppose you want the automation system to automatically "stop" following sign-off at midnight. Any convenient time after 12:00 AM, but prior to the completion of the sign-off tape, can be entered into the compare time memory, along with a function (02) representing system "stop". Let's say then that a time correction of 12:00:05 AM 02 is to be entered. This entry can simply be placed into the compare time memory at any convenient time during the day by keying in the digits. That's it. Regardless of the time entries already in the memory, the micro-computer automatically sorts them all and selects and displays

Operation...Straightforward, Easy to Understand

the next one to occur according to the digital clock. As you can see, your programming is not restricted to locating a time entry at the approximate point in the programming where it is to be used. This unique solid-state compare time memory does away with the use of the troublesome pin and peg board, as well as the wiring strap and motor cam methods of time correction setting.

Time corrections can also be entered in this memory on a repetitive basis, where the entry is made once and performs its function each hour. An entry can also be made to override a repetitive time correction during a specific hour.

The compare time memory has the capacity for 63 time entries. However, with the feature of repetitive entries, the compare time memory is effectively expanded. For example, you could use 43 repetitive time entries each hour for 24 hours (a highly unusual situation), and 20 hourly time entries during the same 24-hour period--the equivalent of 1052 time entries!

System 90's compare time memory has more capacity than will normally ever be used. Enter your programming sequence in the program memory, then determine at what times you want a system time correction--and simply enter the desired times into the compare time memory.

Bulletin Insertion

System 90 makes bulletin insertion simple with its "one-time insert" feature. A recorded (or live) news or weather bulletin can be inserted into the system and it automatically goes on the air as the next source (or it goes on immediately, if desired). This does not alter the memory's program in any way. And there is no need to later remove the bulletin entry from the memory, as it is inserted strictly on a "one-time insert" basis. This is another Harris exclusive that makes the broadcaster's job easier.

Voice Tracking

Voice tracking is the technique of recording a separate

talk tape with intros and extros to precede or follow music selections. When handled properly, this technique can give your automation programming a sound as "live" as if the DJ were right there in the studio conducting the show. Actually, it takes a DJ only 20 to 30 minutes to record a talk tape for an average 4-hour show, which leaves him 3½ hours of productive time--time that he would otherwise be spending in the control room if the show were live.

System 90 insures voice track synchronization with programmable source link, with or without the fade-under feature. This means that with System 90 your programming stays in sync, with voice track and music tapes meshing beautifully to give you a sound that is hard to distinguish from live programming!

Error Sensing

The exclusive System 90 error sensing feature prevents improper operation of control switches and other obvious errors when data is being entered. Should the operator attempt to enter a non-existent source number, or an invalid shelf number, the console beeper sounds, the error indicator flashes, and further keyboard entries are prevented until the alarm is reset.

Non-Ready Sources

A non-ready source will automatically be passed over at the instant it is called on to play. This action is totally independent of the silence sensors. Furthermore, either of System 90's optional logging systems will print an entry that this source was bypassed, along with a code character indicating the reason why (non-ready).

If two successive sources are not ready when the system calls on them, they will both be passed over, and the system will immediately go into the alarm condition. A music source that has been designated as "emergency fill" will automatically go on the air at this time. Successive non-ready sources will not cause System 90 to go silent, as the computer will take action to prevent this.

Successful Automation

The key to the successful use of automation is pre-programming. Determine ahead of time what you want the system to do; then and only then, program the system to do exactly that, and it will do it.

No automation system can operate on its own until it has been instructed what to do. Don't be misled by statements that the machine makes all the decisions for you. *You* must make the decisions, and program those decisions into the system so that it will know what you expect it to do. The features and capabilities of an automation controller are your tools for the job of programming. The more flexibility and the more features a system has, the more tools there are available to you, and the easier your job will be.

HARRIS COMMUNICATIONS AND INFORMATION HANDLING

Automatic Program Logging

Automatic program logging systems that provide a printout are of two types: six-digit numeric code, and clear text alpha/numeric. A modern version of either type offers high-speed encoding and decoding, with short program events, such as station ID's and commercial blurbs completely decoded *from the tape* and printed out in approximately 3.5 seconds! Logging events are no longer restricted to being 10 seconds or longer--now even your time announcements can be encoded.

The Harris logging systems offer true verification of what was scheduled to play and what actually played on the air. The entire logging message is read from the tape playing on the air, but is not printed until the message has played completely. Should the tape break, or the transmitter kick off the air, or the message be manually dumped out while it is playing, the logger printout tells you this by printing a special code character along with the message.

System 90's logging systems print the time of the event, stated in hours, minutes, and seconds, with either AM or PM; the event number from the memory where this message or music is programmed; and the source and shelf number where the message is actually located in the automation system. The above information is printed for every event scheduled to play, and comes from the computer. The actual message from the tape is then printed. This message is in the form of a six-digit numeric code for the Numeric system, or a clear-text English message for the Clear-Text system. No other logging system tells you so much. Harris program logging systems present a true reproduction of your broadcast day.
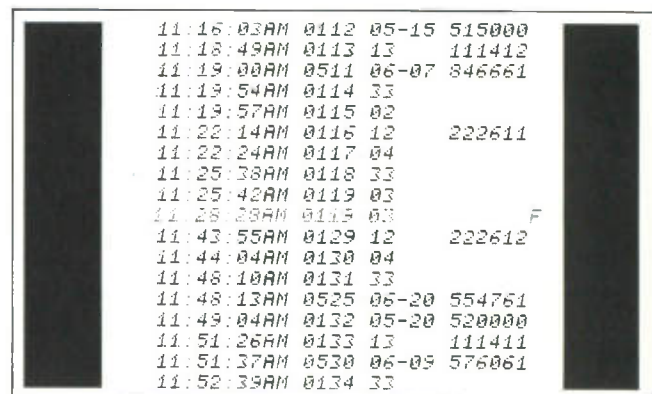
During manual operation of the system (as when used in conjunction with live programming), the logging printer continues operating. Furthermore, the manual mode of operation will be indicated by the letter "M", which is printed with the log entries for all events played in this mode.

Numeric Program Logging

This optional logging system includes a high-speed, solid-state printer, along with the encoding and decoding electronics located on a single plug-in card.

All the information the broadcaster must have to determine what actually played is provided by Numeric logging. This exclusive Harris logging system serves the purpose of verifying what actually played, as compared to what was scheduled to play, and relieves the on-duty operator from the responsibility of aural verification. At the end of his tour of duty he merely verifies that what played was scheduled to play. The numeric printout then becomes a part of the station's official program log.

The six digits making up the code can be used to represent specific information. For example, the first two or three digits can represent an account number. The fifth digit might represent the length of the announcement, while the sixth digit might represent which cut this is on a multi-cut cartridge.

Encoding your tapes with six digits of numeric code is handled through the keyboard of System 90's console. The NEXT/EDIT console display is used to display the logging digits as they are keyed into the encode electronics, and the numeric code is then recorded onto the cue track of the taped message simply by pressing the logging RECORD switch on the console. The recorded numeric code is immediately verified by redisplay of the digits as read from the encoded tape. Also, codes on previously recorded tapes can be easily verified. All the encoding and verification is done without affecting the on-air program in any way!
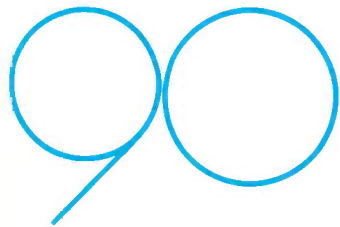
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11:16:03AM 0112 05-15 515000
11:18:49AM 0113 13      111412
11:19:00AM 0511 06-07 846661
11:19:54AM 0114 33
11:19:57AM 0115 02
11:22:14AM 0116 12      222611
11:22:24AM 0117 04
11:25:38AM 0118 33
11:25:42AM 0119 03
11:26:28AM 0115 03            F
11:43:55AM 0129 12      222612
11:44:04AM 0130 04
11:48:10AM 0131 33
11:48:13AM 0525 06-20 554761
11:49:04AM 0132 05-20 520000
11:51:26AM 0133 13      111411
11:51:37AM 0530 06-09 576061
11:52:39AM 0134 33
```

As each tape plays on the air it will be scanned for a logging code. If the tape has been encoded, the six-digit code will be stored in the computer and printed out on the printer when the message has finished playing. The printout consists of the time the event started, the event number, followed by the source number and shelf number, and then the six digits of numeric code.

The numeric printer uses a low-torque motor to roll the

Capabilities

adding machine-type paper for convenience in storage of the printed log. Also, the printed log is scrolled over an aluminum platform that allows easy notation when dating and signing the printout.

Clear-Text Program Logging

This optional logging system includes two printer units, one each for the encoding and decoding electronics. A variety of printer terminals are available to meet your needs--from the econonomical teletype units to the higher-speed, quieter-operating TI-700 (Texas Instruments) and Extel units.

Harris' Clear-Text logging is a stand-alone system, and can be used by any broadcaster wanting an accurate printed log of his daily programming. When this logging system is used without System 90, the event, source and shelf numbers are not printed, as this information comes from System 90's computer.

Clear-Text logging eliminates the need for a hand-kept program log, as the printout is an accurate accounting of what was really broadcast. The operator simply signs the log when coming on and then again when going off duty, and makes any necessary notes and comments on the printed log for the period he is on duty. The Clear-Text printout then becomes your official program log.

The Clear-Text alpha/numeric message is prepared in a solid-state memory. The message is then automatically recorded onto the cue track of the taped message. The encoded message will then print out on the encoding terminal as verification of what has been encoded onto the tape.

As the Clear-Text encoded tape plays on the air, its message will printed out in English on the decoding printer terminal. When used with System 90, the Clear-Text printout consists of the time the event started, along with its event, source and shelf numbers (all provided by System 90's computer), and then the complete encoded message, in English.

Additional Consoles

For your convenience, extra consoles may be added to your System 90 to provide multiple control points throughout the station (within 150 feet of the system). A keyboard lock on each console avoids accidental operation while another console is in use. There are standard provisions for plugging a second console into System 90--and provisions for more than two consoles may be made on special order.

Memory Expansion

The basic 1200 program events in System 90's computer can be easily expanded to 3700 events. Memory expansion may be accomplished at any time in the field by plugging RAM and ROM integrated circuits into their respective computer boards, where sockets have been provided. Memory expansion is available in kits of 1000 events and 2500 events to expand the memory to 2200 and 3700 events respectively. Before adding memory events unnecessarily, System 90's unique memory capabilities should be understood (the sequential and "main format/sub format" methods). Normally, 1200 events will be more than enough for your daily programming requirements. But, should additional memory really be needed, it can be added easily at any time.

Source Expansion

System 90's source capacity can be expanded from the basic 16 sources to 32 sources! Most programming will require fewer than 16 sources; but when more than 16 source inputs are required, a second audio/control switcher can be added. Source expansion should be handled at the time of system purchase; however, it can be added in the field by a Harris automation specialist.

Memory Load/Dump

System 90's memory storage capacity is greatly expanded with the optional memory "load" feature. Programming information (program events, time correction entries, and jump table addresses) can be prepared days ahead of time on either magnetic tape or punched paper tape and loaded into System 90's memory at a predetermined time. The load operation is accomplished automatically, with a time entry.

Instead of changing all events in the memory, it may be desired to change only selected memory events. These, too, can be pre-programmed ahead of time, and loaded into the memory automatically.

The "dump" feature permits a paper printout of all programming in System 90's memory. This printout is normally used for making selective corrections to the basic format for later use. System 90's dump feature is a part of the load feature described above, and will be included when the load option is installed.

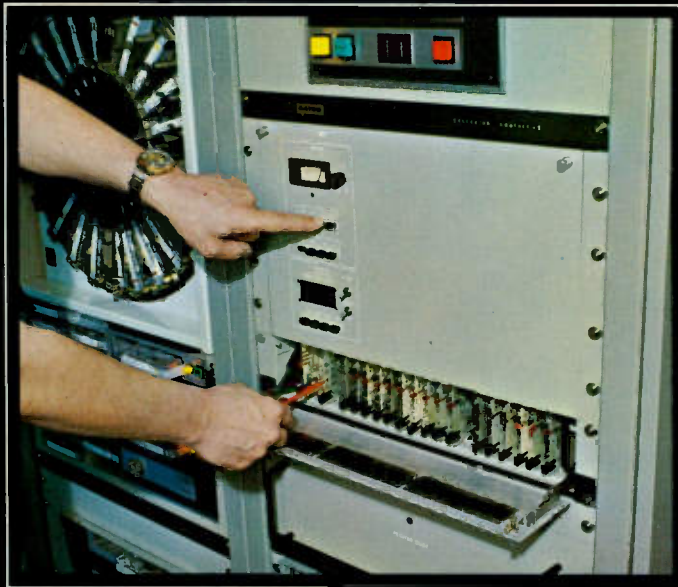**HARRIS** COMMUNICATIONS AND INFORMATION HANDLING

Operation with a Live DJ

As System 90's console features built-in remote control, the DJ has complete access to the automation system during live shows. He can select any commercial or music selection in the system and start it manually, when needed. Or he can even pre-select several commercials and music selections and have them segue automatically. Should the system include automatic program logging, every event the DJ plays will be automatically logged, with the letter "M" indicating that the entry was played manually.

During a live show, the DJ no longer needs to spin his wheels cueing up records or searching for commercial carts. He now has the time to run a more relaxed live program, which is a most important consideration when the live show is a talk or listener participation program.

SYSTEM 90 Maintenance

Test points and level controls are conveniently accessible from the front panel so that the VU meter and other system indicators may be easily observed while you are making adjustments. Both the computer housing and the switcher include extender boards to simplify testing and checking procedures. Long-life solid-state LED lamps and readouts are used throughout, making lamp replacement pretty much a maintenance task of the past.

Ease of maintenance is an important feature of System 90. The three rack-mounted units (computer housing, switcher and power supply) making up System 90's control electronics have hinged front panels to provide ease of access to the plug-in circuit boards. Also, a "mother board" technique is used to eliminate most of the interconnecting wiring between the plug-in circuit boards.

System 90 is the most advanced, most flexible system available today, and also offers convenience of operation and maintenance unmatched by any other system. It is truly the best way to go to simplify your entire broadcast day!

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