EXPANDED ROAD RUNNER MANUAL

2/3/81

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This section will describe the physical characteristics of the components of the EXPANDED ROAD RUNNER and describe the intended use for each. The programmer itself has three basic areas to describe. They are the KEYBOARD, FRONT PANEL (located just above the keyboard), and the REAR (or back) PANEL. The expansion components consist of three additional pieces of equipment each with a FRONT & REAR PANEL description. The three expansion components are the RX1 EXPANDER BOX, the FD1 DISK DRIVE, and the VM5 VIDEO MONITOR.

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ROAD RUNNER
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KEYBOARD

The keyboard is very much like any ordinary typewriter keyboard. You will notice, however, it has a few extra keys with SPECIAL labeling. These keys are described in detail under the CODE heading section of this manual.

FRONT PANEL

The FRONT PANEL is made up of 9 LEDs (Light Emitting Diodes) on the left half, the DISPLAY LINE in the center and 9 LEDs on the right half.

LEFT HALF OF FRONT PANEL

SEQ 2

SEQUENCE 2 - This LED will light when the ROAD RUNNER is instructed to sequence between two projectors instead of the normal default mode of sequencing between 3 projectors.

REM CUE OFF

REMOTE CUE OFF - This LED is lit when the system is instructed to ignore cues received at the remote jack located on the rear panel.

REM CUE

REMOTE CUE - This LED is lit when a remote cue is received at the remote jack on the rear panel. This will occur regardless of whether the remote cue function is disabled or not.

AMP OK

AMPLITUDE OK - This LED is lit when the PLAY IN jack on the rear panel receives an acceptable MAG TAPE signal.

DISP

DISPLAY - This LED is lit when an important message is pending. It will flash when the system is in PROJECTOR or AUXILIARY DISCONNECT. This LED is used generally as an indication that the EXPANDED ROAD RUNNER is functioning in a mode other than normal and the system wants to make sure that you are aware of that fact.

STBY

STANDBY - This LED is lit when the system is in STANDBY mode. (Lamps are off, tray position and status are maintained if the show runs from memory).

MT ERR

MAG TAPE ERROR - This LED is lit when an error is detected in the received MAG TAPE INPUT signal.

MIF

MAG TAPE INPUT OFF - This LED is lit when the system is instructed to ignore any MAG TAPE INPUT.

MOF

MAG TAPE OUTPUT OFF - This LED is lit when the system is instructed to NOT generate any MAG TAPE OUTPUT to the REC OUT or OUT 2 RCA jacks. In this mode a steady series of nulls will be generated at the output jacks. (Nulls are a mag tape output which indicates the absence of data).

DISPLAY LINE

In the EXPANDED ROAD RUNNER system the DISPLAY serves as a backup to the VM5 VIDEO MONITOR. It will display the cue you are presently working on or preview the next cue when in a RUN mode. It allows you to view CUES and CONTROL COMMANDS as you enter them and permits you to monitor additional status information in combination with the DISP key functions such as tray position. NOTE: The ROAD RUNNER assumes starting tray position to be "1". Having the DISPLAY LINE in the ROAD RUNNER permits you to travel without the monitor and still have access to program and status information.

RIGHT HALF OF FRONT PANEL

These 9 LEDs represent the screen and projector assignments. The LEDs are arranged in a 3 by 3 matrix with the vertical columns representing screens and the horizontal rows representing the specific projectors. Using the SCREEN ASSIGNMENT command, any 3 of the 10 screens may be represented by the LEDS. The default display is screens 1,2 and 3. The horizontal rows represent the A, B, and C projectors from top to bottom. The projectors may be alternately designated LEFT, CENTER, RIGHT or TOP, CENTER, BOTTOM by means of the PROJECTOR ASSIGNMENT command. The LEDS will light when the lamp of the projector that it represents is ON. This allows you to keep track of which projectors are ON and which are OFF.

REAR PANEL

Facing the REAR PANEL the features will be described from right to left.

EXPANDER

This connector is for attachment to the RX1 EXPANDER BOX. The ROAD RUNNER normally has a "DUMMY PLUG" inserted to protect the pins of the connector. Whenever the RX1 EXPANDER BOX is not connected the "DUMMY PLUG" should be reinserted. When you use the RX1 EXPANDER BOX, UNDER NO CIRCUMSTANCES should the 40 pin connector be inserted or removed while power is applied to the unit.

REC OUT

The RECORD OUT RCA jack is used for outgoing DATA communications information, e.g. hook up of dissolve units on screens 1-5, peripheral equipment such as X15 AUXILIARY controllers, storing of program information, recording CLOCK TRAK information and Real Time DATA for screens 1-5.

The data format chosen by AVL includes multiple cue passes and a CYCLIC REDUNDANCY CHECK to virtually guarantee failure free operation of the playback equipment and allow use of moderately priced cassette equipment for recording and playback.

Multiple cue pass refers to the fact that the system sends out each cue more than once. At 10 cues per second, each cue is generated 3 times. At 20 cues per second, each cue is generated twice. This increases the reliability of the data transfer because if the data is distorted the other passes of the same cue are available.

CYCLIC REDUNDANCY CHECK refers to the form of error checking used to verify accuracy of the transmitted data. The numeric value of each transmitted character is divided by a specific number to obtain a quotient and a remainder. The value of the remainder is sent along with the transmitted character. At the receiving end the character is again divided by the same specific number and a quotient and a remainder is again obtained. This latest remainder is compared to the remainder which was transmitted with the character. If the remainders are the same, then the character was received clearly. If the remainders are different, the character is discarded and the next pass of the multiple cue passes is used to obtain the correct character.

The data from the REC OUT jack is compatible with the full line of AVL computer products.

NOTE: We recommend the use of high quality audio cables for ALL hook ups, e.g. TEAC TC401xx (the xx indicates length).

PLAY IN

The PLAY IN RCA jack is used for ALL incoming DATA communications information, e.g. loading PROCALL from tape, loading program information stored on MAG TAPE, playing in CLOCK TRAK, VERIFYING your SAVE tapes and playing cue information through the EXPANDED ROAD RUNNER without storing it into memory. (MAG TAPE BYPASS)

REM CUE

The REMOTE CUE jack is a female KODAK type connector. It is used to CUE and REVERSE CUE the EXPANDED ROAD RUNNER from a remote location, e.g for speaker support. The REM CUE jack can be made inoperable by entering a RCF command in the CONTROL COMMAND mode. This will also light the REM CUE OFF LED on the FRONT PANEL. This jack is connected to the REM CUE LED on the FRONT PANEL so that each time a remote cue signal is received at the REM CUE jack it will light the REM CUE LED.

BATTERY

The ROAD RUNNER can be used with the EAGLE BATTERY PAK to protect the internal memory contents (the PROCALL and program portion) from being lost if power to the unit is interrupted for any reason.

POWER RECEPTICLE

This is for connection to the detachable AC power cord when the ROAD RUNNER is used alone, or to the RX1 EXPANDER BOX when used in the EXPANDED ROAD RUNNER system. Always make sure the POWER switch is turned OFF before plugging in the unit.

FUSE

The fuse is removed easily with the FUSE PULL lever. The fuse itself is a #312 3AG 1/2 AMP, 250 VOLT fuse. You will notice in the fuse compartment a small card with "120" marked on it. This card permits you to switch from 120 VOLT operation to 240 VOLT operation. With a small pliers you remove the card and turn it around so that the "240" now appears on the left in the cut away area where the "120" appeared before you removed the card. Make sure the card is secured. Now replace the fuse and you are ready to use 240 VOLT power. CAUTION: Make sure this card is set to the proper voltage rating before you apply power to the ROAD RUNNER. The card actually has four sides and if you can read "110" or "220" in the cut away space, the ROAD RUNNER will NOT operate.

ON/OFF

This switch applies power to the ROAD RUNNER when the ON is in the flat position. Always make sure the ROAD RUNNER is turned OFF before plugging it into an AC outlet.

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RX1 EXPANDER BOX
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FRONT PANEL

The FRONT PANEL will be described from LEFT to RIGHT as you face it.

ON/OFF

This switch supplies AC power to both the EXPANDER BOX and the ROAD RUNNER (when connected appropriately). This is a rocker type switch and power is applied to both units when the upper portion marked ON is depressed so as to be flush with the front panel. This switch must always be in the OFF position before plugging the unit into an AC outlet.

POWER LED

A front panel LED (light emitting diode) is provided as a clear visual indication that power is on in the unit.

ROAD RUNNER POWER CORD

A short (4 inch) AC cord with a female connector on the end is located on the FRONT PANEL. This enables you to plug the main ROAD RUNNER unit into the EXPANDER BOX and power both units with a single AC cord. The power switch on the ROAD RUNNER can then be left in the ON position and the power switch on the expander box will turn ON or OFF both units.

ROAD RUNNER BATTERY PACK CORD

As in the case with the power cord, a short (4 inch) battery pack cord with a 6 pin male connector is located on the FRONT PANEL. This should be plugged into the 6 pin female battery pack connector on the rear of the main ROAD RUNNER unit. Battery backup for the entire system can be provided by connecting a battery pack to the RX1 EXPANDER BOX.

40 PIN RIBBON CABLE

A flat ribbon cable approximately 5" in length with a 40 pin female connector on the end is located on the FRONT PANEL. This cable is for interconnection with the 40 pin male connector on the rear of the the ROAD RUNNER and allows communication between the Z-80 CPU in the ROAD RUNNER and the video, mag tape and disk control circuits located in the RX1 EXPANDER box. The suggested order of cable connection between the RX1 EXPANDER BOX and the ROAD RUNNER is to first connect the 40 pin cable, next connect the battery backup cable and lastly connect the AC power cord. UNDER NO CIRCUMSTANCES should any of the cables be disconnected or connected while power is applied to the units.

REAR PANEL

The REAR PANEL will be described from LEFT to RIGHT as you look at it.

COMPOSITE VIDEO CONNECTOR

A coaxial connector on the REAR PANEL is provided for interconnection to the VM5 VIDEO MONITOR. This is a threaded female connector and is used with the coaxial cable supplied with the system.

VIDEO DC POWER

A female 3 pin power connector is located under the COMPOSITE VIDEO CONNECTOR. Video monitors are powered by a DC voltage which is usually obtained by means of a power supply in the monitor enclosure which converts AC to DC. In order to minimize it's size and weight the 5 inch monitor uses the power supply in the EXPANDER BOX and only low voltage DC power is supplied to the monitor itself.

OUT 2

The RCA phono jack labeled OUT 2 provides cue information for screens 6 through 10 to the projector dissolve units and also to tape decks for recording.

The data from this jack is compatible with the full line of AVL computer products.

NOTE: We recommend the use of high quality audio cables for ALL hook ups. e.g. TEAC TC401xx (the xx indicates length).

BATTERY

A 6 pin female connector is located on the rear panel and allows the EXPANDED ROAD RUNNER SYSTEM to be used with the EAGLE BATTERY PACK to protect the contents of the internal memory (PROCALL and program section) from being lost if power to the unit is interrupted for any reason. The connector is keyed so that the plug may only be inserted the correct way.

DISK DRIVE

A 37 pin female connector is provided on the REAR PANEL for connection to the FD1 floppy disk drive. This connector provides both power and data to the drive. The system is also compatible with the standard EAGLE'S FD1 disk drive.

AC POWER CONNECTOR, FUSE HOLDER, 120/240 VOLTAGE SELECTOR

As is the case with the ROAD RUNNER, the EXPANDER BOX comes with an integrated AC power connector, line filter, fuse holder and input voltage selector. You should ensure that the POWER switch is turned OFF before plugging in the unit. A standard AC power cord plugs into the male connector on the REAR PANEL. The cord is identical to and interchangable with the power cords for the ROAD RUNNER, GOLDEN EAGLE, STANDARD EAGLE and CX-120 EXPANDER. The fuse is easily removed by levering it out with the FUSE PULL lever. The recommended fuse is a 3AG 1 Amp, 250 VOLT fuse.

The fuse compartment contains a small, gold-plated printed circuit card with "120" marked on it. This card allows you to select operation from either 120 or 240 VAC input voltage. With a small pliers you remove the card and turn it around so that the "240" now appears on the left in the cut away area where the "120" appeared before the card was removed. Reinsert the card and make sure it is securely in place. The original fuse should be replaced with one of 1/2 (one-half) the amperage rating. If the system came with a 1 Amp 250 VAC fuse, replace it with a 1/2 Amp 250 VAC fuse for operation at 240 VAC.

CAUTION: Make sure this card is set to the proper voltage rating before you apply power to the system. The printed circuit card actually has four sides and if you can read either "110" or "220" in the cut away area the system will not operate.

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VM5 VIDEO MONITOR
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FRONT PANEL

The front panel contains no controls and consists of a 5" (diagonal measure), high resolution CRT designed specifically for alphanumeric data display.

REAR PANEL

The REAR PANEL will be described from left to right as you look at it.

VIDEO INPUT

A threaded female coaxial connector is located on the REAR PANEL. The coaxial cable included with the system is used to connect the VM5 monitor to the RX1 EXPANDER BOX.

VIDEO OUTPUT

A threaded female coaxial connector identical to the VIDEO INPUT connector is provided for connection of more than one video monitors to the EXPANDED ROAD RUNNER SYSTEM. Use of this connector enables you to "daisy chain" multiple video monitors to the system in much the same manner as the DOVE dissolve units are linked together. The actual hook up technique is discussed in the HOOK UP section of the manual.

TERMINATION

A two-position slide switch is mounted horizontally on the rear panel to allow for selection of TERMINATION ON/OFF. When only one monitor is being used with the system the TERMINATION switch is set to the left in the ON position. When more than one monitor is being used with the system, only the end monitor in the chain has the TERMINATION switch in the ON position. All of the other monitors will have their TERMINATION switches in the OFF position. An easy way to remember the procedure is that all monitors which have two coaxial cables connected to them will have their TERMINATION switches in the OFF position and the monitor which has only one coaxial cable connected to it will have its TERMINATION switch in the ON position.

BRIGHTNESS

A BRIGHTNESS control is located on the rear panel to allow each user to adjust the CRT MONITOR screen brightness to their personal preference. Rotating the BRIGHTNESS control in a clockwise direction will increase the screen brightness and counterclockwise will reduce screen brightness. All other controls such as contrast, horizontal size, etc. are located internally and adjusted at the factory prior to shipment. Do not attempt to remove the cover and adjust these controls yourself as DANGEROUS VOLTAGES are present within the monitor enclosure and a severe shock could be received.

DC POWER

A power cable with a 3 pin male connector is provided on the rear panel for connection to the DC power connector on the rear panel of the RX1 EXPANDER BOX. In order to minimize the size and weight of the VM5 monitor, the power for the monitor is drawn from the power supply of the RX1 EXPANDER BOX. The connector is keyed and may only be inserted in the correct direction. Make sure power to the system is OFF before connecting the power cable.

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FD1 DISK DRIVE
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FRONT PANEL

ACTIVITY LED

There is a red ACTIVITY LED located on the lower left side of the front panel. The sole purpose of the LED is to indicate that the disk drive is being accessed by the EXPANDED ROAD RUNNER. The ACTIVITY LED will be illuminated during both READ (LOAD) and WRITE (SAVE) functions.

DOOR HANDLE

The DOOR HANDLE is located in the center of the faceplate. To insert or remove a diskette it is necessary to open the DOOR HANDLE. This is done by lifting up on it. The diskette is inserted with the oval read/write slot (approx. .5" X 1.4") away from you and with the label facing up.

REAR PANEL

DRIVE CABLE

At the rear of the enclosure is located the DRIVE CABLE. This consists of a 37 conductor shielded cable with a 37 pin male connector on the end. This cable is plugged into the EXPANDER BOX in the connector labeled DISK DRIVE. This cable serves the dual function of providing power to the drive and also transmits data to and from the drive.

NOTES: Always make sure there is enough space around the vents in the EXPANDED ROAD RUNNER to allow proper cooling. These vents are located just above the REAR PANEL and on the bottom of the ROAD RUNNER unit. On the RX1 EXPANDER BOX and the VM5 VIDEO MONITOR the vents are located on either side of the enclosure.

The EXPANDED ROAD RUNNER is a professional piece of equipment. It should be treated as such and not tampered with. If you ever have a problem with your EXPANDED ROAD RUNNER, you should have it checked by an AUTHORIZED AVL SERVICE REPRESENTATIVE. The components of the EXPANDED ROAD RUNNER should NEVER be opened by anyone else. Failure to comply with this stipulation will void your warranty and could cause further serious problems with your EXPANDED ROAD RUNNER. We know you will enjoy your EXPANDED ROAD RUNNER system. HAPPY MOTORING.

INTRODUCTION TO THE SYSTEM

This section of the manual introduces you to the EXPANDED ROAD RUNNER SYSTEM. A functional description of the system's components is included to help familiarize owners who have had no prior experience with AVL equipment or possibly computer systems in general.

The EXPANDED ROAD RUNNER SYSTEM is a non-dedicated type computer similar to the AVL EAGLE. This allows the system to be completely flexible and easily updatable. The EXPANDED ROAD RUNNER gets its intelligence from PROCALL which can be loaded into the EXPANDED ROAD RUNNER from either DISK or MAG TAPE. Once the EXPANDED ROAD RUNNER is loaded, it is a very powerful and versatile tool for programming slide projectors and other peripheral equipment.

A WORD ABOUT PROCALL

The dictionary defines SOFTWARE as "The internal programs or routines professionally prepared to simplfy programming and computer operations. These routines permit the operator to use his own language (English) in communicating with the computer."

This is exactly what AVL had in mind with the development of PROCALL (PROgrammable Computerized Audio-visual Language Library). The object was to maximize the capabilities and flexibility of the system while at the same time minimizing the work expended to use the system. No longer would it be necessary to return the system to the factory for time consuming updates to the hardware (the mechanical, magnetic, electrical and electronic devices or components of a computer) every time a new feature was developed. Instead the system was designed to be "software updatable". The EAGLE then and the EXPANDED ROAD RUNNER now were designed with all of the latest hardware features that could possibly be used and all of the standard communication channels available so that once designed, the system could be completely adaptable and require no more hardware changes. AVL's purpose was to give the user all the system that they would ever need and then as new uses arose, a new peripheral device, such as the RAVEN for film control, would be developed. Then by making a change to the PROCALL software the same system could control yet another device. EAGLE owners who have owned their systems since 1977 have seen a tremendous increase in the power of their programmer, without losing the use of their system for an update.

When the EAGLE was introduced its programming features were basically limited to those of the SHOW PRO V. But as time has gone by there have been many new features added as PROCALL has progressed all the way from VERSION 1A through the latest level about to be released--VERSION 5. The EAGLE can now control film projectors, up to 120 slide projectors or hundreds of auxiliary relays. At the same time the on-screen performance and programming convenience have improved dramatically through the introduction of features such as CLOCK TRAK, POSITRAK, LOOPING, BLINKING, SMOOTH FADES, PROGRAMMABLE LOAD FROM DISK etc. The list goes on and on but the main point is that EAGLE owners have been able to benefit from all these new developments without giving up the use of their EAGLE for weeks at a time. Just a quick phone call to the nearest dealer is all that is necessary to obtain all the latest features on a 5 1/4 inch square diskette for a very nominal price.

This same convenience and power is now available to all EXPANDED ROAD RUNNER SYSTEM owners. Being able to load the system from either DISK or MAG TAPE gives you the additional benefit of backup protection. The system will normally be loaded using the DISK DRIVE because it is over 10 times as fast as MAG TAPE but, should you ever want to--or need to load from MAG TAPE, that option is open to you.

Each EXPANDED ROAD RUNNER SYSTEM comes with two RR V5 diskettes which not only contain PROCALL for operating the system, but also provide storage for in excess of 10,000 cues on each diskette.

EXPANDED ROAD RUNNER SYSTEM FUNCTIONAL DESCRIPTION

EXPANDER BOX

The EXPANDER BOX when added to the ROAD RUNNER programmer provides a second mag tape output channel (OUT 2) which is used to send cue information to the dissolve units. The RX1 EXPANDER BOX also provides an interface to the FD1 FLOPPY DISK DRIVE and to the VM5 VIDEO MONITOR.

With the addition of the second MAG TAPE channel the EXPANDED ROAD RUNNER SYSTEM is able to program and play back a full 30 projector show versus the basic ROAD RUNNER which has the capability to program a 9 projector show and play back a 15 projector show. But like most things in life, the increased capabilities do cost something. The standard 56K ROAD RUNNER comes with an available cue storage space of 10,000 cues. With the addition of more PROCALL in order to control the DISK DRIVE, write the display on the VIDEO MONITOR and address a full 30 projectors you are forced to give up some cue storage. The memory of the ROAD RUNNER is used to store both cue information and the software which makes the whole system work--PROCALL. It's a matter of simple arithmetic that if the area where two things is stored stays the same size and one of the things increases in size (PROCALL) then the other must get smaller. With the addition of the rest of the components of the EXPANDED ROAD RUNNER SYSTEM the available cue storage will still be in excess of 5,600 cues.

There are several ways to look at this. First, for the people who own or have owned an EAGLE, this is still much more storage space than is available in the EAGLE. That large a number of cues should satisfy any user. Second, for the person who wants to program an extremely long show such as an "EXPERIENCE" show it is still possible to string together as many programs as the diskette will hold by using the PROGRAMMABLE LOAD COMMAND.

If you owned a 16K ROAD RUNNER and then purchased the EXPANSION SYSTEM you will gaining rather than losing cue space. The standard 16K ROAD RUNNER has a memory capacity of 1000 cues and with the addition of the EXPANSION SYSTEM you will have an increase in memory storage of over 500% to more than 5,600 cues.

VM5 VIDEO MONITOR

The VM5 VIDEO MONITOR uses a 5 inch CRT (cathode ray tube roughly equivalent to the picture tube in your TV), and the whole unit was specifically designed for computer information display use. The monitor is optimized for sharp, clear alphanumeric displays featuring excellent resolution, brightness and contrast. The VM5 VIDEO MONITOR operates on 12V DC at less than one amp, making it independent of international power considerations.

The VM5 VIDEO MONITOR in the EXPANDED ROAD RUNNER SYSTEM has several functions. First, it displays the information that you are entering into the EXPANDED ROAD RUNNER SYSTEM and allows you the convenience of editing or correcting the information before you enter it into the memory of the programmer. Use of the standard typewriter configuration keyboard makes learning to use the EXPANDED ROAD RUNNER SYSTEM a breeze. The system is quiet and the display is easy to read in normal indoor lighting.

Once upon a time it was necessary to write out complex sequences of cues in order to be able to visualize what the program was going to do next. Now with the VIDEO MONITOR you can look at up to 11 cues at a time or quickly scroll through the program in either direction. Note: scroll is used here in the context of looking smoothly through the program as if the contents of memory were contained on a long rolled up scroll which could then be slowly unwound before us for observation.

Most people find the speed and flexibility of a VIDEO MONITOR impossible to do without once they are used to it. Note for example, the wide use of CRT MONITORS throughout industry in applications such as data entry and point-of-sale.

Second, by means of a special computer language, PROCALL, the VIDEO MONITOR allows the computer to "talk" to you by displaying various messages. Instead of trying to figure out some complicated code to ascertain what the system is doing or pondering whether or not the fact that the system erased a cue meant that it was entered incorrectly, the monitor will tell you what is going on in plain ENGLISH e.g. "end of cue space encountered,""standby for GOTO" or "keyboard editing is disabled."

The third function of the VIDEO MONITOR is to display the cues and the lamp status of the program you are working on or showing. The alphanumeric LED string in the DISPLAY LINE and lamp status LEDS on the front of the ROAD RUNNER were adequate for communicating with a system that controlled a maximum of 15 projectors or programmed up to 9 projectors at a time. But use of a VIDEO MONITOR greatly facilitates the task of creating and programming any show. In particular, shows that have as many as 30 slide projectors or 5 film projectors are greatly simplified. Just by glancing at the screen while the show is running you could tell for example that the show will have the center film projector run forward at 24 frames per second until frame 4321 is reached, then it will stop for 2 seconds and then run forward at 4 frames per second for 5 seconds. VIDEO MONITORS can display incredible amounts of information at one time. If LED'S were used, just to show lamp status would require 30. Then any future expansion/format changes would require a hardware update. EAGLE users can verify the fact that there have been 5 levels of programming sophistication since its' introduction and a tremendous increase in the amount of information available to the user without any hardware changes to the system.

The VIDEO MONITOR can display 16 lines at a time and each line can have up to 64 characters in it. This means that up to 1024 characters can be displayed on the screen at any one time. The monitor is also capable of highlighting important messages in reverse video (black letters on an illuminated background) and flashing a cursor. The cursor is an illuminated rectangle, the size of one character, that flashes and indicates where the next letter or number is going to appear when you are entering information.

All components (except the cathode ray tube) are completely transistorized in the VM5 VIDEO MONITOR to allow for compact size, low power drain and minimum maintenance. Additionally, 99% of the circuitry of the VIDEO MONITOR is contained on easily removed printed circuit board modules for simple, expeditious service.

FD1 DISK DRIVE

The principle behind the operation of disk drives is similar to the operating principle of the familiar phonograph turntable. The diskette fits on a spindle inside the drive which then rotates the diskette at a much faster rate than the typical LP album (300 rpm vs. 33 1/3 rpm).

In a disk drive system, a read/write head is used like the phonograph needle and it reads data on the disk in a very similar manner. The head is mounted on a positioner which equates to the record player arm and the positioner moves the head laterally across the disk to any area requested by the computer program.

This ability is known as random access and allows users to store, access and retrieve information from the disk much more rapidly than is possible by sequential access which must be use with tape drives. What this means to you as the end user is a much quicker process of loading and saving data. If you had 52 pieces of data stored on a tape and wanted to load the 52nd, the tape must run by the first 51 to get to the desired location whereas the disk drive would go directly to the 52nd piece of data.

The "floppy" diskette is a circular piece of pliant mylar plastic which is coated on one or both sides with a magnetic iron oxide similar to that on magnetic recording tape. It is enclosed in a plastic or paper jacket to protect it from fingerprints, dust and anything else which might contaminate it. There is a cutout in the jacket to permit the head to access the disk surface, but the jacket itself is never removed. The soft, low friction material that lines the jacket continuously cleans the surface of the diskette and allows the diskette to rotate freely. The jacket also has an index hole for timing information and a write-protect notch for preventing unwanted or accidental erasue of information .

The diskette contains concentric flat "tracks" on which the data is recorded and the typical 5 1/4 inch floppy diskette contains about 35 tracks. They are numbered from track 00 to track 34 with track 00 being on the outside edge of the diskette and track 34 being the innermost track. The first 10 tracks generally contain the operating system software (PROCALL) and the remainder of the tracks are reserved for cue storage with track 10 being the directory which lists the titles of the programs stored on that particular diskette.

The actual process of writing information onto the floppy diskette or reading from it is similar to recording music on to magnetic tape or playing it back with the important exception that the disk drives' read/write head can get to any portion of the diskette in just over .4 seconds on the average. Once at the correct track the disk drive has a tremendous advantage over mag tape media in both speed and density of storage.

To give you an illustration of the difference in speed between magnetic tape storage and disk storage, it takes about 8 seconds to load a block of 3000 cues from the diskette into the memory of the EXPANDED ROAD RUNNER. That figure includes starting the drive up, allowing it to get up to speed, finding the information on the diskette and transferring it. Now compare those figures to data storage using mag tape. Assume that the cues are recorded on the mag tape one right after the other at a 20 cue per second rate, and the tape is running at 15 ips(inches per second). You would have to play over 220 feet of tape which would take about 2 1/2 minutes to transfer the same amount of data. If there were more than one block of data stored on the tape there would be even more time involved finding the right block.

SYSTEM HOOK UP

A wise piece of advice often heard, but seldom heeded it seems, is the recommendation to CHECK THE AC POWER SOURCE YOU WILL BE USING TO SEE IF IT IS WIRED CORRECTLY. There are two very good reasons for spending the time to do this.

First, it can prevent you or someone else from being hurt. Second, it can prevent the equipment from being damaged or not functioning correctly.

Checking out the receptacles you will be using is a simple task and can save you hours of sweat and aggravation later. There is a small device called an AC receptacle tester on the market which is manufactured by several companies and sells for about $7.00. It plugs into the standard 3 wire grounded receptacles. There are 3 indicators on the unit, and a table printed on it that shows the combination of indicators lit for various fault conditions, as well as correct wiring. These testers can be found at electrical supply stores and at some deparment stores in the electrical section.

The recommended hook up procedure for the EXPANDED ROAD RUNNER SYSTEM is as follows:

1.

First, make sure that the POWER SWITCHES on both the ROAD RUNNER and the RX1 EXPANDER BOX are in the OFF position and then connect the ROAD RUNNER to the RX1 EXPANDER BOX. The recommended order of cable attachment is to begin with the flat ribbon cable on the RX1 EXPANDER BOX and plug it into the connector marked EXPANDER on the rear panel of the ROAD RUNNER. Next, plug in the cable marked RR BATTERY CONN. on the front panel of the RX1 EXPANDER BOX to the connector on the rear panel of the ROAD RUNNER marked BATTERY. Finally, insert the cable marked RR AC CONN. on the front panel of the RX1 EXPANDER BOX into the AC connector on the rear panel of the ROAD RUNNER.

2.

The next step is to attach the FD1 DISK DRIVE. This is done by plugging in the 37 conductor cable on the rear of the drive to the connector marked DISK DRIVE on the rear panel of the RX1 EXPANDER BOX.

3.

The VM5 VIDEO MONITOR is now attached to the RX1 EXPANDER BOX. The power connection is made by plugging in the DC POWER cable located on the rear panel of the MONITOR to the connector marked DC POWER on the rear panel of the RX1 EXPANDER BOX. Then, using the coaxial cable provided with the system, link the connector labeled COMPOSITE VIDEO on the rear panel of the RX1 EXPANDER BOX to the connector labeled VIDEO IN on the rear panel of the VM5 MONITOR.

Optional MONITORS such as the VM9 VIDEO MONITOR from the STANDARD EAGLE system may be used with the EXPANDED ROAD RUNNER system. The only qualification is that the monitor has to be COMPOSITE VIDEO compatible. To hook up such an optional monitor you would connect the coaxial cable using the same procedure described above. All video monitors will have a coaxial connector on the rear panel marked with VIDEO or VIDEO IN.

In order to "daisy chain" or link more than one monitor together the following procedure is used:

If you are going to connect two monitors to the EXPANDED ROAD RUNNER system, at least one of the monitors must have VIDEO IN and VIDEO OUT connectors on it. This will enable you to connect the monitor to the RX1 EXPANDER BOX using the VIDEO IN connector and then connect the first monitor to the second using the VIDEO OUT connector on the first. A coaxial cable similar to the one provided with the system would be used to connect the two monitors by connecting from the VIDEO OUT connector on the first monitor to the VIDEO IN connector on the second. The termination switch on the first monitor will be set to the OFF position and the termination switch on the second or last monitor in the chain will be set to ON. Both the VM5 and VM9 VIDEO MONITORS have VIDEO IN and VIDEO OUT connectors located on their rear panels.

4.

Make sure that the input voltage selector is set to the appropriate voltage. Connect the AC cord on the RX1 EXPANDER BOX to grounded AC power and turn ON the power switch on the rear panel of the ROAD RUNNER. Now, power to the entire system will be applied when the AC POWER SWITCH on the rear panel of the RX1 EXPANDER BOX is turned ON.

5.

The EXPANDED ROAD RUNNER SYSTEM is connected to the dissolve units (DOVES) via the "REC OUT" RCA phono jack on the rear panel of the ROAD RUNNER and the "OUT 2" RCA phono jack on the rear panel of the RX1 EXPANDER BOX. AVL dissolve units label the projectors L,C,R (LEFT - CENTER - RIGHT), this notation will correspond respectively to the A,B,C of the projector status LEDs on the ROAD RUNNER front panel and the L,C,R of the projector status display on the VIDEO MONITOR.

Dissolve unit hook up is accomplished using SHIELDED audio cable with RCA phono plugs on each end. Dissolve units for use on screens 1-5 are connected to "REC OUT" and screens 6-0 are connected to "OUT 2". The other end of the cable is attached to one of the two jacks on the front of the dissolve unit. These two jacks enable you to "daisy chain" or loop the signal from dissolve to dissolve. The screen select switches on the dissolves are set appropriately and then only cues which pertain to that particular unit are executed by the dissolve.

To illustrate correct dissolve hook up we will describe hook up of a nine projector set-up using 3 DOVE dissolve units.

The normal configuration of a 9 projector show would be in 3 "stacks" of 3 projectors each. Each stack is referred to as a screen and may be labeled any number from 1-10. Normal labeling would be screens 1,2,3. Each DOVE dissolve unit has a 5 position screen select switch on its front panel marked 1-5. In the EXPANDED ROAD RUNNER system, cues for the first 5 screens, 1-5, are issued from the REC OUT jack. You could think of it as the REC OUT jack addressing the first 15 projectors. Cues pertaining to the second group of 15 projectors, or screens 6-0, are issued from the jack labeled OUT 2.

In the case of our 3 screen show, the REC OUT jack on the EXPANDED ROAD RUNNER is connected to the first dissolve unit in the chain. The screen select switch is set to position 1 and now that dissolve unit will decode cue information intended for screen 1. Notice that there are 2 RCA phono jacks on the front of each dissolve unit. Any signal appearing at one jack is automatically routed to the other. The second jack is connected to the next dissolve--screen 2. The screen select switch on the second dissolve unit is now set to 2 and that unit will decode only the cue information which pertains to screen 2. Now using the other jack on dissolve number 2 you will connect it to the third dissolve unit on screen 3. The screen select switch on the third dissolve unit is now set to 3 and that unit will decode only cue information pertaining to that screen.

Chains or loops of dissolve units must never mix dissolve units from screens 1-5 with units for screens 6-0. This is required because the dissolve units only have 5 screen selections. Dissolve units hooked up to OUT 2 are set at screen select position 1 for screen 6, position 2 for screen 7, etc.

NOTE: We recommend the use of high quality audio cables for ALL hook ups. e.g. TEAC TC 401xx (the xx indicates length).

SELF TEST

The EXPANDED ROAD RUNNER system has a built-in SELF TEST feature that is designed to test the internal functions of the system. This feature will be most handy to use: prior to a show, when the system is to be shipped (to use as a test to be performed before the unit is shipped and again when it arrives on location) or when you feel there may be an error in the system that is causing a malfunction.

When the EXPANDED ROAD RUNNER system is powered ON, it performs a diagnostic check of its memory. Due to the limited time involved, this routine is not as thorough a test as could be done if more time were allowed. Therefore, AVL has developed a more comprehensive test that can be run prior to loading PROCALL.

The SELF TEST feature is actually comprised of 3 separate tests. They are the T TEST, the K TEST, and the M TEST. Between these 3 tests all INTERNAL MEMORY, all KEYBOARD functions, all DISPLAY LEDS, and MAG TAPE IN/OUT functions are checked out completely.

These tests are conducted after the unit is powered ON and BEFORE you load PROCALL. When the unit is powered ON, the ROAD RUNNER will display "BOOT FROM DISK" in the DISPLAY LINE. The system will pause for a couple of seconds at this time and you will be able to select one of the 3 tests. If a test has not been selected by the time the red ACTIVITY LED on the front of the FD1 DISK DRIVE comes on, the system will no longer accept test requests and PROCALL loading will begin.

NOTE: In order to exit from any of the tests and load PROCALL, you simply press the letter "D" for "BOOT FROM DISK" or the letter "L" for "LOAD FROM TAPE" and PROCALL can be loaded.

DISPLAY TEST

This test is accessed by depressing the letter "T". This puts the ROAD RUNNER in the test mode at which time the unit will display "G000" and either "16K" or "56k" in the DISPLAY LINE. Next you press and hold the "DISP" key. The ROAD RUNNER unit will light ALL 18 LEDs (9 on the left and 9 on the right), light ALL segments in the alphanumeric DISPLAY LINE and sound the BEEPER. The alphanumeric characters will look like 16 asterisks inside boxes. This test is to determine that all lights, characters and the beeper are functioning properly. Release the "DISP" key when you have determined that all is working properly.

NOTE: This DISP key is also used to clear and restart the SELF TEST described below.

KEYBOARD FUNCTION TEST

To enter the KEYBOARD test mode, PRESS and HOLD the letter "K" until the DISPLAY LINE has cleared. The KEYBOARD TEST is used to check all the keys for proper functioning. As you press each key on the keyboard, the character will appear on the right side of the DISPLAY LINE. The previous character will move to the left as each new key (or the same key) is pressed. The same letter will be displayed on the VIDEO MONITOR and as more are entered they will progress across the monitor from left to right.

NOTE: While doing this KEYBOARD test do not press the letters "T", "M", "L" or "D". "T" will put you into the MEMORY test mode, "M" will put you into the rigorous MEMORY test mode, "D" will return you to the "BOOT FROM DISK" status and "L" will put you into the PROCALL load from tape mode. If you enter one of these modes, simply hold down "K" to get back to the KEYBOARD test mode and continue with your test.

As you move across the board, you will notice SPECIAL keys. These keys are listed below with the corresponding character they will display. Most of these SPECIAL keys will also display a caret ("^" meaning "CNTRL") in front of a letter designation as follows:

SPECIAL KEY	DISPLAY LINE DESIGNATION
ESC	^[
DISP	Z
INSERT	^A
DELETE	^D
STBY	^S
GOTO	^G
RUB OUT	Creates a space.
REPT	Repeats any key held down with it.
RETURN	^M
CNTRL or SHIFT	Will not affect the DISPLAY LINE.
ENTER	^M
TAB	B
LEFT ARROW	^H
RIGHT ARROW	^I
SPACE BAR	Creates a space.
UP ARROW	^K
CUE (DOWN ARROW)	^J

The last step in a complete KEYBOARD check out is to press the following LETTER keys together with the CONTROL key to check their CONTROL COMMAND functions. This will also display a caret in front of the character.

C/C KEY	DISPLAY
CNTRL/A	^A
CNTRL/B	^B
CNTRL/C	^C
CNTRL/D	^D
CNTRL/F	^F
CNTRL/G	^G
CNTRL/N	^N
CNTRL/P	^P
CNTRL/Q	^Q
CNTRL/R	^R
CNTRL/S	^S
CNTRL/X	^X
CNTRL/TAB	^B

NOTE: These are the only valid combinations and any other combination of keys may generate confusing results.

T MEMORY TEST

There are 3 degrees of rigor as far as testing the memory in the system is concerned. When the system is initially powered up it will do an immediate quick check of all memory locations. If you desire a little more thorough examination of the memory you can use the "T" TEST. This will enable you to test the entire 56K of memory and the test information is visible on the DISPLAY LINE of the ROAD RUNNER. To initiate the "T" TEST depress the letter T and hold for a moment. The ROAD RUNNER will display "G000" and "16K" in the DISPLAY LINE if a 16K ROAD RUNNER is being tested. If a 56K ROAD RUNNER is being tested the DISPLAY LINE will read "G000" and "56K". The G000 is used as a Pass Counter. The 3 digits which follow the G will indicate the number of passes through the memory. The counter uses a number system called Hexadecimal (Base 16) which is commonly used in computers. Therefore, the counter will display a series of letters and numbers, always beginning with the letter G.

In the event there is an error, the letter "B" will appear in the 6th character position of the DISPLAY LINE followed by 6 characters (letters or numbers). The B is for BAD and is followed by 6 characters describing the error. The first 2 digits after the B act as a counter (again, in Hexadecimal) for the number of errors encountered. The next 4 digits contain useful information about the error. If an error is ever detected, the information on the display should be written down and kept with the system to be furnished to your AVL service representative. This information will assist them in determining where the problem is and will help to put your unit back on line as soon as possible. The system will continue to perform the test, so the first "G000" PASS counter will continue to increment.

For example, the DISPLAY LINE may look like G2CD B2F2341 if an error occurs.

NOTES:

(1) At power ON, the ROAD RUNNER may display the "G000" in the DISPLAY LINE due to a transient power problem. The unit thinks it detected an error in the initial diagnostic routine and proceeds to the MEMORY test to perform a more in depth test to check the error. When this happens, press the "D" key to clear this condition. After you press "D", the unit will display "BOOT FROM DISK". When this occurs the condition is transient and there is no need to be concerned.

If the problem is not transient, the unit will go back to the MEMORY test mode (G000) and continue to perform the test until it finds the error. At this point you will want to observe the unit to watch for the ROAD RUNNER to display the error on the DISPLAY LINE.

(2) Use 15 minutes as a minimum length of time to do this test. This will cover about 98% of the possibilities. To obtain a 100% test, we recommend that you leave the unit in the MEMORY test mode with the MAG TAPE TEST over night.

M MEMORY TEST

The "M TEST" is similar to the "T TEST" in that its purpose is to test the memory. There are a couple of differences to consider in deciding which test to use. First of all, the "M TEST" is the most rigorous memory test that AVL has ever designed. Use of this test will provide you with the most exhaustive memory check possible with the system. This test will take longer to execute than the "T TEST" which is only logical because more conditions are being checked. The second consideration is that the "M TEST" status is displayed on the VIDEO MONITOR and not on the DISPLAY LINE of the ROAD RUNNER. If you do not happen to have the VIDEO MONITOR with you, it is still possible to check the memory out using the "T TEST".

A minimum of 3 passes is recommended when using the "M TEST". To virtually guarantee a complete checkout of the memory AVL recommends that you let the system execute 300 passes.

Again, as with the "T TEST" some information will be displayed when the system detects a memory error. This information should be written down and furnished to the AVL service representative.

MAG TAPE TEST

A MAG TAPE test can ONLY be performed while in the SELF TEST mode. MAG TAPE can be tested using either the "T TEST" or the "M TEST". The "T TEST" MAG TAPE check will be discussed first. While the system is in the "T TEST" mode the "REC OUT" jack is connected to the "PLAY IN" jack creating a loop. The REC OUT jack generates a test signal that is received by the PLAY IN jack to test the functions of the MAG TAPE circuitry. The ROAD RUNNER will display "MT G" on the right side of the DISPLAY LINE. In the event the MAG TAPE circuitry is in error the display will change to "MT E".

NOTE: If "MT E" is displayed while you are plugging in the connectors press the DISP key to clear this condition. Also when you encounter a "MT E" check to make sure your cabling is in good condition.

The second MAG TAPE test is accomplished while in the "M TEST" mode. The hook up is the same, the "REC OUT" jack is looped back to the "PLAY" jack. The exact same kind of test is performed as in the "T TEST" except that now the status information is displayed on the VIDEO MONITOR instead of the ROAD RUNNER'S DISPLAY LINE. The monitor will display "MAG TAPE GOOD" if all of the mag tape input and output circuitry is functioning correctly. If there is an error detected the display will change to "MAG TAPE BAD". If you are in the "M TEST" mode and the output is not looped back to the input the display will say "NO MAG TAPE" to inform you that the mag tape circuitry is not being tested.

LOADING PROCALL INTO THE ROAD RUNNER

PROCALL LOAD FROM DISK

This is the normal means of loading PROCALL into the system and the system will load from disk automatically when turned on in the same fashion as the EAGLE. There are a few words of caution to follow in dealing with the diskettes (generally just referred to as disks):

1. Do not bend or fold the disk. The magnetic coating might crack if bent excessively and you could either lose your data or the PROCALL information.

2. Keep the disk away from magnetic fields. Treat them as you would your audio tapes and you will be safe.

3. Always replace the disk in its protective envelope whenever it is not being used. Slide it into the envelope so that the exposed areas are covered.

4. Never write on the plastic jacket with a lead pencil or ball point pen. Always use a soft, felt-tip pen. Write only in the label area. There should never be more than two labels (one placed over the top of the other) on a disk at one time. Always remove the top label before putting on a new one.

5. Do not touch or attempt to clean the exposed surfaces of the disk. Any abrasions may cause a loss of stored data.

6. Do not expose the disk to heat or sunlight.

7. Keep your disks in the storage cases provided. Store the disks in an upright position to prevent warping if stored for a long period of time.

8. There is a mechanical SHOW PROTECT notch on every AVL disk that when exposed allows you to change or SAVE programs on the disk. When the small silver/white tab, supplied with the disk, is covering the notch you are not able to write on the disk. In either case you can always load (READ) data on the disk into the memory of the EXPANDED ROAD RUNNER. The SHOW PROTECT tab may be removed whenever it is necessary to write data on to the disk.

To insert the PROCALL disk into the FD1 DISK DRIVE do the following:

1. Flip up the gate on the disk drive.

2. Remove the disk from its protective envelope and hold it flat (horizontal) with the arrow pointing towards the gate.

3. Insert the disk into the disk drive until it stops. It should slip in easily. IF IT DOES NOT, DO NOT FORCE IT! Remove it and try again.

4. Push the gate down until it locks.

When the system is powered on, the first thing the EXPANDED ROAD RUNNER will try to do is load PROCALL from the disk. The system will always do this unless instructed otherwise.

The monitor will display "PLEASE STANDBY FOR PROCALL LOAD. THANK YOU." while the program is loading. After the load is complete the display will change to:

HELLO, I AM THE ROAD RUNNER. WHAT IS YOUR NAME?

At this point you can type your name and press the ENTER key. There is a maximum of 25 characters allowed in the name space. As soon as you press the ENTER key the display will instantly change to:

HI THERE (your name), NICE TO MEET YOU

THANK YOU FOR USING PROCALL VERSION V5

I CAN SEQUENCE EITHER 2 OR 3 PROJECTORS PER SCREEN. HOW MANY WOULD YOU LIKE?

At this point you can enter either 2 or 3 and the system will move on to the next question. Anything other than 2 or 3 is unacceptable and will cause the monitor will display a question mark and the system will BEEP. Now the monitor will add:

PLEASE NAME YOUR PROJECTORS. ENTER 1 FOR LCR, 2 FOR TCB, OR 3 FOR ABC.

As with projector sequencing, the system will accept only a 1, 2, or 3 and immediately move on when it receives one of the three. The monitor will now add:

> VERY GOOD. PLEASE NAME YOUR PROGRAM AND WE CAN BEGIN.

Now the system expects you to enter the title of the program you will be creating and it will allow you a space 8 characters long to title it. Up to this point, if you decide to change any of the parameters just set you may back up one question at a time by depressing the REVERSE CUE (up arrow) key. Upon entry of the program name the monitor will now change to "THE NORMAL PROGRAMMING MODE DISPLAY"(see FIG. 1).

At any point in the Hello sequence, you may skip the rest of the questions by pushing the CUE (down arrow) key. If you use the CUE button at the first question the system will default to LCR for projector assignment and sequence 3.

NOTE: After PROCALL load the EXPANDED ROAD RUNNER will automatically be in MAG TAPE BYPASS MODE.

MAG TAPE PROCALL LOAD

As mentioned previously, the normal way to load PROCALL is with the disk. To load from MAG TAPE:

(1) Connect the ROAD RUNNER PLAY IN jack to your tape recorder line output jack for the PROCALL load.

(2) Turn ON both your tape recorder and your EXPANDED ROAD RUNNER. When powered ON, the EXPANDED ROAD RUNNER will display "BOOT FROM DISK" because this is the normal loading mode. Depress the "L" key on the keyboard and the DISPLAY LINE will say PLEASE LOAD TAPE. Now start your tape recorder.

When the EXPANDED ROAD RUNNER starts to recieve information from the tape, the AMP OK green LED will light and the DISPLAY LINE will change to "BLOCK 1 OF XX". A BEEP sound will occur each time a good BLOCK of information is received by the EXPANDED ROAD RUNNER and the number of blocks received will be indicated by the first number. When all XX BLOCKS of information have loaded correctly into the memory, the EXPANDED ROAD RUNNER will BEEP twice and the DISPLAY LINE will read "ROAD RUNNER Vx.x". Vx.x indicates the version of PROCALL you have loaded.

The data blocks are recorded sequentially on the tape with the entire program repeated continuously the length of the tape on all four tracks. This enables you to start loading the program anywhere on the tape, on either side of the cassette. The EXPANDED ROAD RUNNER will simply load the first block it receives, label it block 1 of XX and continue to load until all of the required blocks are loaded into the memory. AVL advises against rewinding the tape for each PROCALL load as that will tend to cause unnecessary wear on the first section of the tape. A better procedure would be to stop the cassette after a load is completed and then start from that point the next time the system is loaded from tape. This will distribute more evenly the wear on the tape and extend its useful life.

If for some reason the EXPANDED ROAD RUNNER should happen to miss a block of data, the MAG TAPE ERROR light will flash briefly, the count will not be incremented and the system will proceed to load the next block of data. The program load will continue until all blocks but the missed one are loaded, at that point the EXPANDED ROAD RUNNER will continue to BEEP without incrementing the block count. The system will keep track of which block it is missing and when the needed block is repeated on the tape again it will load it, BEEP twice and be ready for use.

NOTE: The EXPANDED ROAD RUNNER will automatically be in the MAG TAPE BYPASS condition after the PROCALL load. This allows you to:

1. Run a show that has the DATA TRACK on tape through the EXPANDED ROAD RUNNER and bypass loading the program into the memory.

2. LOAD a program directly into the memory after loading PROCALL and then run a show with DATA TRACK through the EXPANDED ROAD RUNNER in MAG TAPE BYPASS MODE. In this way both "live" and "canned" shows can be mixed effectively.

3. LOAD a program into the memory after the PROCALL load and then run from a tape that has a DATA TRACK and a CLOCK TRACK.

STORING YOUR PROGRAM ON DISK

When you have reached a point in your program where you are ready to quit for a while you will want to save the portion you have just completed. The disk is your normal permanent storage. A program is saved on to the disk by doing the following:

1. Depress the CONTROL and C keys, then push the ENTER key. The cursor will move to the COMMAND field.

2. Type in "SV" or "SAVE", ENTER. A file name may be entered after "SV" if desired. If a file name is entered, the program will be saved on to the disk under the file name just selected. If no file name is entered, the program will be saved on to the disk with the PROGRAM NAME as the file name. The red activity LED on the disk drive will come on. When the program has been written on to the disk, the comment "OPERATION COMPLETE" will appear.

LIBRARY DISPLAY

In order to verify the program is stored on the disk or to determine which programs are stored on a particular disk, you may call up the LIBRARY DISPLAY. This display shows all the FILE NAMES of the programs stored on the disk.

The LIBRARY DISPLAY is called up by entering the COMMAND MODE as described above and then typing in "LIB" or "LIBRARY". The LIBRARY DISPLAY will now appear in the PROGRAM area of the display.

NOTE: The LIBRARY DISPLAY has no effect on the program in memory. It may be called up anytime the system is not executing a program or receiving data input.

STORING YOUR PROGRAM ON MAG TAPE

After you have created a program in memory, you may want to store that program on to mag tape. There are two methods for storing the program.

(1) ROAD RUNNR and EAGLE configuration.

(2) SHOW PRO V and pre-EAGLE compatible.

Below are outlined the basic set ups for both procedures and an explanation of the differences.

SET UP FOR STORING PROGRAMS ON MAG TAPE

1. Connect the "REC OUT" jack on the ROAD RUNNER to a line input of your tape recorder.

2. Connect the "PLAY IN" jack on the ROAD RUNNER to the corresponding "line outpput" jack on the tape recorder. This connection is used to VERIFY (described below).

3. In the CONTROL COMMAND mode, type in STL (SET LEVELS) and adjust the input levels of the tape recorder to between +1 and +3 db.

4. Press ESC (ESCAPE) to clear STL. This will put you into the normal programming mode.

5. Return to the CONTROL COMMAND mode and type in ONE of the following commands depending on the type of store you want to create.

CONTROL COMMAND STORE ENTRIES

1. MSV,ENTER - ROAD RUNNER/EAGLE CONFIGURATION

When the ENTER key is pressed, the DISPLAY LINE and CRT DISPLAY will start to run the cues as they are saved onto the tape. This method will MSV (MAG TAPE SAVE) the program just as it appears in the ROAD RUNNER memory. This method also codes the tape so that later when you reload the program, the ROAD RUNNER will automatically load the program and then return to the MAG TAPE BYPASS status.

1A. VER,ENTER - VERIFY

Once you have saved your memory with the SAVE method, you can VERIFY to see that what you recorded on the audio tape is the same as what is in the memory (program). Return the tape to the starting position of the SAVE on that tape. In the CONTROL COMMAND mode, type VER, than ENTER. Start the tape recorder and watch the cues count down.

2. MTD,ENTER - MAG TAPE DUMP

This method will store the program to be compatible with the SHOW PRO V and other pre-EAGLE AVL equipment. This mode is usually used with shows of 5 screens or less. VERIFY will NOT work with this type MAG TAPE storage.

LOADING YOUR PROGRAMS FROM MAG TAPE

Loading an existing program into the memory will normally occur immediately after you have loaded PROCALL into the EXPANDED ROAD RUNNER. Any ROAD RUNNER or EXPANDED ROAD RUNNER program that was stored on MAG TAPE with the MSV method has been coded so it can be loaded directly into the PLAY IN jack on the ROAD RUNNER rear panel. For programs that were stored with the MTD, you will have to tell the EXPANDED ROAD RUNNER to load the program by turning off the MAG TAPE BYPASS. This is done by entering the CONTROL COMMAND mode and typing in MLD (MAG TAPE LOAD) and then entering it. Because the MTD storage tapes are not coded, you will have to return the EXPANDED ROAD RUNNER to the MAG TAPE BYPASS condition manually by pressing any key. We recommend you use the SPACE BAR.

DUPLICATION OF PROCALL TAPES

The magnetic PROCALL tapes that are used with your EXPANDED ROAD RUNNER can be duplicated. This allows you to place the PROCALL load on the front of your show tape, make a number of tapes for back-up or just to ensure you have spares, etc. The same type of "original" quality PROCALL tapes are available from AVL. One thing to keep in mind is the fact that any time you duplicate a tape you are moving one more step away from the original quality.

For this reason, AVL strongly suggests that you use a DATA BOOSTER between the two tape recorders to boost the signal to ensure the best possible quality from duplication. If this suggestion is not followed there is the possibility that your PROCALL load from MAG TAPE will take longer because the ROAD RUNNER may not receive the information the first (or second) time it tries to load due to weak or distorted data.

The greatest reliability will come from those tapes purchased from AVL that are "originals". AVL will offer the following tape configurations:

CASSETTES	1 7/8 IPS (INCLUDED)
REEL-TO-REEL	7 1/2 IPS (OPTIONAL)
REEL-TO-REEL	15 IPS (OPTIONAL)

FIG. 1 PROCALL MONITOR DISPLAY

```
PROGRAM:  DEMO 1   OPERATOR:

MODE: MAG TAPE BYPASS                                    0.00

CONTROL COMMAND:                          V5

STATUS:

CUE#  CODE   STATEMENT    SCREENS     RUN  SCREEN STATUS

0001                                       1  2  3  4  5
                                           -- -- -- -- --
0002                                       0  0  0  0  0 L
0003                                       0  0  0  0  0 C
0004                                       0  0  0  0  0 R
0005
0006                                       6  7  8  9  0
                                           -- -- -- -- --
0007                                       0  0  0  0  0 L
0008                                       0  0  0  0  0 C
0009                                       0  0  0  0  0 R
0010
0011
```

VIDEO MONITOR DISPLAY

TOP LINE

This line contains the name of the operator and the program title. The field for the program title is 8 characters long and the operator name field is 25 characters long. If you skip over the "HELLO" sequence the program title will default to DEMO 1, and the operator name will be blank.

The space at the far right hand side of this line is reserved for incoming data display. When the system receives cue information from either mag tape or another AVL programmer, this line will display the word AMP if the data is correct and not distorted. MT POOR is displayed if the incoming data has some distortion in it but the system is still able to decode the cue. If the data is so distored as to be unreadable by the system, MT BAD and the cue number of the distorted cue will be displayed. When no data is received by the system the display will remain blank. If only POSITRAK information is being received by the system the display will show the word POSITRAK.

SECOND LINE

This line contains the PROGRAMMING MODE selection. The possible choices are MAG TAPE BYPASS (the default mode), CEM (CLOCK EDIT MODE), CIM (CLOCK INPUT MODE), COM (CLOCK OUTPUT MODE), MAG TAPE DUMP, MAG TAPE LOAD and VERIFY.

THIRD LINE

This is the CONTROL COMMAND field and its features are discussed in the PROCALL GUIDE.

FOURTH LINE

This line is the status line. When certain normal features have been disconnected by the user, it will be indicated in this line e.g. RCF (REMOTE CUE OFF) or POF (POSITRAK OUTPUT OFF). This line also functions as a display for "EAGLE COMMENTS" such as "STANDBY FOR GOTO".

FIFTH LINE

This line contains the headings for the various columns of the programming area:

CUE # - As with other AVL programmers the cue is previewed before it is executed. Unique to the EXPANDED ROAD RUNNER and the EAGLE is the fact that the display shows you the 5 preceding cues as well as the five following cues.

CODE - This area is for the various programming CODES as described in the PROCALL GUIDE that designate what the screen action will be.

STATEMENT - After the entry of the CODE, the system will use this area to feed back to you a more complete statement of what the action will be. This serves as a check on the CODE entry process.

SCREENS - This area is used to specify which screen (stack of 3 projectors) will respond to the CODE entries.

RUN - This is used to indicate that the program in the system is executing. Runs are initiated by entering a "GO" while in the screen area and are terminated when they encounter a "STOP" in the screen area of a subsequent cue. While a run is in progress the RUN heading will appear as reverse video (black characters against a white background).

When a run is in progress at a selected speed of 20 cues per second the area on the heading line between the SCREENS title and the RUN title will display "20CPS". When the system is executing the program at 10 cues per second, this area will remain blank.

STATUS AREA

This area is used to give you a constant display of the projector tray position and projector lamp status. The projector status area breaks up the 30 projectors into two groups of 15 each referred to as "BANK 1" and "BANK 2". Each group of 15 projectors is further divided into vertical stacks of 3 projectors each called screens and five screens are displayed left to right in each "BANK". The screens are labeled 1-5 in bank 1 and 6-0 in bank 2. The projectors in each screen are labeled LEFT, CENTER, RIGHT from top to bottom (default value). They may alternately be designated A,B,C or TOP, CENTER, BOTTOM by use of the projector assignment command.

The projector designations appear to the right of the projector tray position display. You can tell what projector sequence you are using by just looking at the center pojector designator. If it is blank you are in sequence 2 (left, right); if it is not blank, you are in sequence three (left, center, right).

The TPO Control Command (tray position offset) permits you to set the starting tray position. Once you have saved a program with a particular starting tray position, anytime you load that file the starting poition will be reset to that value. Note, that this does not send any cues to the equipment attached to the system. It assumes that you actually started with your trays in the offset position.

CLOCK DISPLAY

The CLOCK DISPLAY is located on the right hand side of the screen on the second line. This clock acts as a free running timer as well as a display for CLOCK TRAK time coming in from mag tape. The system can receive CLOCK TRAK from mag tape in either CLOCK EDIT or CLOCK INPUT mode. The clock will begin to run anytime you push the CUE button and a TIME or TIME X cue is executed. It will continue to run until a STOP is encountered or you push the ESC key. Additionally, if the end of cue space is encountered while the clock is free running (no CLOCK TRAK data is being received) the clock will stop.

PROCALL GUIDE VERSION RR V5

This section is broken into four major headings:

1. PROGRAMMING COMMANDS
2. EDITING COMMANDS
3. CONTROL COMMAND MODE ENTRIES
4. COMMANDS FOR OPTIONAL PERIPHERALS

1. PROGRAMMING COMMANDS

ENTER UNDER CODE HEADING

DISSOLVE SPEEDS

CT

CUT - This cue turns the lamp ON or OFF instantantly. If the lamp is already ON, this will turn the lamp OFF and initiate a tray advance. If the lamp is OFF it will then be turned ON. If you wish to cross from one visual to another instantantly, a CUT will turn the ON lamp OFF and the OFF lamp ON, and the projector with the down going lamp will do a tray advance.

HC

HARD CUT - A hard cut was designed with 2 things in mind, first was the desire to move images faster, and second was the ability to create a sharper, harder image change on the screen. A hard cut closes the gate of the slide projector which shuts off the light before the lamp is turned OFF. The tray advances to the next image. This allows that projector to be ready to be turned ON again with the next slide. When HARD CUTS are used to make a transition between 2 visuals the change is much crisper than a CUT. This can be used to simulate the flicker of an old time movie when moving through many visuals rapidly.

DISSOLVES - This cue turns the lamp ON or OFF in the designated amount of time in seconds, creating a dissolve or a fade effect e.g. 2D is a 2 second dissolve. You can create a cross-fade or dissolve from one visual to another using a dissolve in conjunction with 2 or more projectors. Again, the projector with the down-going lamp will have a tray advance.

1D

2D

3D

4D

6D

8D

16D

32D

DISSOLVE ALTERNATES - These cues are used to turn the lamp ON or Off in the designated amount of seconds with NO tray advance.

FA

FAST ALTERNATE - This cue turns the lamp ON or OFF faster than an alternate with NO tray advance. It is used to do alternates at 20 cues per second and roughly equates to a HARD CUT with no tray advance. The purpose behind the fast alternate has to do with the lamp response in a slide projector. The lamp does not turn ON or OFF instantly with the application or removal of power. The lamp actually requires a fraction of a second to heat up or to cool down. This is called the "thermal lag" of the lamp, and the lag is different for turning ON the lamp than it is for turning OFF the lamp. All AVL computerized dissolve controls automatically compensate for this effect. For CUTS and ALTERNATES they use what we call an "afterburner" which never allows the lamp to go all the way off. Looking in the lens of a projector which has its' lamp OFF you would see that the lamp is glowing very, very dimly. This prevents any possibility of a "blink" occuring on the screen and allows the visuals to attain full intensity when moving at the rate of 10 cues per second. At 20 cues per second this afterburner would not allow the lamp to be turned OFF and ON quickly enough. It would instead tend to hold the lamp ON. The afterburner is turned off when FAST ALT is programmed to allow solo flashing and/or moving visuals at 20 cues per second.

AT

ALTERNATE or ALT - This cue turns the lamp ON or OFF instantly with NO tray advance. An ALT looks like a CUT on the screen with no tray advance.

1A

2A

3A

4A

6A

8A

16A

32A

AX

AUXILIARY FOR DOVES - AXs are used with a screen and projector designation to obtain a momentary contact closure for control of auxiliary devices.
AX 1 — Triggers a cassette pause on travelers

BG

BLINK GO - BG is used to initiate BLINKING in DOVE D'S.

BS

BLINK STOP - BS is used to terminate a BLINKING sequence.

FZ

FREEZE - The EXPANDED ROAD RUNNER has the ability to stop a dissolve alternate at any rate while it is in progress and hold the light level at any light intensity. This cue also allows you to continue the dissolve in the same direcion at the same rate or change the rate. You are also permitted to change directions using the same rate or a different rate. ONLY dissolve alternates should be used with a FREEZE.

HOME

PROGRAMMABLE RETURN TO BEGINNING OF PROGRAM - HOME is used as a program function to return the program, slide trays and lamp status to the home (cue #1) position. HOME brings the lamps down and sends the trays to their original starting position by the shortest route.
NOTE: When HOME is part of a run sequence in the program, the program will assume it is to continue to run. The program will execute cue #1 and all subsequent cues in the memory until it encounters a STOP command.

LDxx

PROGRAMMABLE LOAD OF FILExx - This cue automatically executes a load from the disk into memory. When the LOAD FILE cue is executed in a run mode, the system will load the file "xx". The system will then reset itself to cue number one and continue to run from that point. The tray and lamp status of the projectors will stay exactly the way they were before the load. Keep in mind that while the system is loading the file it is totally occupied; pick a convenient "slow" period when no projector action is needed such as a wait or a long dissolve. The load time for a 1000 cue file is about 4 seconds and about 6 seconds for 2000 cues.

LG

LOOP GO - LG with DOVE D dissolves will cause ALL specified LOOPS to be repeated until told to STOP.

LL

LOAD LOOP - LL is used to instruct DOVE D'S to store a series of cues (ACTION CUES) in their memory as a routine that will be repeated.

LS

LOOP STOP - LS will cause all LOOPS in progress on the designated DOVES to stop.

N

NO OPERATION - This has no affect on the screen action. It equals a .1 second wait at 10 cues per second and a .05 second wait at 20 cues per second. N is also used as a convenient location for a GO or STOP separate from any screen action.

PF

PROJECTOR FORWARD - This cue, used with a screen and a projector designation, will move the assigned projector tray FORWARD one position without affecting the lamp status. If you use only the screen designation without specifying a projector the system will assume that you want ALL projectors in the screen to move FORWARD one position.

PR

PROJECTOR REVERSE - This command functions the same as the PROJECTOR FORWARD command except that it will REVERSE the trays one position.

PS

PRESET - This cue presets specific projectors to respond to the next action cue issued to the corresponding dissolve unit. This allows you to access projectors that do not have like projector assignments at the same time without the normal .1 or .05 seconds between cues. Preset allows simultaneous action on the asigned preset projectors when cued. Preset can also be used to deselect. In this case, you would select the projectors you do not want to respond. When a lamp command is executed on that screen the preset projectors will not respond.

RPO

REPEAT UNTIL TERMINATED - This cue is used if an undetermined number of REPEATS is desired. The RPO can be resolved by pressing the CUE key or using a REMOTE CUE. This command is of use when you are doing "live" portions of your program and the length of a sequence is not predetermined.

RPX

REPEAT X - RPX allows you to determine the number of times the sequence has to repeat. It is used while you are in the RUN mode and actually viewing the sequence. Enter the RPX into the program and start the sequence running; when the correct number of repeats have gone by, press the CUE key to move on to the next part of your program. The EXPANDED ROAD RUNNER will resolve the X to the number of times the sequence repeated.
NOTE: when you press the CUE key to resolve the RPX, the system will finish the sequence in progress before moving on.

RPxx

REPEAT - This key is used to repeat a series of cues that have a GO embedded in the first cue of that sequence. xx = number of times to be repeated from 1-255. Up to 10 consecutive (nested) RP commands are allowed.

NOTE: 1) When you repeat a sequence 23 times the sequence will actually take place 24 times. The sequence will take place once and then be repeated 23 times.
2) With the use of nesting, it is possible to create a sequence that has billions of cues. Use nesting with extreme care.

RUN SEQUENCES

The EXPANDED ROAD RUNNER SYSTEM has the capability to execute the program at 10 cues per second or at 20 cues per second. Either speed may be selected by embedding cues in the program. At 10 cues per second the EXPANDED ROAD RUNNER will wait .1 seconds between the time a cue is issued and the time a subsequent cue is issued. At 20 cues per second the system will wait .05 seconds between cues.

A run sequence is initiated by using a GO command (stopped by a STOP command) or with the use of time cues from the CLOCK TRAK. A run sequence will execute until it encounters a stop or the next time cue. Run sequences are used to fire a series of cues rapidly with precise timing.
NOTE: The CURSOR will NOT flash when the system is in the RUN mode and running from memory.

S10

SPEED-10 CUES PER SECOND - This is normal running speed. S10 is used to shift speed from 20 cues per second to 10 cues per second. The EXPANDED ROAD RUNNER will automatically select 10 cues per second when the system is first LOADED, when you CLEAR ALL CUES using the control command field or when you perform a HOME.

S20

SPEED-20 CUES PER SECOND - S20 is used to increase the running speed to 20 cues per second.

SG

SMOOTH GO - SG is a DOVE D command which changes the dissolve ramp in the designated projector. It also allows a change in dissolve direction from any desired lamp intensity level.

SS

SMOOTH STOP - SS is used to return all DOVES to normal from the SMOOTH state. A HOME will accomplish the same thing.

TBxx

TBxx - This is a label which may be nested in the program to mark different sections of the show. xx may be any two characters.

TM hh:mm:ss:ff

TIME IN .01 SECOND STEPS - TIME cues may be located in the program at any desired point. In this format "hh" is hours, "mm" is minutes, "ss" is seconds and "ff" is hundredths of seconds. You do not have to enter unused fields. For example:

10	becomes 10 seconds
10:	becomes 10 minutes
10::	becomes 10 hours

The maximum value for a time cue is approximately 11 hours and 39 minutes. A time cue of 0.00 is not valid. If you should attempt to enter a time cue less than or equal to the current time, the system will reject the cue and issue a message on the status line. A time cue is essentially a null cue, that is, nothing goes out the mag tape channel when it is executed. A time cue takes less than .01 seconds to execute.

When PROCALL encounters a time cue while in the run mode, it will cause the program to stop. PROCALL will then wait until the clock equals the value of the time cue and then put the program into the RUN mode again.

TX

TIME X - TX is used to mark the beginning of a timed (RUN) sequence using the CLOCK TRAK. The X value is resolved when you press the CUE key.

W.05 THROUGH W10

WAIT TIMES - Waits are computer generated timing links that allow you to time out action sequences precisely. These times are entered into the program in the form of wait cues ranging from .05 seconds to 10 seconds in increments of .05 seconds. If a time longer than 10 seconds is desired, you may use additional consecutive wait cues to achieve the desired wait time.

NOTE: Because of the convenience of using CLOCK TRAK, we strongly suggest that you use it instead of WAIT commands for times in excess of 1.5-2.0 seconds.

WX

WAIT X - This cue is used when the proper timing of a sequence has not been determined before programming. The WX cue is resolved to the nearest .05 second when you are operating at 20 cues per second and to the nearest .1 second when you are operating at 10 cues per second. The WAIT X is resolved by pressing the CUE key during the running of the particular section.

ENTER UNDER SCREEN HEADING

G

GO - GO is used in the "screen area" of the DISPLAY LINE to designate one of the following:

1. To mark the beginning of a REPEAT sequence.
2. To initiate a RUN sequence.
3. As a reference point.

S

STOP - A STOP is used in the "screen area" of the DISPLAY LINE to designate one of the following:

1. To mark the end of a RUN sequence.
2. To stop the screen action when using CLOCK TRAK.

P

PROCEED - This is a 1/40TH second link between two cues referencing different banks.

12345

SCREEN NUMBERS on OUT 1

67890

SCREEN NUMBERS on OUT 2

PROJECTOR ASSIGNMENTS - The EXPANDED ROAD RUNNER SYSTEM will default to LCR. However, you may choose to use A, B, C or LEFT, CENTER, RIGHT or TOP, CENTER, BOTTOM by using the AP (assign projectors) control command.

EDITING COMMANDS

Editing is a very important part of programming. The commands described below will assist you in editing your program quickly and easily.

Certain keys have dual functions and some keys are used in conjunction with the CONTROL key. For purposes of notation, to indicate that two keys are to be pressed simultaneously, a slash "/" will be used to separate the two keys. For example, ADD-A-CUE will be represented as "CNTRL/A."

CTRL/A

ADD-A-CUE - This allows you to "open up" the memory and insert a cue into your program. This will move all subsequent cues down one cue number in the memory.

CTRL/B

REVERSE TO PREVIOUS TAB - Same as CTRL/TAB.

CTRL/C

CONTROL COMMAND - This is the way to enter the CONTROL COMMAND mode.

CTRL/D or Press Delcat

DELETE CUE - This will delete (remove) the cue that is being previewed and close up the memory.

CTRL/F

FILM DISCONNECT/NORMAL - This command disconnects or disables any film related cues from going out of the system.

CTRL/G ENTER or Press Go TO

HOME PROJECTORS - This will issue a HOME cue to the attached dissolve units and return the program to CUE #1. The lamps will come down and the trays will move to their original starting position via the shortest route. This command functions the same as depressing the GOTO key and then the ENTER key.

CTRL/G.xx

GOTO CUExx - This will issue a command to the EXPANDED ROAD RUNNER to GOTO a specific cue in memory. xx = the desired cue number. The lamp status and tray position will be updated to the dissolve units. This cue is used to move from any cue in memory to any other cue in memory. Use 9999 as the cue number to quickly move to the end of your program since the GOTO will stop at the last cue in memory.

CTRL/G.T.M.

GOTO TIME HH:MM:SS:FF - This will issue a command to GOTO the desired time cue. If there is no time cue equal to the entered value, the system will go to the next time cue greater than the desired cue.

CTRL/N

DISPLAY NOTES/NORMAL - This is used to display a NOTE stored in the NOTE buffer (the program will continue to run without interruption).

CTRL/P

SLIDES DISCONNECT/NORMAL - This command disconnects or disables any slide projector cues from going out of the EXPANDED ROAD RUNNER system.

CTRL/Q

STEP REVERSE CUE - You can step through the program in the REVERSE direction one cue each time the "Q" is depressed while holding down the CONTROL key. Reverse SCROLLING at 10 cues per second is initiated by depressing the CNTRL/Q and repeat keys simultaneously.

CTRL/R

REPEAT PREVIOUS CUE - This repeats the previous cue each time the CNTRL/R is depressed. Cues may be repeated rapidly by depressing the CNTRL/R keys and the REPT key.

CTRL/S

STANDBY - This will bring down the lamps of ALL projectors. The projectors still respond to advances and reverses and keep track of the lamp and tray status. To return to the normal lamp status, depress CNTRL/S again.

CTRL/T

GOTO NEXT TAB - This allows you to access the next TAB cue quickly.

CTRL/T.xx

GOTO TABxx - This allows you to GOTO any desired TAB. xx = desired TAB.

CTRL/X AD Aux Disconnect

AUX DISCONNECT/NORMAL - This disconnects or disables auxiliary cues from going out of the EXPANDED ROAD RUNNER system.

CUE ↓

CUE - This key commands the EXPANDED ROAD RUNNER system to execute a cue or run a sequence from memory. When you are using the CLOCK TRAK, the EXPANDED ROAD RUNNER will execute a chain of cues from memory until the next time cue is encountered. If you are hand cueing or remote cueing the system, CUE will step the program one cue at a time or start a run sequence if that cue has a GO included in it.

DELETE

DELETE CUE - Same as CNTRL/D.

DISP

DISPLAY - This is to provide a monitor for a condition which is not "normal" to the operation of the EXPANDED ROAD RUNNER. The DISP LED will light when an abnormal condition exists and will flash when SLIDES, FILM or AUXILIARIES are disconnected.

This control will also display tray position. Press the key to view the conditions. Press the key again to view the tray position for the first set of three projectors, again to view the second set, and again to view the third set. One more push returns you to the programming mode.

NOTE: The EXPANDED ROAD RUNNER assumes that the trays start at "1".

ENTER

Depressing this key will enter the cue into the memory of the EXPANDED ROAD RUNNER.

ESC

ESCAPE - This allows you to ESCAPE (stop) any action that is being carried out by the EXPANDED ROAD RUNNER. ESCAPE will turn off the MAG TAPE INPUT and cause the system to ignore CLOCK TRAK or DATA information. Pressing any key will turn the MAG TAPE INPUT back ON. AVL recommends that you use the space bar. The ESC key also returns you to the programming mode from the CONTROL COMMAND mode.

INSERT

ADD-A-CUE - Same as CNTRL/A.

Q

STEP CUE - This will step through the program in the FORWARD direction each time you push the key. SCROLLING in the forward direction at 10 cues per second may be initiated by depressing the Q key and the REPT key simultaneously.

REPEAT

REPEAT DEPRESSED KEYS - This is used in conjunction with other keys to repeat functions. EXAMPLE: Q/REPT will initiate SCROLLING in the FORWARD direction.

RETURN

SAME AS ENTER

RUB OUT

This is used to clear an entire entry in either the PROGRAM or CONTROL COMMAND mode.

SPACE BAR

This key is used to move one character to the right without changing the character the cursor is moving across.

STBY

STANDBY - Same as CNTRL/S.

TAB

FORWARD TO NEXT TAB - ~~Same as CNTRL/I.~~

CTRL/TAB Reverse to previous tab.

↑

REVERSE CUE - When depressed, this key will move the program (memory) in the REVERSE direction:

1. ONE cue if you are not in a RUN condition.

2. To the previous GO in a RUN mode.

3. To the previous TIME cue when using CLOCK TRAK provided that there is not an intervening GO command.

<--

CURSOR LEFT - This is used as a tab to move from the SCREEN area of the DISPLAY LINE to the CODE area. In the CONTROL COMMAND mode, the cursor will move one character to the left each time the key is pressed.

-->

CURSOR RIGHT - This is used as a tab to move from the CODE area of the DISPLAY LINE to the SCREEN area. If the key is pressed again, it will cause the program to advance to the next cue with the cursor in the CODE area of the DISPLAY LINE. In the CONTROL COMMAND mode, the cursor will move one character to the right each time the key is depressed.

3. CONTROL COMMAND MODE ENTRIES

EDITING CONTROL COMMANDS

BPF ENTER

BEEPER OFF - This allows you to turn the BEEPER OFF.

BPN ENTER

BEEPER ON - Turns the BEEPER back to normally ON.

CAC ENTER

CLEAR ALL CUES - This allows you to clear ALL cues from the memory. A home is also issued to the dissolve units.
NOTE: Use this command with caution. Make sure you have already stored the information that you are clearing or that you do not, in fact, want the information.

CLN

CLEAR NOTES - This permits you to clear a NOTE currently stored in the NOTE BUFFER.

CUES

DISPLAY TOTAL CUES - This will displays the total number of cues allowable in memory and the amount of cues remaining. Subtracting the two will give you the total cues used in the program.

ESN

EXCHANGE SCREEN NUMBERS - ESN enables you to exchange the screen numbers of your program. EXAMPLE: ESN xx,yy will take all cues on screens xx and change them so they are now on screens yy.

IAMxx

CHANGE OPERATORS NAME TO xx - This changes the operator name on the program in memory. xx may be up to 25 characters in length.

KBF

KEYBOARD EDIT OFF - This will disable the keyboard so that no direct changes may be made to the cues of the program. Any of the features of the EXPANDED ROAD RUNNER system that are available to you in the CONTROL COMMAND mode are still usable.

KBN

KEYBOARD EDIT ON - This returns the keyboard to normal operation.

NEW

ESTABLISH NEW HOME POINT - This tells the system that you want to use the current status as the home reference point. This is done automatically with the use of programmable loads.

NOTES

EXAMINE AND EDIT NOTES - This blanks the display and allows the entry of up to 11 lines of 45 characters each. A NOTE can store information such as special set up instructions for a show.

PAxxx

PROJECTOR ASSIGNMENT - This allows you to determine how the projectors will be assigned (ABC, LCR, or TCB). Default status is LCR.

PGMxx

CHANGE PROGRAM NAME TO xx - This permits you to change the name of the program in memory. xx may be up to 8 characters in length.

RCF

REMOTE CUE OFF - This will turn the REMOTE CUE jack off. The EXPANDED ROAD RUNNER system will ignore any remote cue impulses.

RCN

REMOTE CUE ON - This will return the remote cue jack to "normally on".

RTCx.y

REPLACE TIME CUES WITH TX - This command will replace all TIME cues with TIME X cues beginning with the first cue specified (x) and continuing until the last cue specified (y) has been examined.

SEQ2

PROJECTOR SEQUENCE 2 - This allows you to sequence between two of the three available projectors (A and C). NOTE: You can still independently access the "B" projector

SEQ3

PROJECTOR SEQUENCE 3 - This allows you to return to sequencing three projectors.

TOCxx.yy

TIME OFFSET CUES xx,yy ± HH:MM:SS.FF - This command allows you to add or subtract a time value from either a range of time cues or from all time cues in memory. PROCALL will use the first cue number (xx) to begin a search for time cues and continue until the last cue specified (yy) has been examined.

TPO x

TRAY POSITION OFFSET - This command allows you to set a starting tray position for the position status. You can use any number x from 0 to 80.

XSN

EXPAND SCREEN NUMBERS - This feature is similar to the EXCHANGE SCREENS feature, but instead of exchanging the screen numbers this command allows you to expand the screen numbers of the cues on a particular screen to any or all of the other screens. ESN 1,1234567890 will expand all cues on screen 1 to be on all screens.

MEMORY/DISK DATA TRANSFER COMMANDS

APxx

APPEND FILE xx - This allows you to add a file named xx from the disk to the end of the program in the memory of the EXPANDED ROAD RUNNER. The long form "APPEND xx" is the same.

CNPxx

CLEAR NAME PROTECT xx - This allows a file named xx to be renamed.

CWPxx

CLEAR WRITE PROTECT xx - This allows a program named xx to be deleted from the disk or written over.

DELxx

DELETE FILE xx FROM DISK - This permits you to delete a file named xx from the disk. Deletion occurs only if the program is not WRITE PROTECTED.

DLC xx.yy

DELETE CUES FROM xx TO yy - This command allows you to delete portions of your program from cues xx to yy inclusive.

INSxx

INSERT FILE NAMED xx - This allows you to insert a program named xx between cues already in the memory of the EXPANDED ROAD RUNNER. The insertion takes place at the location of the cursor. The long form "INSERT xx" is the same.

LD

LOAD - This will load a program which has the same name as the monitor program name from the disk into the memory of the EXPANDED ROAD RUNNER. The long form "LOAD" is the same.

LDxx

LOAD FILE NAMED xx - This permits you to load a program named xx from the disk into memory. The long form "LOAD xx" is the same.

LIB

LIBRARY - This will display on the video monitor the file names of all programs stored on the disk. When a full screen of library entries has been displayed you may push any key except the ESC or REVERSE CUE (up arrow) keys to see the next line of entries. If you would like to start over again at the top of the list, push the REVERSE CUE key. If you do not wish to see any more entries, push the ESC key.

NLDxx

NOTES LOAD xx - This will load a NOTE file titled xx into the NOTE BUFFER in the memory of the EXPANDED ROAD RUNNER.

NPRxx

NAME PROTECT xx - This will protect a file named xx from being accidentally renamed.

NSVxx

NOTES SAVE xx - This will save a NOTE currently in the NOTE BUFFER in memory onto the disk as xx. (xx may be any two characters)

PACK

PACK DISK - This command will close the gaps between the files stored on the disk caused by deletion of other files. The EXPANDED ROAD RUNNER will do this automatically as the disk fills up.

RNMxx.yy

RENAME FILE xx AS yy - This will rename a file titled xx on the disk as yy. Renaming will occur only if you have not name protected the file.

SV

SAVE - This will save the program in memory on to the disk with the program name on the monitor as the file name. The long form "SAVE" is the same.

SVxx

SAVE WITH xx AS FILE NAME - This will save the program in memory onto the disk with xx assigned as the file name. xx may be up to 8 characters in length. The long form "SAVE xx" is the same.

SCxx.yy.FILENAME

SAVE CUES xx TO yy UNDER FILENAME - This command allows you to save sections of cues out of your program on to the disk under an assigned file name.

WPRxx

WRITE PROTECT FILE xx - This enables you to protect a file named xx on the disk from accidental erasure.

MAG TAPE CONTROL COMMANDS

CEM

CLOCK EDIT MODE - Allows the EXPANDED ROAD RUNNER to read CLOCK TRAK off magnetic tape and synchronize the program in memory. If the tape data stops, the program will stop .5 seconds after the data stops. As soon as the CLOCK TRAK input begins again, the system will execute a GOTO to be ready for the next section.

CIM

CLOCK INPUT MODE - This command will put the system into the CLOCK INPUT MODE. The CLOCK TRAK data on a tape does not resemble normal cues on a data tape so the EXPANDED ROAD RUNNER will ignore CLOCK TRAK data unless you are in either CLOCK INPUT or CLOCK EDIT mode. When the system is in either of the two modes (CIM, CEM) it will accept only CLOCK TRAK data as valid input. The CLOCK TRAK coming into the system will start and stop a program stored in the memory of the EXPANDED ROAD RUNNER at precise times that you can designate and normal cue data will be sent out of the system.

The main difference between CLOCK INPUT and CLOCK EDIT modes is that in CLOCK INPUT mode the system will continue to run on its own internal clock timer if the input from the CLOCK TRAK on tape stops. The EXPANDED ROAD RUNNER will display a message warning you that the input from tape has stopped.

Once a TIME or TIME X cue has been executed, the EXPANDED ROAD RUNNER will stay in perfect sync with the time recorded on the tape. The system will automatically execute a GOTO, if necessary, to continue tracking with the CLOCK TRAK from tape. If you stop the tape and fast forward or reverse the tape, the system will GOTO the correct place in the program automatically and update projector lamp and tray status.

COM

CLOCK OUTPUT MODE - This will generate CLOCK TRAK from the REC OUT jack on the EXPANDED ROAD RUNNER for recording on to magnetic tape. Normally the time will begin at time zero. However, if you want to start at a fixed point in time, you can enter the starting time.

When COM is entered POSITRAK is turned off, mag tape input is turned off and the clock will begin running. The clock signal will continue to go out until you push the RUBOUT or ESC key. To ensure smooth operation, begin recording the CLOCK TRAK at least 5 seconds before the start of the music on the other tracks and turn off POSITRAK to prevent POSITRAK DATA making the program do an unwanted GOTO.

COM hh:mm:ss

CLOCK OUTPUT MODE - This will also generates CLOCK TRAK from the REC OUT jack. However, if you want to start at a fixed point in time, you can enter the starting time (hours, minutes, seconds and hundredths).

MIF

MAG TAPE INPUT OFF - This will turn OFF mag tape input and the EXPANDED ROAD RUNNER will ignore any input from the PLAY jack.

MIN

MAG TAPE INPUT ON - This turns the mag tape input (PLAY) back ON.

MLD

MAG TAPE LOAD - This allows you to load a program into the memory of the EXPANDED ROAD RUNNER from mag tape or directly from an EAGLE or one of AVL'S other programmers.

MOF

MAG TAPE OUTPUT OFF - This will shut off DATA signals to the "REC OUT & OUT 2" jacks and only "nulls" will be generated. (A null is a signal that indicates the absence of DATA) This permits you to move through the program without advancing the projectors.

MON

MAG TAPE OUTPUT ON - This turns back on DATA to the "REC OUT & OUT 2" jacks.

MSV

MAG TAPE SAVE - This feature allows you to dump the contents of the memory of the EXPANDED ROAD RUNNER on to mag tape. This is similar to a MAG TAPE DUMP with two major differences. First, it will be in a format which is compatible with only other ROAD RUNNERS or EAGLES using V5. This means that WAIT 10 SEC. is dumped at a 10 second wait and not broken up into 3 wait 3s and a wait 1. In similar fashion a 1 SEC ALTERNATE followed by a REPEAT 5 is sent out as an alternate followed by the repeat command which is a total of two cues instead of the MTD format which would sent the above sequence out as 6 alternates in a row. This means when you SAVE a program on tape it will load back into memory having the exact same number of cues whereas the MTD program on tape would have an increased number of cues due to certain cues being broken down into simpler components.

Second, the tape will have a special code recorded at the beginning of the program which will tell the EXPANDED ROAD RUNNER or EAGLE that it was recorded using the SAVE format and enable the tape to load automatically.

MTD

MAG TAPE DUMP (SP V) - This allows you to store the program in a configuration that is compatible with the SHOW PRO V and pre-EAGLE equipment.

PIF

POSITRAK INPUT OFF - This tells the system to ignore any incoming POSITRAK while in the PIF mode.

PIN

POSITRAK INPUT ON - This tells the EXPANDED ROAD RUNNER to process any POSITRAK that is being received.

POF

POSITRAK OUTPUT OFF - This command instructs the EXPANDED ROAD RUNNER to stop generating POSITRAK.

PON

POSITRAK OUTPUT ON - This command is used to instruct the EXPANDED ROAD RUNNER to restore POSITRAK generation.

STL

SET LEVELS - This commmand tells the EXPANDED ROAD RUNNER to generate a continuous test tone from the RECORD OUT RCA jack on the rear panel to enable you to adjust the record level of your tape recorder. (Adjust for 0 VU)

VER

VERIFY (MSV ONLY) - This command allows you to verify the accuracy of the information that has been SAVED on to mag tape before you clear the program from memory.

COMMANDS FOR OPTIONAL PERIPHERAL EQUIPMENT

RAVEN PROGRAMMING COMMANDS

This version of PROCALL (RR V5) allows up to 5 independent film projectors to be used with slide projectors. All film projectors must be connected to OUT 2 and will accept screen codes 6-0 ONLY. The screen codes selected must be assigned using the AF (Assign Film) Command as described in the EDITING COMMANDS portion of this section. GO or STOP codes can be combined with any film type cue.

FFxx

FILM FWD @ xx FRAMES PER SECOND - With the use of the data analyst type projector, film speeds of 1,2,3,4,6,8,12,18 or 24 FPS (Frames Per Second) may be selected. For use with Arc type projectors only 24 FPS is allowed.
NOTE: The default speed is 24 FPS.

FRxx

FILM REV @ xx FRAMES PER SECOND - All of the above description on FILM FORWARD applies equally to FILM REVERSE.

FFS

FWD STEP THE FILM ONE FRAME - The selected projector(s) will move in the FORWARD direction ONE frame with each cue.

FRS

REV STEP THE FILM ONE FRAME - The selected projector(s) will move in the REVERSE direction ONE frame with each cue.

FS

FILM STOP - This cue will immediately stop the film projector upon execution. This command should be reserved for program editing ONLY and not in the actual program for the show. For more information about this command, see the RAVEN OPERATOR/USER MANUAL.

FB

FILM BEGIN POINT = xxxxx - This cue is a film positioning cue and a double cue. The first cue is to assign the code and the selected projector and the second cue is to assign the frame number at which you want to begin or end. Upon execution the projector will run at 24 frames per second to the assigned frame with its lamp out. xxxxx = (1-65535)

FE

FILM END POINT = xxxxx - This cue is a double cue similar to the FRAME BEGIN CUE. For normal operation this cue is used to give the RAVEN a target frame to run to. The projector will go to the specific film frame at whatever speed designated and with its lamp ON or OFF as required.

FTN

FILM TRACKING ON - This command returns the speed tracking in the RAVEN to normally ON.

FTF

FILM TRACKING OFF - This command disables the speed tracking in the RAVEN.

F +/- x

FILM SPD CHANGE ±x% (1-6) - The selected projector(s) can be tweaked from 1-6% in the Plus (+) or Minus (-) direction to compensate for tape deck speed or speed of the camera used to film your motion picture sequences.

F +/- .x

FILM SPD CHANGE ±x% (.1-.9) - The selected projector(s) can be tweaked from .1-.9% in the Plus (+) or Minus (-) direction to compensate for tape deck speed or speed of the camera used to film your motion picture sequences.

FO

FILM SPEED NORMAL - This command is used to cancel the tweak value and return you to the normal running speed you have assigned. (Crystal controlled by the RAVEN)

MN

MOTOR ON - Permits the motor of the film projector to be turned ON remotely. With the use of an Arc type projector, this command will turn on the Arc lamp.

MF

MOTOR OFF - Permits the motor of the film projector to be turned OFF remotely. With the use of an Arc type projector, this command will turn OFF the Arc lamp.

LN

LAMP ON - This command is used to turn ON the lamp of projectors with incandescent lamps. On an Arc lamp projector, this command will lift the DOUSER up out of the path of the light.

LF

LAMP OFF - This command is used to turn OFF the lamp of projectors with incandescent lamps. On an Arc lamp projector, this command will drop the DOUSER down and cut off the light.

RAVEN EDITING CONTROL COMMANDS

AF

ASSIGN FILM SCREEN NUMBERS - ALL film projector screen assignments must be entered by this control command before ANY film type cues can be executed. The designated screens will now accept FILM TYPE cues ONLY.

FS +/-

FILM STEP ONE FRAME (±) - This command allows the selected film projector to move one frame in the forward or reverse direction each time the + or - key is depressed.

FOCx.y +/-

FRAME OFFSET CUES (±) - This command allows you to add or subtract a frame value from either a range of cues or from all cues your program.

X-15 PROGRAMMING COMMANDS

XS

SHORT PULSE - This will initiate a momentary (50 millisecond) closure of the contacts. This amount of contact closure time is usually sufficient for most auxiliary equipment.

XL

LONG PULSE - This will cause a momentary (1/2 second) closure of the contacts. This is used for equipment that requires a longer contact closure such as KODAK S-AV projectors.

XN

LATCH ON - This will keep the selected channels closed until interrupted by a new command. This permits the relays to be used as either NORMALLY OPEN or NORMALLY CLOSED. The new command can be an XS or XL which will cause the contact to open momentarily and then close again.

XF

LATCH OFF - Cancels the LATCH ON status and renders the assigned channel inactive.

NOTES:

1. The EXPANDED ROAD RUNNER allows you to use two X 15s in line with your dissolve units (one each on REC OUT & OUT 2) and allows you to use both the X-15 and dissolve auxiliaries with their respective commands.

2. All auxiliary cues must specify screen and projector independents.

3. You can NOT have an auxiliary command for the X15 and an auxiliary in your dissolve unit in the same cue.

PROGRAMMING YOUR ROAD RUNNER

We will assume that you have read through the manual up to this point and have a fair knowledge of the functions of the EXPANDED ROAD RUNNER. If this is not ture, you may want to do so before reading this section.

For the rest of this section, you will need a tape recorder with a selection of music on at least one channel and one open channel to record the various kinds of DATA, an assortment of slides that will work with the music you have chosen, a dissolve unit (preferably a D DOVE), three projectors and trays, the EXPANDED ROAD RUNNER and all connectors needed to interface the above equipment. (You may also want to story board your slides.)

CLOCK TRAK

Also see PKG in resolve RIR Section

********** GENERAL INFORMATION **********

INTRODUCTION

The CLOCK TRAK is essentially a much more powerful SYNC track. It uses a string of digital time cues, each with its own CRC (Cyclic Redundancy Check), rather than the simple 1000 HZ pulses of the Synchronizer. The CLOCK TRAK has an AVL exclusive format compatable with the EXPANDED ROAD RUNNER's Mag Tape input/output hardware which is NOT compatable with SMPTE or any other clock track. Three of the most significant advantages of the CLOCK TRAK are:

1. The mag tape track only has to be recorded once, since the internal memory "cue"/timing points can be moved to either later or EARLIER times without re-recording the pulses on the tape.

2. Because the CLOCK TRAK mag tape times are only used to insure the precise timing between the tape recorder and the EXPANDED ROAD RUNNER, a significant amount of the track can be non-readable (you could even disconnect it for periods of time) without any particularly noticable affect on the show.

3. Since the time points are uniquely identifiable you can actually do a tape rewind or fast forward and the EXPANDED ROAD RUNNER will bring your projectors to the new status once you put the tape back into play mode.

The CLOCK TRAK can be used to create shows which are to run entirely out of memory, shows which are a combination of live and canned (note in this case both the live and canned could actually be run from memory), and to edit and synchronize shows which will eventually be transferred on to the tape as digital tracks for playback without an EXPANDED ROAD RUNNER.

RECORDING THE CLOCK TRAK

To lay down a CLOCK TRAK in parallel with the music tracks:

1. Connect the REC OUT jack on the rear of the EXPANDED ROAD RUNNER to the appropriate input jack on your tape.

2. Set your tape record level up so that it will play back at about 0 on the VU meter by using the STL (set levels) command.

3. Turn the POSITRAK OUTPUT OFF and use the COM control command to begin clock output

4. Ensure that you begin recording on the tape at least 5 seconds before the music begins

5. Allow the EXPANDED ROAD RUNNER to continue recording the time points past the end of the music track

6. To turn off the clock output either use the ESC or the RUB OUT key.

The constraint in step 4 is to insure that the clock times on the tape begin at least five seconds before the actual music begins. This is necessary because the forced Time GOTO from mag tape must go to an internal program Time cue which is at least 2.5 seconds greater than the current mag tape time to allow the EXPANDED ROAD RUNNER and the projectors time to attempt to reach the new status. Thus, to allow the tape to force a GOTO to cue #1 after a rewind you must be able to rewind the tape to a time point at least 2.5 seconds before the first time cue. The COM command used in step 5 can start the clock output at any time you wish so that if you are programming separate sections you can have them start at different times. Thus if none of your sections are more than about 9 minutes long you could start the first section at 10 minutes, the second at 20, etc. Then you could later combine the sections into one contiguous tape.

SYNCING THE CUES TO MUSIC

Typically all further operations will be done in either CEM (Clock Edit Mode) or CIM (Clock Input Mode). You can switch to either of these modes and simply leave it there while doing all your editing, timing, etc. The only difference between CEM and CIM modes is that in CEM mode the EXPANDED ROAD RUNNER stops running, unless in a live section, .5 seconds after the mag tape clock track input stops while in CIM mode the EXPANDED ROAD RUNNER continues running even if the tape input stops.

Thus CIM mode protects the show from possible mag tape failures, RCA jacks getting kicked out, etc. Note that if you always want the EXPANDED ROAD RUNNER to stop when the tape stops then you can use CEM mode for both editing and showing.

There are two possible approaches to syncing the time points to the music. One approach is to work on one section at a time by beginning each set of cues which will reference a single time point with a TX cue. You can then play that section of the tape back through the EXPANDED ROAD RUNNER in CEM mode and strike the CUE key at the point you wish to sync to. If necessary you can then "tweak" this point to the nearest 1/100th second by simply changing the cue appropriately. This section can then be saved and later combined with other sections to form the complete show.

Another approach is to create a table of all the timing points on the tape by first creating a file of TX cues (using the REPT key in conjunction with the CTRL/R keys), then playing the taped clock track back through the EXPANDED ROAD RUNNER's PLAY jack with the EXPANDED ROAD RUNNER in CEM mode while striking the CUE key at each point in the sound track for which you want timing information. This will create a file of timing points which you can either print out or save on a diskette for later reference. Note that in actual use two contiguous Time cues (eg., no other types of cues between them) is an invalid operation since the Time cue is not actually a "cue" but rather it is defined as a link between an actual cue and a real time point on the tape recorder. Thus you cannot actually "play back" this file of Time cues you created without first combining it with actual cues because when the EXPANDED ROAD RUNNER receives a time from the mag tape it will simply jump around all contiguous Time cues unless they are TX's.

CONVERTING A SHOW FROM SYNC TRACK TO CLOCK TRAK

If you have a program which was previously cued from a sync track you can fairly quickly convert it over to time track cueing by:

1. Insert into the program a TX cue at each point which was previously triggered by sync pulses

2. Lay down a time track in parallel with your sync track (see RECORDING THE CLOCK TRAK)

3. Connect the time track from the tape to the play jack on the EXPANDED ROAD RUNNER

4. Connect up the sync track from the tape to the sync in on an AVL SYNCHRONIZER and from the SYCNCHRONIZER to the remote cue jack on the EXPANDED ROAD RUNNER.

5. Switch back to clock edit mode by doing a CEM control command.

6. Issue a CTRL/G, ENTER to bring everything HOME

7. Now start your tape, the TX cues will automatically be replaced by the appropriate times at which the sync pulses occurred.

8. After the entire tape has been converted you must disconnect the sync track to use the time track to avoid "extra" conflicting cueing.

SPECIAL NOTE ON THE USE OF "GO's" WITH CLOCK TRAK

A high speed section does not need a "GO" to initiate it when using a time cue. The time cue will cause the action to begin when either the clock input from tape matches the time cue or when the CUE button is pushed when the cursor is either on the time cue or within a sequence begun with a time cue. However, you must still use GO's for a reference point for repeats.

MIXING LIVE AND CANNED SECTIONS

The CLOCK TRAK software was written to allow live sections cued from the keyboard or a remote cue switch to be mixed with sections cued from a mag tape clock track. This feature is implemented by having the EXPANDED ROAD RUNNER ignore clock track inputs while in a section that is not begun with a time cue. Live sections can be placed first and/or at any other position/positions following a cue with a STOP imbedded in it. A mixed live/canned show might look something like this:

	CUE #	CODE	SCREENS
LIVE	1	TBJB TAB JB	
	2	4A	123
	3	2D	123
	4	2D	2 GO
	5	W1	
	6	1D	1 3
	7	W2.5	
	8	6D	123 R STOP
CANED	9	TBC1 TAB C1	
	10	TM 1:02.36	
	11	1A	1
	12	W.5	
	13	1A	2
	14	W.5	
	15	1A	3
	16	TM 1:04.21	
	17	FA	123 GO
	18	RP9	
	19	NOP	STOP
LIVE	20	TBTS TAB TS	
	21	2D	123
	22	4D	123
	.	.	.
	.	.	.
	.	.	.
	.	.	.

Cues 1-8 are John Brown's live speaker support section (note use of tabulator JB for reference point), 9-19 are canned, 20-XX are live, etc. The key to mixing live/canned presentations with CLOCK TRAK is to remember that the clock itself will be stopped and time GOTO's will not be forced by the mag tape clock input as long as the EXPANDED ROAD RUNNER is not in a RUN mode caused by a time cue.

EXPANDED ROAD RUNNER/MAG TAPE "TRACKING" DURING EDITING

The PROCALL software was designed to allow the EXPANDED ROAD RUNNER to uniquely identify any point on the tape and thus after doing a fast forward or a rewind the EXPANDED ROAD RUNNER can automatically do a GOTO to the nearest point in the program which corresponds to the new time point on the tape.

The one exception to the automatic "tracking" operation (other than in a live section) is if the EXPANDED ROAD RUNNER's cursor is actually pointing at a time cue. If the cursor is pointing at a time cue and you start your tape at a time point preceding the time cue, the EXPANDED ROAD RUNNER assumes that you wish to wait for the tape to play forward to the present cue time. This allows you additional flexibility at show time but can be overridden by simply stopping the tape again and restarting it in play mode a second time.

When PROCALL encounters a time cue dring a run mode, it will cause the program to stop. PROCALL will then wait until the clock equals the value of the time cue and then put the program into RUN mode again. Consider the following example:

```
 1 TIME    5.00
 2 1A      1 SEC ALT        1
 3 1A      1 SEC ALT         2
 4 1A      1 SEC ALT          3
 5 1A      1 SEC ALT           4
 6 1A      1 SEC ALT            5
 7 TIME    10.00
 8 1A      1 SEC ALT              6
 9 1A      1 SEC ALT               7
10 1A      1 SEC ALT                8
11 1A      1 SEC ALT                 9
12 1A      1 SEC ALT                  0
13 TIME    15.00
```

If you go to cue #1 the clock will be set to 5 Sec and the EXPANDED ROAD RUNNER will wait for either the cue button to be pressed or for mag tape clock track input if in CIM or CEM mode. If you push the CUE key the clock will start running and cues 2-7 will begin executing. After executing cue 7 the EXPANDED ROAD RUNNER will stop executing cues, but the clock will continue running. When the clock reads 10 seconds cues 8 through 13 will be executed, and so on. If you try to "push" the timing of cues, the EXPANDED ROAD RUNNER will issue a warning message. Using the above example, suppose the time cue at cue number seven read "TIME 5.10". It takes the EXPANDED ROAD RUNNER 0.6 seconds to reach that point (six cues at 0.10 seconds per cue). Therefore, when you run this section, the EXPANDED ROAD RUNNER will issue the warning and continue on. If the gap is great enough, the EXPANDED ROAD RUNNER will be forced to jump around the offending section to catch up with the clock. To illustrate this, consider the following incorrectly timed sequence:

```
TIME    10.00
FA      FAST ALT 1      GO
RP99    REPEAT 99
TIME    10.01
```

At 10 cues per second the 100 fast alternates execute for 10 seconds, thus the second time cue must be greater than 20 seconds. When the EXPANDED ROAD RUNNER sees the incorrect time cue (10.01 seconds) it will do a GOTO around any succeeding cues until it finds a time cue which is greater than 22.5 seconds (current time of 20 seconds + 2.5 seconds to allow the EXPANDED ROAD RUNNER and the projectors time to attempt to catch up). Note that by using TX's to time your show you should never have a problem with time cues occuring too soon unless you add additional cues between resolved time cues.

The TIME X cue allows Procall to fill in the correct timing points for you. When Procall encounters the TIME X cue, it will go into a stop mode just as if it had encountered a time cue. It will stay in this mode until the CUE button is pushed (or an external SYNC or remote CUE is received). Procall then replaces the TIME X with the clock time at that moment and then continues on with the program. One use for the TIME X cue is to provide an overall timing chart for your show. In order to do this, put a large number of TIME X cues into the EXPANDED ROAD RUNNER by using the CTRL/R key or by doing a series of saves and appends. You probably will want to save this file of TIME X cues both for retrying the timing on this show as well as having it for future shows. Connect the output of a previously recorded Clock Trak tape to the EXPANDED ROAD RUNNER's PLAY jack. Put the EXPANDED ROAD RUNNER in clock input mode by doing CTRL/C, CIM and ENTER. GOTO cue #1 and start the music. Push the cue button at each key point. The time of that event will be placed into the cue space. Now, you can save this timing chart as a disk file or print it out for a permanent record, for use in programming, storyboarding, etc.

POSITRAK

POSITRAK from the EXPANDED ROAD RUNNER will be useful when using DOVEs, D DOVEs, TRAVELERs, or a SHOW PRO VC. POSITRAK is information that is interleaved with the data that is sent to the DOVEs (or any of the above mentioned compatible dissolves). An explanation of how the POSITRAK works, goes like this:

Every time you enter a command into the EXPANDED ROAD RUNNER, it sends out a coded DATA pulse that corresponds to the command that you entered. It is received by the DOVE and is executed. This all takes a fraction of a second. The same thing holds true when you run a show from memory. The coded DATA pulses are sent out with the timing that you have given them in your program.

Just for example, let's say the code going out looked like this: (left to right is relative time and a "D" is a DATA pulse)

DD DDD D D D D D D D

We will now add POSITRAK to the data going out maintaining the same relative time positioning and the result will look like this: (the "P" represents the POSITRAK information)

DDPPPDDDPPPPPPPPPDPPPPPPDPPPDPDPPPDPPPPDPPPPPPD

Now to define what POSITRAK is. POSITRAK is DATA that is constantly being sent out to all the connected DOVEs to let each projector know what tray position and lamp status it is supposed to have at that particular moment. Therefore, when the ROAD RUNNER has no cues going out, its' output will be all POSITRAK. When you are running at 20 CPS there is not as much time between cues, so no POSITRAK will go out until there is a break between the cues (e.g. during WAITS or between sequences while you are waiting for the next TIME cue).

The POSITRAK is very useful when you record your DATA on your show tape amd play back your show with your DOVEs. Playing a show this way does not require you to use your EXPANDED ROAD RUNNER. The DATA is recorded along with the POSITRAK on your audio tape and is sent to the DOVEs exactly as if the EXPANDED ROAD RUNNER were attached. The CLOCK TRAK allowed you to move back and forth through the program and keep track of where it was according to the time given to the ROAD RUNNER by the CLOCK TRAK.

The POSITRAK on the audio tape can now do the same thing by letting all the projectors know at what tray position and what lamp status it is supposed to be at any time.

To record the DATA and POSITRAK information onto the audio tape, do the following:

1. Place a "Y" connector (one male to two female) into the REC OUT jack on the rear panel of the ROAD RUNNER. Connect one end to you DOVEs and the other to the "line input" on your tape recorder of an open channel where you wish to put your DATA TRAK.

2. Enter the CONTROL COMMAND field and use STL to set the record level. Set the level on the tape recorder to about +3db (this will play back around 0db).

3. Put your tape recorder in the "sync" mode to monitor from the record head so the DATA you put on the tape will be in sync with your sound.

4. In the programming mode with the EXPANDED ROAD RUNNER set at the starting cue for the section you are recording, put your tape recorder in the record mode to record your DATA and start the tape recorder.

The CLOCK TRAK will run the show, the cues will go to the DOVEs and the same information will be recorded on the audio tape on your DATA TRAK. After you have finished your recording, home your trays to the starting position, rewind your tape, reconnect so the "line out" from the DATA TRAK channel of the tape recorder is connected to the DOVEs and restart your tape recorder. Your show will now run with just the tape recorder and the DOVEs. To see how POSITRAK works, stop the tape about half way into the show, rewind a little, restart the tape recorder and watch the program back up to the proper position, resync and continue on through the show.

NOTE: The DOVEs are designed to keep the lamps off until all trays of that DOVE have reached the proper position before restoring the lamp status.

CLOCK TRAK EXCERCISE

The following exercise is designed to familiarize you with the operation of the CLOCK TRAK which is essentially a more powerful sync track. By recording CLOCK TRAK on one channel of your sound tape, you have in effect marked the tape with a uniquely identifiable sync pulse every hundredth of a second. In other words, instead of waiting for a 1000hz pulse and then executing the next cue in memory, the EXPANDED ROAD RUNNER can tie each cue or group of cues to a specific time cue, and will always execute that cue at that exact instant. In addition, the internal clock of the EXPANDED ROAD RUNNER is synchronized to the tape so that if the tape is running slightly slow or fast, your cues will be adjusted accordingly.

This gives you the ability to do a tape rewind or fast forward, and the EXPANDED ROAD RUNNER will automatically bring your projectors to the new status when the tape is put back into the play mode.

The following program is a demonstation of the CLOCK TRAK'S features:

PROGRAM NAME: DEMO OPERATOR: AVL

CUE#	CODE	STATEMENT	SCREENS	RUN
1	TIME	5.00		
2	PF	PROJ FWD	12345	
3	TIME	6.00		
4	3D	3 SEC DIS	1 3 5	
5	TIME	10.00		
6	3D	3 SEC DIS	1 3 5	
7	TIME	14.00		
8	3D	3 SEC DIS	1 3 5	
9	TIME	18.00		
10	3D	3 SEC DIS	2 4	
11	TIME	22.00		
12	CT	CUT	1	C
13	CT	CUT	2	A
14	CT	CUT	3	B
15	CT	CUT	4	A
16	CT	CUT	5	B
17	TIME	23.50		
18	CT	CUT	5	
19	CT	CUT	4	C
20	CT	CUT	3	
21	CT	CUT	2	C
22	CT	CUT	1	
23	TIME	25.00		
24	CT	CUT	3	A
25	3D	3 SEC DIS	3	C

```
26  W.05   WAIT 0.05 SEC
27  CT     CUT          2 4          C
28  W.1    WAIT 0.1 SEC
29  CT     CUT        1     5      A
30  TIME   28.50
31  CT     CUT          3
32  TIME   31.00
33  3D     3 SEC DIS     234          B
34  TIME   34.00
35  3D     3 SEC DIS     234
36  TIME   38.00
37  2D     2 SEC DIS     234
38  TIME   40.50
39  4D     4 SEC DIS     234
40  TIME   46.00
41  4D     4 SEC DIS    1 3 5
42  1D     1 SEC DIS     2 4            B
43  TIME   52.00
44  3D     3 SEC DIS    1 3 5
45  TIME   57.00
46  3D     3 SEC DIS    1 3 5
47  TIME   1:02.00
48  8D     8 SEC DIS    1 3 5          B
```

When you GO TO cue #1 and then push the CUE button, the clock starts and the program begins to run. The EXPANDED ROAD RUNNER sees the 5.00 second cue and waits for that time to be reached by the clock. At 5.00 seconds, it executes the PROJECTOR FORWARD on screens 12345, and sets the speed at 20 cues per second. It then sees the 6.00 second cue and waits until the clock reaches that point, at which time it executes the 3 second dissolve on screens 1 3 5. The EXPANDED ROAD RUNNER will continue to read time cues, wait for that time to appear, and then execute the proper cue.

Notice that pushing the ESCAPE key stops the program. The REVERSE CUE (Up Arrow) key will reverse to the last time cue.

To record the CLOCK TRAK on to tape in parallel with a music track do the following:

1. Connect the "REC OUT" jack on the rear of the EXPANDED ROAD RUNNER to the appropriate input of your tape recorder.

2. Enter the CTRL/C field, type STL and push the ENTER key. Adjust the level of tape recorder input to +1Db.

3. Push the ESC key and type in COM (Clock Output Mode). Start your tape recorder. Depressing the ENTER key will start the CLOCK TRAK output to the tape. You should ALWAYS record at least 5 seconds of extra CLOCK TRAK on your tape before the first cue and make sure that no cue ever occurs before TIME 2.50. The EXPANDED ROAD RUNNER will skip your first cues if you do not follow these rules.

4. At the end of your sound track, always allow the CLOCK TRAK to run on for a few extra seconds. For this excercise, continue recording the CLOCK TRAK until the clock on the CRT screen reads 02:00.0 (Two Minutes). At that instant, push the ESC key and the clock output will stop.

Now you are ready to play the program from the CLOCK TRAK on the tape. Run the output from the tape channel that the CLOCK TRAK is recorded on into the "PLAY" jack on the back of the EXPANDED ROAD RUNNER. The tape output level should be set at approx. "0Db." At this time the EXPANDED ROAD RUNNER should still be in the CONTROL COMMAND MODE. Type in CIM (Clock Input Mode) and press the ENTER key. Now you can press the ESCAPE key to return to the program, and do a GOTO if the program is not at cue #1. Rewind the tape and start at the beginning. At 5.00 seconds, the first cue will be executed and the program will continue running.

Let's explore some of the features of the CLOCK TRAK as the program runs. Unplug the tape output from the "PLAY" jack and notice that the internal clock takes over and the EXPANDED ROAD RUNNER tells you that the CLOCK TRAK input has been interrupted. This guarantees that if CLOCK TRAK drops out or is very poorly recorded, the EXPANDED ROAD RUNNER will stay in sync. Slow the tape by grasping the reel, and notice that the clock slows down. This assures you that if the tape is not running at exactly the same speed, the EXPANDED ROAD RUNNER will still stay in sync. Stop the tape, rewind it or do a fast forward, and start it again. The EXPANDED ROAD RUNNER will automatically do a GOTO the nearest time cue past the current time, update the projectors, and continue the show.

NOTE - If the tape is rewound and restarted while the cursor is actually resting on a time cue, the EXPANDED ROAD RUNNER will assume that you want it to wait for that specific cue. If you want the EXPANDED ROAD RUNNER to back up the show to match the tape, simply stop the tape momentarily and restart it. The EXPANDED ROAD RUNNER will then GOTO that point in the program.

Enter the CTRL/C field, and type in CEM (Clock Edit Mode) and press ENTER. Go back to the program and play the tape again. Stop it and rewind or fast forward and start it again. Clock Edit Mode is essentially the same as Clock Input Mode except that if the tape is stopped or the signal is cut off, the program stops .5 seconds after it receives its last CLOCK TRAK data. This is useful during editing when you want to stop the whole show to make changes, or when you want your show to stop if the tape should stop.

Now go to the CTRL/C field and type in TOC 1,50,+3 (Time Offset Cues 1, 50, +3 sec) and press ENTER key. You will notice that all of the time cues starting with #1 and ending with #50 have three seconds added to their times. Type in TOC 1, 50, -3 and press the ENTER key. Three seconds is subtracted from each time cue. You may use this to offset any number of cues in the show. If any one or two numbers are typed by the + or - sign, the EXPANDED ROAD RUNNER will assume that they are seconds. Typing ".3" would be read as .3 seconds, "3:" as three minutes, "3::" as three hours. If there is no + or - typed, the EXPANDED ROAD RUNNER will assume that the amount is to be added. You can fine tune any cue or group of cues in increments of .01 (one/hundredth) of a second.

While still in the CTRL/C field, type in RTC 1, 50 (Replace Time Cues 1, 50) and press ENTER key. This will replace all time cues with TIME X cues. These act much like WAIT X cues. The EXPANDED ROAD RUNNER should still be in the Clock Edit or Clock Input Mode. Rewind the tape, and return to cue #1. Start the tape. After the clock is past 5 seconds, press the CUE button. The EXPANDED ROAD RUNNER will substitute the exact time that the button was pressed for the first TIME X. See how easy this makes synchronizing cues to points in the sound track? If you were off on certain cues, you can either use the RTC command to replace a whole group with TIME X cues or step through the program and change only the cues that need to be changed. Simply typing over the times changes their value also. GO TO one of the cues and put the cursor over any digit and type another digit, when you push the ENTER key the new value is entered into memory. The EXPANDED ROAD RUNNER will not allow you to enter a time that is out of sequence. For example, a cue of 20 seconds between cues at 30 seconds and 40 seconds is not allowed.

You may use a TIME cue with every cue in your program, or to start sequences of cues tied together with WAITS much as you formerly used a 1000HZ pulse. Time cues, like REPEAT and TAB cues, take less than 1/100th of a second to execute and they do not affect program timing.

ADVANCED PROGRAMMING WITH YOUR EXPANDED ROAD RUNNER

The intention of this section is to teach you a few of the more advanced techniques of programming. In this section we will cover most of the basic kinds of entries.

The main concepts of the exercises can be understood by using just one D DOVE and three projectors on screen #3 (If you use a dissolve unit other than a D DOVE, you will not be able to do D DOVE routines). The other screens are used mainly as a reference to other programming moves.

PROGRAMMING EXERCISES

Wherever TXs are entered into the program, you will go back to the beginning of that section and resolve them with the internal clock. The first time you press the CUE key it will start the clock. To resolve the first TX you will press the CUE key again.

When you are using the internal clock to resolve your time cues, make sure that you GO TO the preceding TIME cue in order to get the clock started on the right time. This will keep you from attempting to resolve a TX to a TIME that is smaller than the previous TIME cue or not allowing enough time for the last sequence to finish before trying to start another one. If your program seems to skip ahead, that is most likely what has happened.

EXERCISE 1. A three step animation that dissolves in and out again.

	CODE	SCREEN	
0001	TX		
0002	BG	3	
0003	3D	3ABC	
0004	TX		
0005	3D	3A	
0006	TX		
0007	3D	3 B	
0008	TX		
0009	3D	3 C	
0010	TX	<-------	Wait for the lamp to go OFF
0011	BS	3	before resolving this one.

This exercise shows you how to start an animation sequence with the lamps OFF and dissolve the lamps ON while animating the three projectors. Time the animation to dissolve OFF with the next series of TX cues that are used to dissolve those projectors OFF individually. Finally, stop the animation (BLINKING) with the last TX cue.

> NOTE: With this method, you are limited to a three step animation. In order to do an intensity controlled dissolve animation using more than 3 projectors, you will have to use the FA (FAST ALTERNATE) method described later.

The BLINK GO can be used either before or after the dissolve cue for the designated projectors. The usage depends on the desired final lamp status when the BLINK STOP is cued. The rule is that the BLINKING projectors will assume the status in effect when the BLINK GO was assigned. Now go back and reverse the order of cues #2 and #3. You will see that 3A, B and C will come on after you assign the BLINK STOP. You can also see how the effect will look at a faster rate by inserting a 20 CPS cue in between #1 and #2. To do this you:

> A. GOTO 2. You should now be looking at cue #2. Press either CNTRL/A or the INSERT key to open up a space to insert a cue. All following cues are pushed down one number in the memory and only the cursor should remain at #0002.
>
> B. Type in "S20" and press the ENTER key. The EXPANDED ROAD RUNNER will advance to cue #0003. You will notice the cursor is now flashing at a faster rate to let you know you are in 20 CPS.

<u>EXERCISE 2.</u> Dissolving an animation sequence that uses more than three projectors using the FA and RP method.

CODE	SCREEN
0001	TX
0002	S20
0003	3D 23A C
0004	FA 23A C
0005	FA 2 A
0006	FA 2 A CG
0007	FA 23 C
0008	FA 3A C
0009	FA 23A
0010	RPX
0011	HC 2 A C
0012	HC 23 C
0013	HC 3A C
0014	TX
0015	3D 3A

In this case, the four projectors are told to dissolve ON and FA between the four of them X times. When the light intensity gets to full brilliance or you want the flashing to stop, terminate the REPEAT by pressing the CUE key. This will resolve the REPEAT to a number. When the repeat is complete the animation sequence will HARD CUT. This allows the last move of the animation to remain on the screen. The next TIME cue will dissolve that slide OFF and begin a new sequence.

> NOTE: The lamps must be told to come ON all at the same time or go OFF at the same time in order for the effect to work properly.

EXERCISE 3. Moving through a number of visuals rapidly to demonstrate another use of the REPEAT function.

	CODE	SCREEN	
0001	TB2		
0002	TX		
0003	HC	3	G
0004	W.5		
0005	RPX		
0006	HC	3	

In this example, the TB2 (TAB) is used to mark the beginning of a new section. (It makes it easier to find). The HARD CUT in cue 0003 will bring the A projector ON (since there is NO assignment and there are NO projectors ON on that screen, it will assume the A projector is to come ON) and then proceed to change from A to B to C to A to B and so on until you resolve the RPX. When you resolve the X the program will move to the next cue, in this case, #0006 HARD CUT on screen #3. The desired effect is for #0006 to HARD CUT the last visual OFF. Now when you have resolved the RPX the program will proceed to the next projector in the sequence. When the program stops, STEP REVERSE CUE (CNTRL/Q) to the last cue (#0006). Now you can change it to take OFF whatever projector is still ON after your REPEAT is concluded. If you had RP12, your program would have ended with 3A being ON. So you will make #0006 look like this:

0006	HC	3A

Another REPEAT technique is to use them with ALTs or FAs to create a flashing routine. This is more easily done with the BLINKING routines. See the INDEX for more information on D DOVE routines).

EXERCISE 4. The use of PRESETs to maximize control and minimize time

	CODE	SCREEN
0001	TB3	
0002	TX	
0003	1D	2 A
0004	PS	2 AB
0005	PS	3A
0006	TX	
0007	HC	23

In this sequence, you want to bring ON 2A. Next, you want to bring on 2B and 3A and take OFF 2A at the same time. This is what happens:

1. You assign 2A to dissolve ON at the intended rate.
2. You PRESET (assign) the projectors you want to react to the next action command you give for those screens.
3. You assign the command you wish for the intended projectors.

In this case, we only wanted two projectors to come ON and one to go OFF. We can also use PRESETs to access all BUT the projectors that are PRESET. Now that we have 2B and 3A ON, suppose we want to leave them ON and bring ON 2A, 2C, 3B, and 3C.

	CODE	SCREEN
0008	PS	3A
0009	PS	2 B
0010	TX	
0011	HC	23ABC

We have now used INDEPENDENTS to hold back projectors.

We want to stress the fact that PRESETs are NOT necessary in MOST programming instances. In the two examples above, the PRESET allowed us to instruct the appropriate projectors to do a HARD CUT at exactly the same time. Because of the nature of a HARD CUT, if all projectors did not respond at exactly the same time, you would see the different projectors cut at different times. In a sequence like either of the above two you could dissolve, CUT, ALT, or FA the projectors instead of using a HARD CUT. If you assign each screen (and projector) to come ON (or go OFF) individually, the 1/10th (or 1/20th) of a second between the dissolves would NOT be noticeable.

EXERCISE 5. A similar effect could have been done like this:

CODE	SCREEN
0008	TX
0009	2D 2 A C
0010	2D 3 BC
0011	TX
0012	3D 3 BC
0013	3D 2 ABC

With this method we save a cue and therefore save ourselves time. PRESETs were designed to help you out of tight timing jams. They are NOT designed for general use. In fact they will take up more programming time and use more cue space if they are not used properly. Use them with discretion.

INDEPENDENTS

An INDEPENDENT refers to the use of specifically assigned screens AND projectors on which a particular action will take place. The projectors will always sequence in the following manner if you DO NOT assign them independently. This means that you use the screen assignment and NO projector assignment with a lamp control cue.

NO projectors ON - "A" projector will come ON.
"A" projector ON - "A" goes OFF, "B" comes ON.
"B" projector ON - "B" goes OFF, "C" comes ON.
"C" projector ON - "C" goes OFF, "A" comes ON.

"A&B" projectors ON - "A" goes OFF, "B" stays ON.
"B&C" projectors ON - "B" goes OFF, "C" stays ON.
"A&C" projectors ON - "A" goes OFF, "C" stays ON.
"AB&C" projectors ON - "A&B"go OFF, "C" stays ON.

When you use INDEPENDENTS, the projectors you assign will either come ON or go OFF according to their status at that time.

"A" is ON - You assign "AB" - "A" goes OFF, "B" comes ON.

"A&C" are ON - You assign "ABC" - "A&C" go OFF, "B" comes ON.

No projectors are ON - You assign "AB" - "A&B" come ON.

These are some examples of the way the independents work. They allow you to independently tell each projector what to do.

The advantage of using independents is knowing exactly what will happen in any instance and knowing that the show will still run correctly if one of your dissolve units is not set to the proper sequencing (in sequence 2 the center projector is still accessible using independents). It is also easier to keep track of your sequencing if you go back and change a cue in the program that will change the status of a projector entering a sequence.

Working with both methods will enable you to determine the way that allows you to be the most creative (you may want to use a mix of the two).

EXERCISE 6. FREEZING a dissolve to control the brightness of the lamp (and therefore the brightness of the slide) for looks, supers (superimpositions) or creating other special effects.

CODE	SCREEN	
0001	2A	3A
0002	WX	
0003	FZ	3A
0004	8A	
0005	FZ	3A
0006	4A	3A

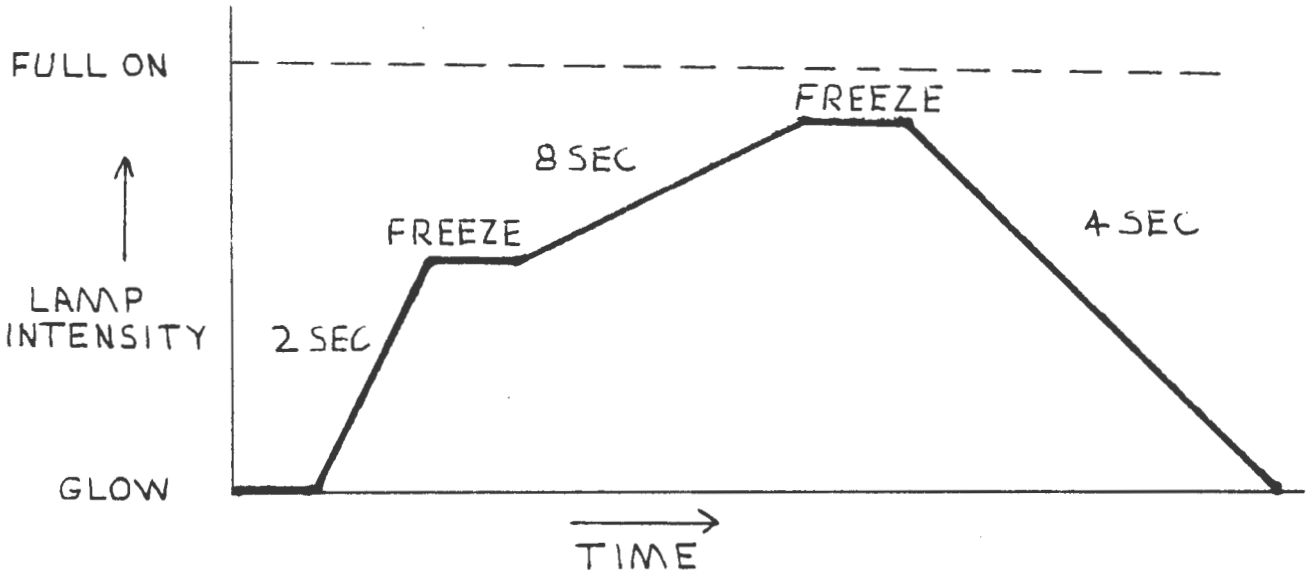
The FREEZE cue is used to halt a dissolve in progress. To use this feature you assign a dissolve to the projector you wish to FREEZE and then begin the lamp dissolve. You now wait until the lamp had reached the desired intensity and then cue the FREEZE. If you use a WX (WAIT X) you will be able to see the lamp fade to the level you want and then press CUE to resolve it. Next you assign the FREEZE.

Once the lamp dissolve has been frozen at the desired level you may release the freeze in one of four ways. First, to have the lamp continue in the same direction it was going when told to FREEZE and at the same rate you would use a FREEZE cue again with a screen and projector assignment. This will release the FREEZE. Second, if you want the lamp to continue in the same direction it was going when told to FREEZE but at a different dissolve rate you would use a dissolve cue with NO screen or projector assignment.

Third, if you wish to reverse the dissolve direction with the same rate you would assign the same dissolve speed <u>with</u> the screen and projector assignment. Fourth, if you wish to reverse the dissolve direction with a new dissolve rate you simply assign the new dissolve rate <u>with</u> the screen and projector assignment.

The following graph shows how easily complex dissolve effects may be created:

FIGURE 2.



"D" DOVE COMMANDS

With the "D" DOVE it is possible to do four (4) new screen effects that were not possible with the standard DOVE. These four new effects will be covered in detail later.

The new software in the DOVE now allows for the SETTING UP of routines inside the DOVE that are carried out solely by the DOVE and need no further commands from the EXPANDED ROAD RUNNER once the routine commands have been sent to the DOVE.

IMPORTANT: It is suggested that you use ALTERNATES with the BLINKING routines at least until you have a grasp of what the routine is capable of doing for you.

A brief description of the New Effects follows:

LOOPING

The LOOP LOAD command allows you to set up a looping routine in a DOVE for the purpose of looping either 1, 2 or all 3 projectors controlled by that DOVE. A LOOP may include more than one DOVE with the capability of having up to 30 projectors in one large continous LOOP. Once you have assigned the individual projectors that will be contained in the loop, you initiate the LOOP with a LOOP GO cue. To stop the looping you assign a LOOP STOP to the selected DOVEs.

BLINKING

BLINKING allows you to blink a projector or a series of projectors at one of 4 different rates. To start the BLINKING you enter a BLINK GO command for the selected DOVEs and a cut or dissolve command for the desired projectors that you want to BLINK. To stop the BLINKING you have to enter a BLINK STOP for the selected DOVEs.

SMOOTH

SMOOTH allows you to do two different things, both at the same time if you so desire. First the SMOOTH allows a change in the way the lamp in the projector is RAMPED ON and OFF. Without SMOOTH the lamp will ramp on faster at first to allow light to reach the screen faster making a smooth transition between the oncoming and the outgoing slides. With SMOOTH the lamp no longer has this fast start up and therefore has a SMOOTH start up and increase in light intensity throughout the entire dissolve.

Second, in SMOOTH the lamp will no longer come to full brilliance for an oncoming dissolve when you tell it to go OFF before it has reached its full intensity (referred to as "stepping on the dissolve") or all the way OFF when you are doing a dissolve OFF and tell it to come ON again. This now allows you to do a ripple dissolve effect or what is termed a continous dissolve effect.

EXAMPLE: If you do a 4 SEC ALT on screen 1L and a WAIT 2 SEC then another 4 SEC ALT and another 2 SEC WAIT etc. the effect that will occur on the screen will be one where the lamp starts on with a 4 second dissolve and after 2 seconds will change directions and begin to dissolve OFF. Then after 2 seconds it will begin to dissolve ON again and so on. To return to normal dissolves, program a SMOOTH STOP.

THE "D" DOVE EXPANDED ROAD RUNNER COMMAND ENTRIES

LL LOOP LOAD

LL (LOOP LOAD) cues alert version "D" DOVEs to store a series of cues (ACTION CUES) in its memory as a routine that will be repeated until told to stop. These ACTION CUES are WAIT, ALT, 1 SEC ALT, and FREEZE. Although any type of cue may be within a LOOP LOAD routine, ONLY ACTION CUES will be accepted by the EXPANDED ROAD RUNNER as such and sent to the designated LOOP LOAD screen.

ACTION CUES with GO, STOP or PROCEED CODES are INVALID within a LOOP. A LOOP LOAD is INVALID if another LOOP LOAD is in progress.

The MAXIMUM number of ACTION CUES per DOVE is 4 plus 5 WAIT cues. The MAXIMUM WAIT time between cues is 6 SECONDS in increments of .05 SECONDS. For example, if you are starting a LOOP LOAD on screens 1,3 and 5 you will be allowed 4 ACTION CUES per DOVE or a total of 12 ACTION CUES plus WAITS and any other projector assignments.

LG LOOP GO

LG (LOOP GO) cues will cause ALL specified LOOPS to be repeated until told to STOP. A LOOP GO without a LOOP LOAD in progress is INVALID.

LS LOOP STOP

LS (LOOP STOP) cues will STOP all LOOP's in progress on the designated DOVEs.

BG BLINK GO
BS BLINK STOP

BLINK is similar to FAST ALT except that with FAST ALT it is necessary to repeat that cue the amount of times you wanted it to flash ON and OFF. Likewise with FAST ALT, if you wanted to do an intensity controlled dissolve you also have to repeat the FAST ALT. Now with BLINK simply enter a BG with screen numbers and a dissolve for the projector and an intensity controlled dissolve will occur with no further commands from the EXPANDED ROAD RUNNER except to stop the BLINKING. The EXPANDED ROAD UNNER is now free to perform other functions. (see section under BLINK for BLINKING rates and ratios).

SG SMOOTH GO
SS SMOOTH STOP

A SG (SMOOTH GO) will allow you to "step on" a dissolve and change its direction WITHOUT having it flash ON or OFF. You also have the capability to produce a ripple dissolve effect.

If you are using a video monitor SMOOTH will be HI-LITED in the SCREEN STATUS area replacing the word STATUS whenever in the SMOOTH mode. When a SG(Smooth Go) is issued all Doves are in this mode and will remain in this state until a SS(Smooth Stop) or Home is issued.

SPECIAL NOTES REGARDING "D" DOVE CUES

It is NOT possible to use BLINKING and LOOPING routines in the same DOVE(s) at the same time. You have to end (stop) one before entering (starting) the other.

It is recommended that you use independents when assigning projectors that are contained inside a LOOP LOAD sequence when all three projectors controlled by that DOVE are not involved in the LOOPING sequence. Failure to comply may cause the projector not involved in the LOOPING routine to participate in the LOOPING that is taking place in that DOVE.

When you execute an ESCAPE, ALL action will stop and the projectors will assume the status in effect at the time the LOOP GO or BLINK GO was assigned.

When you execute a GOTO or an ESCAPE the action will stop and you can tell which projectors are in what modes from the screen status area of the video monitor. The projectors with Bs in front of them are in a BLINKING mode and the projectors with Ls in front of them are in a LOOPING mode.

After GOTO's and ESCAPES, in order to resume (begin) BLINKING/LOOPING routines you must go to a point preceeding the appropriate BLINK GO/LOOP LOAD.

If you are between a LOOP LOAD and a LOOP GO and you do a STEP or RUN REVERSE, a LOOP GO and a BLINK STOP will be sent to the DOVE automatically and a GOTO to the LOOP LOAD cue will be executed. Likewise, if you are reverse cueing through your program (in either step or run reverse) and you come across a LOOP LOAD sequence, the EXPANDED ROAD RUNNER will force you from the LOOP GO to the LOOP LOAD only allowing you to reach a cue in that sequence in the forward direction. The same holds true when you try to do a GOTO to a cue inside a LOOP LOAD sequence. The EXPANDED ROAD RUNNER will take you to the LOOP LOAD command of that sequence and allow you to access any cue in that sequence only from the forward direction.

In order to stop smoothly from a LOOPING routine use a Loop Stop (LS). This command will allow the loop to continue to the end of the routine and then stop the screen action and start accepting cues. Always allow enough WAIT time to stop the loop before issuing cues to a Dove that was in a loop. When you have sent a BLINKING or LOOPING routine to a DOVE the incoming POSITRAK will be automatically shut off. Now, when you tell the DOVE to stop it assumes tha it is to stop with the same status with which it began.

In a situation where you wish to let a sequence finish before going on to something else, you MUST make sure you have allowed enough time to let the routine finish. Then you may turn ON or OFF any projectors necessary to continue your effect. This avoids a "hick-up", but more importantly it avoids losing status when you go right into another LOOPING routine. What you are doing is allowing the DOVE to recover and let POSITRAK resume for a moment to verify that the status in the DOVE matches that in the EXPANDED ROAD RUNNER.

IMPORTANT: In regards to the last two points, it is even more important when you are running from MAG TAPE to make sure all the BLINKING and LOOPING routines are satisfied and ended properly.

LOOPING and BLINKING routines may look different when you step through them than when you run through them. For this reason we suggest you always go back to the beginning or to a point where there is no Blinking or Looping taking place to start the effect and verify that it looks the way it was intended. This is most important when you are moving from one routine to another.

BLINKING

There are four rates of BLINK. They are obtained by entering BLINK commands in different ways. BLINK is set up by the EXPANDED ROAD RUNNER and carried out by the DOVE. When BLINK is assigned to a DOVE the DOVE will assume it is to blink all projectors it controls. The DOVE sets up the BLINKING routine internally and waits for a command to turn the lamps ON or OFF. The BLINKING routine will continue to be stored in the DOVE until you tell it to stop with a BLINK STOP command. If you do a BLINK GO on Screen #1, dissolve the LCR projectors ON and then dissolve the LCR projectors OFF later WITHOUT stopping the BLINK; the next time you dissolve any of the projectors on Screen #1 ON, they will BLINK because the DOVE was not told to stop the BLINK routine.

Assigning BLINK GO to a selected screen does nothing more than set up a BLINKING routine inside the DOVE controlling that screen. A lamp control command (Cut, Alt, Dis, etc.) must be used for that screen in order to bring the lamp ON. BLINK STOP simply stops the BLINKING routine leaving the projector lamps ON or OFF depending upon their status at the time of the BLINK GO.

There is another way to end routines other than calculating or keeping track of status to ensure that you end with the proper status. A BLINK GO immediately before the BLINK STOP can be used instead. The BLINK GO will update the routine to the status and the BLINK STOP will in turn stop the routine with the new status. This can be used to stop BLINKING or LOOPING routines.

REMINDERS: The BLINK GO can be put at any location prior to the BLINK STOP as long as there is NO subsequent change in status for that DOVE(s).

The following is an explanation of how the different BLINK rates are obtained:

1. Running at 10 cps, when you enter a dissolve on a particular screen followed by a BLINK command the DOVE will set up a 1:2 ratio and create a looping effect on the three projectors of that screen. This means that the left projector will be OFF for 1 part of the time and ON for 2 parts of the time. Likewise the center and right projectors will be OFF for 1 part and ON for 2 parts, respectively. The DOVE assumes the LEFT projector goes OFF first and the looping effect is created by this ratio.

EXAMPLE #1

	CODE	STATEMENT	SCREENS
1.	TIME	5.35	
2.	8A	8 SEC ALT	1 LCR
3.	BG	BLINK GO	1
4.	TIME	8.23	
	ETC.		

Here all three projectors will come ON. 1/10th of a second later the BLINKING effect will start with the LEFT projector going OFF, 1/10 of a second later the CENTER projector will go OFF and the LEFT projector will come ON, 1/10 of a second later the RIGHT projector will go OFF and the CENTER will come ON, 1/10 of a second later the LEFT goes OFF and the RIGHT comes ON and so on. This BLINKING loop will continue until you stop it with a BLINK STOP command from the EXPANDED ROAD RUNNER or from MAG TAPE.

The following describes what actually happens:

TIME	ACTION
5.35	1 LCR start to dissolve ON with an 8 second alternate.
5.45 1st 10th	1 LEFT goes OFF.
5.55 2nd 10th	1 LEFT comes ON and 1 CENTER goes OFF.
5.65 3rd 10th	1 CENTER comes ON and 1 RIGHT goes OFF.
5.75 4th 10th	1 RIGHT comes ON and 1 LEFT goes OFF.
5.85 5th 10th	1 LEFT comes ON and 1 CENTER goes OFF.

EXAMPLE #2

If you blink only two of the projectors on that screen they will still blink at a ratio of 1:2 causing each to be flashing ON for 2/10 of a second and OFF for 1/10 of a second with the two projectors overlapping the first 1/10 of a second after the first comes ON.

	CODE	STATEMENT	SCREENS	
1.	TIME	15.04		
2.	8A	8 SEC ALT	1	LC
3.	BG	BLINK GO	1	
4.	TIME	23.09		
	ETC.			

In this example only the LEFT and CENTER projectors will be BLINKING. The LEFT projector will come ON for 1/10th of a second, 1/10th later the CENTER projector will come ON, 1/10th later the LEFT will go OFF, 1/10th later the CENTER will go OFF and the LEFT will come ON, then back through the cycle again until the cycle is terminated by a BLINK STOP command from the EXPANDED ROAD RUNNER or from MAG TAPE. (This is exactly the same as if you were using all three projectors except that the third projector is not in the loop.)

EXAMPLE #3

Using one projector we can set up a flashing effect.

	CODE	STATEMENT	SCREENS	
1.	TIME	45.97		
2.	6A	6 SEC ALT	1	L
3.	BG	BLINK GO	1	
4.	TIME	1:05.99		
	ETC.			

Here again the DOVE will set up a 1:2 ratio, this time using only one projector (1L). In this case the left projector will be ON for 2/10th of a second and OFF for 1/10th of a second.

2. Running at 20cps will give you the same effects only faster.

3. A different effect can be created by using a PRESET with the BLINK command.

This PRESET will allow you to do two different things. First it will allow you to BLINK projectors in a dissolve loop and also dissolve projectors that are NOT BLINKING in that same loop as long as the projector you want to dissolve is not blinking.

Second it will allow you to BLINK projectors at a rate of 1:1. This means one, two or all three projectors on that screen will BLINK ON for 1/10th and OFF for 1/10th repeating until told to stop.

EXAMPLE #4

	CODE	STATEMENT	SCREEN	
1.	TIME	2:45.98		
2.	4A	4 SEC ALT	1	L
3.	PS	PRESET	1	L
4.	BG	BLINK GO	1	
5.	W5	WAIT 5 SEC		
6.	3D	3 SEC DIS	1	C
7.	W3.25	WAIT 3.25 SEC		
8.	FA	FAST ALT	1	R
9.	TIME	3:23.88		

In this example the PRESET is used to preset the BLINK GO. With the use of the PRESET the DOVE will set up a BLINK routine for that projector (1L) ONLY, this time with a 1:1 ratio. After waiting 5 seconds 1C will dissolve ON followed by a FAST ALT on 1R 3.25 seconds later.

In this example you could have PRESET 1 LEFT AND CENTER or 1 LEFT and RIGHT or any combination of one, two or all three projectors. Remember when you use more than one projector, both or all three projectors will BLINK at a 1:1 ratio ALL ON for 1/10th and ALL OFF for 1/10th when you use this PRESET.

4. Using 20 cps will give the same effects only faster.

NOTES:
1. Other effects can be obtained with the use of different timing, waits, and presets. Experimentation is the best way to familarize yourself with the routines.
2. You cannot use a LOOP STOP (LS) to stop a BLINK.
3. After issuing a BLINK STOP (BS) always wait 1/10 of a second before issuing another command to that Dove.

LOOPING

LOOPING could be described as an easy way to do repeats. LOOPING was created to permit independent looping routines by each DOVE leaving the EXPANDED ROAD RUNNER free to carry out other programming functions. LOOP LOAD cues will alert version "D" DOVEs to store a series of ACTION CUES in their memory as a routine to be repeated until told to stop. The difference is that LOOPING routines are limited to ACTION CUES. These ACTION CUES are 1 SEC ALTs, ALTs, FREEZEs plus WAITS. Athough any type of cues may be within a LOOP LOAD routine, ONLY ACTION CUES will be accepted by the EXPANDED ROAD RUNNER as such and sent to the designated LOOP LOAD "D" DOVEs. All cues assigned to other projectors not in the LOOP LOAD mode will be executed as normal cues and appear as appropriate waits for those projectors in the LOOP. (Refer to the third example under ANIMATION).

It is important to note that there is a MAXIMUM of 4 ACTION CUES per DOVE plus 5 wait cues per LOOP LOAD sequence. Other limitations are noted under NEW "D" DOVE COMMANDS.

LOOP LOAD can be used to create some old and new effects with greater ease and simplicity. The following are some examples of some of the things that can be done:

ANIMATION

Three step animation.

	CODE	STATMENT	SCREEN	
1.	AT	ALT	1	L GO
2.	LL	LOOP LOAD	1	
3.	AT	ALT	1	LC
4.	W.1	WAIT .1 SEC		
5.	AT	ALT	1	CR
6	W.1	WAIT .1 SEC		
7.	AT	ALT	1	L R
8.	W.1	WAIT .1 SEC		
9.	LG	LOOP GO	1	

In this typical example, the sequence is set up similar to that of a repeat sequence.

1. The projector that is to start the LOOP is turned ON.
2. The LOOP LOAD routine is assigned to the intended DOVEs.
3-8. The ACTION CUES are assigned for the desired effect.
9. The LOOP GO instructs the DOVE it is to LOOP (repeat) the routine until told to stop.

The ACTION CUES can be manipulated with more or less time or 1 SEC ALTs in the place of the ALTs to create other effects.

Another type of three projector animation might have the animation move back and forth or in and out as follows:

	CODE	STATMENT	SCREEN		
1.	AT	ALT	1	L	GO
2.	LL	LOOP LOAD	1		
3.	AT	ALT	1	LC	
4.	AT	ALT	1	CR	
5.	W.2	WAIT .2 SEC			
6.	AT	ALT	1	CR	
7.	AT	ALT	1	LC	
8.	W.2	WAIT .2 SEC			
9.	LG	LOOP GO	1		

More than three projectors in an animation means using more than one DOVE. A 6 projector animation might look something like this:

	CODE	STATEMENT	SCREENS		
1.	AT	ALT	1	L	GO
2.	LL	LOOP LOAD	12		
3.	AT	ALT	1	LC	
4.	W.1	WAIT .1 SEC			
5.	AT	ALT	1	CR	
6.	W.1	WAIT .1 SEC			
7.	AT	ALT	12	R	
8.	3D	3 SEC DIS	4	L	
9.	AT	ALT	2	CR	
10.	W.1	WAIT .1 SEC			
11.	AT	ALT	2	LC	
12.	W.1	WAIT .1 SEC			
13.	AT	ALT	12	L	
14.	W.1	WAIT .1 SEC			
15.	LG	LOOP GO	12		

Again the sequence is set up and carried out like in the three projector animation. In this example you will notice the WAIT cue in number 8 was replaced with a 3 SEC DIS on screen 4 LEFT. This is to demonstrate the flexibility of using non-ACTION CUES inside the LOOP LOAD sequence set-up. This cue will still appear to the LOOP routine as a .1 second wait.

FLASHING

For this exercise you will need a large rain coat.

You may want to use the looping to create flashing, random or syncopated animation. By entering a non-uniform pattern of waits mixed with Alts and 1 Sec Alts you can create random effects. This may be used to create effects using logos or other graphics that have more than one step or piece. Using flashing you can animate the pieces differently from the normal continuous motion animation.

OTHER USES

Using FREEZE as part of the ACTION CUES enables now control dissolves to make effects by locking and unlocking the FREEZE (dissolve) in the looping routine. This can be used to prolong dissolves and to create effects based on the different wait times and different dissolve rates you use:

	CODE	STATEMENT	SCREEN	
1.	8A	8 SEC ALT	1	LCR GO
2.	FZ	FREEZE	1	LCR
3.	FZ	FREEZE	1	L
4.	LL	LOOP LOAD	1	
5.	FZ	FREEZE	1	LC
6.	W.8	WAIT .8 SEC		
7.	FZ	FREEZE	1	CR
8.	W.8	WAIT .8 SEC		
9.	FZ	FREEZE	1	L R
10.	W.8	WAIT .8 SEC		
11.	LG	LOOP GO	1	

This first example accesses projectors independently:

1. Dissolve projectors ON.
2. Freeze all projectors before they have a chance to start to dissolve.
3. Unfreeze the first of the series.
4. Loop Load the selected screen.
5. Cross freeze the left to the center.
6. Wait .8 sec.
7. Cross freeze the center to the right.
8. Wait .8 sec.
9. Cross freeze the right to the left.
10. Wait .8 sec.
11. Start the Loop routine on selected screen.

This can also be accomplished another way:

	CODE	STATEMENT	SCREEN	
1.	8A	8 SEC ALT	1	LCR GO
2.	LL	LOOP LOAD	1	
3.	FZ	FREEZE	1	
4.	W.8	WAIT .8 SEC		
5.	FZ	FREEZE	1	
6.	LG	LOOP GO	1	

The second example does NOT use independents:

1. Dissolve projectors ON.
2. Loop Load the selected screen.
3. This Freeze command will Freeze the projectors in the loop.
4. Wait .8 Sec.
5. This Freeze command will unfreeze the projectors involved.
6. Start the Loop routine on the selected screen.

SMOOTH

SMOOTH allows you to do either of two (or both) things. First the SMOOTH changes the way the lamp in the projector is RAMPED ON and OFF. WITHOUT SMOOTH the lamp will ramp on faster at first to allow light to reach the screen faster and to make a smooth transition between the oncoming and the outgoing slides. In the SMOOTH mode the lamp no longer has this fast start up, therefore, creating SMOOTH start ups from black, cross-dissolves and follow throughs throughout the entire dissolve.

Second, in SMOOTH the lamp will no longer come to full brilliance on an oncoming dissolve when you tell it to go OFF before it has reached its full intensity nor all the way OFF when you are doing a dissolve OFF and tell it to come ON again. This now allows you to do a ripple dissolve effect or what is termed a continuous dissolve effect.

SMOOTH used in conjunction with Freezes in a Loop can prolong dissolves to obtain very long dissolve rates.

EXAMPLE:

	CODE	STATEMENT	SCREEN	
1.	SG	SMOOTH GO		
2.	32A	32 SEC ALT	1	L GO
3.	LL	LOOP LOAD	1	
4.	FZ	FREEZE	1	L
5.	W.2	WAIT .2 SEC		
6.	LG	LOOP GO	1	

This example will produce a Dissolve approximately 60 seconds long.

You will have to adjust the wait times to ensure that there is not too much wait time which would make the dissolve effect appear jerky on the screen--unless that is what you want. Remember that SMOOTH affects ALL screen areas. If you were to start the above example, you will not be able to remove the smooth effect until all 60 seconds of the dissolve have elapsed or the dissolve would not look smooth.

You can also use SMOOTH with BLINKs and LOOPs in other ways:

EXAMPLE:

	CODE	STATEMENT		SCREEN
1.	NO	NO OPERATION		GO
2.	SG	SMOOTH GO		
3.	4A	4 SEC ALT	1	LCR GO
4.	BG	BLINK GO	1	
5.	W2	WAIT 2 SEC		
6.	RP12	REPEAT 12 TIMES		

In this example you will see the dissolve never reaches full brilliance on the screen and has a rippling and blinking effect at the same time.

You will find many new effects possible with the new "D" DOVE. We recommend that you order the "D" Dove Exercise kit which contains both slides and sample programs if you would like additional examples.

APPENDIX 1. TROUBLE SHOOTING GUIDE

There are times when you may experience difficulty in either programming or running a show. In our experience we have come to be familiar with some of the more common problems. The following list details some of these common problems and lists them in order of likely occurance.

1. Operator Error - This is the most common source of problems. Either the equipment has not been interconnected properly, a switch is not set to the correct position, or a procedure has not been followed properly. Take time to double check everything. Do not overlook possible tape problems if you are running a canned show. Are all switches set correctly on the tape recorder and is the output volume set correctly? Are you reading the correct track? Don't panic, take your time and check everything.

2. A-C Power Problems - A poor ground can cause problems. Always use an A-C Receptacle Tester, available for less than $7 at most electrical supply stores, to test your power source. The EXPANDED ROAD RUNNER SYSTEM should ALWAYS be plugged into a good three wire grounded circuit. Carefully check temporary power supplied to you at hotels or other show sites.

   Along this line, another source of problems can be caused by ground loops between different pieces of equipment. Screen action malfunctions and hum in the sound system are a good indication that you might be having this problem. The safety ground is theoretically almost a zero impedence to ground for all powered devices in the power distribution system, but this is not <u>always</u> the case. If the sound system is some distance from the programming equipment it may be on a different part of the house power distribution system. If its impedence to ground is not low enough a ground loop is established.

   Occasionally a piece of equipment may be causing the problem due to A-C power leakage to an equipment chassis ground. To check for this condition, remove each plug one at a time to isolate the equipment causing the problem. Projectors are particularly vulnerable to this problem.

3. Problems in the EXPANDED ROAD RUNNER SYSTEM - If the problem still seems to be internal to the EXPANDED ROAD RUNNER, try the following:

A. Mag Tape Problems. The EXPANDED ROAD RUNNER SYSTEM allows you to self test its Mag Tape record/play circuit. To test this function follow the procedure described in the SELF TEST section of the manual.

If the mag tape SELF TEST fails there is a problem in the mag tape circuitry. MAKE SURE THAT THE CORD YOU USED FOR THE TEST IS NOT BAD.

B. Memory Problems - If you suspect that the memory in your EXPANDED ROAD RUNNER SYSTEM may be faulty, try the memory tests described in the SELF TEST section of the manual.

C. Disk Related Problems - The disk operating system has many checks and associated error messages. Messages such as "DISC DRIVE NOT REAY", "DISC READ ERROR", "DISC SEEK ERROR", "READ ERROR ON DIRECTORY", "PACKING ERROR OCCURED", "DISC WRITE ERROR", or "DISC VERIFY ERROR" indicate a problem or failure in this area. Possible causes are as follows:

1. Disk not inserted, or not inserted correctly
2. Disk Drive Gate not closed
3. Disk Drive not connected to EXPANDED ROAD RUNNER SYSTEM
4. Defective Diskette
5. Defective Disk Drive
6. Defective Disk Control Circuitry

If the EXPANDED ROAD RUNNER SYSTEM displays the message "INVALID WRITE REQUEST", it is likely to do something that could be dangerous to the health of your diskette. Either re-boot the system immediately by turning the AC power switch OFF and then ON, or remove the diskette quickly and attempt a MT dump.

Should any problem arise that you can not solve, first try to contact your local AVL Dealer for assistance. If that is not possible, a service technician can be reached 24 hours a day by calling AVL's New Jersey number. The number is (201) 291-4400.

APPENDIX 2. VERSION 5 QUICK REFERENCE GUIDE

PROGRAMMING COMMANDS

ENTER UNDER CODE HEADING

AT	ALTERNATE
FA	FAST ALTERNATE
1A	1 SECOND ALTERNATE
2A	2 SECOND ALTERNATE
3A	3 SECOND ALTERNATE
4A	4 SECOND ALTERNATE
6A	6 SECOND ALTERNATE
8A	8 SECOND ALTERNATE
16A	16 SECOND ALTERNATE
32A	32 SECOND ALTERNATE
CT	CUT
HC	HARD CUT
1D	1 SECOND DISSOLVE
2D	2 SECOND DISSOLVE
3D	3 SECOND DISSOLVE
4D	4 SECOND DISSOLVE
6D	6 SECOND DISSOLVE
8D	8 SECOND DISSOLVE
16D	16 SECOND DISSOLVE
32D	32 SECOND DISSOLVE
AX	AUXILIARY FOR DOVES
BG	BLINK GO
BS	BLINK STOP
FZ	FREEZE
HOME	PROGRAMMABLE HOME
LDxx	PROGRAMMABLE LOAD FILE xx
LG	LOOP GO
LL	LOAD LOOP
LS	LOOP STOP
N	NO OPERATION
PF	PROJECTOR FORWARD
PR	PROJECTOR REVERSE
PS	PRESET
RP0	REPEAT ZERO
RPX	REPEAT X (TO BE RESOLVED)
RPxx	REPEATxx TIMES
S10	SPEED-10 CUES PER SECOND
S20	SPEED-20 CUES PER SECOND
SG	SMOOTH GO
SS	SMOOTH STOP
TBxx	TABxx
TMxx	TIME IN .01 SECOND STEPS
TX	TIME X (TO BE RESOLVED)
W.05-W10	WAIT IN .05 SECOND STEPS
WX	WAIT X (TO BE RESOLVED)

PROGRAMMING COMMANDS CONT'D

ENTER UNDER SCREEN HEADING

G	GO
S	STOP
P	PROCEED
12345	SCREEN NUMBERS ON OUT 1
67890	SCREEN NUMBERS ON OUT 2
ABC	A, B, C
LCR	LEFT, CENTER, RIGHT
TCB	TOP, CENTER, BOTTOM

EDITING COMMANDS

CTRL/A	ADD-A-CUE
CTRL/B	REVERSE TO LAST TAB
CTRL/C	CONTROL COMMAND FIELD
CTRL/D	DELETE CUE
CTRL/F	FILM DISCONNECT/NORMAL
CTRL/G ENTER	HOME PROJECTORS
CTRL/G--	GOTO CUE--
CTRL/G,T,M,	GO TO TIME HH:MM:SS:FF
CTRL/N	DISPLAY NOTES/NORMAL
CTRL/P	SLIDES DISCONNECT/NORMAL
CTRL/Q	STEP REVERSE CUE
CTRL/R	REPEAT PREVIOUS CUE
CTRL/S	STANDBY
CTRL/T	GOTO NEXT TAB
CTRL/T,xx	GOTO TABxx
CTRL/X	AUX DISCONNECT/NORMAL

EDITING COMMANDS CONT'D

CUE	CUE
ENTER	ENTER
ESC	EACAPE
Q	STEP CUE
REPEAT	REPEAT DEPRESSED KEYS
RETURN	SAME AS ENTER
RUB OUT	CLEAR ENTRY
	REVERSE CUE
<--	CURSOR LEFT
-->	CURSOR RIGHT

CONTROL COMMAND FIELD ENTRIES

EDITING CONTROL COMMANDS

BPF	BEEPER OFF
BPN	BEEPER ON
CAC	CLEAR ALL CUES
CLN	CLEAR NOTES
CUES	DISPLAY TOTAL CUES
ESN	EXCHANGE SCREEN NUMBERS
IAMxx	CHANGE OPERATORS NAME TO xx
KBF	KEYBOARD EDIT OFF
KBN	KEYBOARD EDIT ON
NEW	ESTABLISH NEW HOME POINT
NOTES	EXAMINE AND EDIT NOTES
PA	PROJECTOR ASSIGNMENT
PGMxx	CHANGE PROGRAM NAME TO xx
RCF	REMOTE CUE OFF
RCN	REMOTE CUE ON
RTCx,y	REPLACE TIME CUES WITH TX
SEQ2	PROJECTOR SEQUENCE 2
SEQ3	PROJECTOR SEQUENCE 3
TOCx,y	TIME OFFSET CUES HH:MM:SS.FF
TPO	TRAY POSITION OFFSET
XSN	EXPAND SCREEN NUMBERS

CONTROL COMMAND FIELD ENTRIES CONT'D

MEMORY/DISK DATA TRANSFER COMMANDS

APxx	APPEND FILExx
CNPxx	CLEAR NAME PROTECTxx
CWPxx	CLEAR WRITE PROTECTxx
DELxx	DELETE FILExx FROM DISK
DLCxx,yy	DELETE CUES xx TO yy
DSKx	USE DISKx
INSxx	INSERT FILE NAMEDxx
LDxx	LOAD FILE NAMEDxx
LIB	LIBRARY
NLDxx	NOTES LOADxx
NPRxx	NAME PROTECTxx
NSVxx	NOTES SAVExx
PACK	PACK DISK
RNMx,y	RENAME FILE x AS y
SV	SAVE
SVxx	SAVE WITHxx AS FILE NAME
SCxx,yy,nn	SAVE CUES xx TO yy AS nn
WPRxx	WRITE PROTECT FILExx

MAG TAPE CONTROL COMMANDS

CEM	CLOCK EDIT MODE
CIM	CLOCK INPUT MODE
COM	CLOCK OUTPUT MODE
COM hh:mm:ss	CLOCK OUTPUT BEGINNING AT TIME hh:mm:ss
MIF	MAG TAPE INPUT OFF
MIN	MAG TAPE INPUT ON
MLD	MAG TAPE LOAD
MOF	MAG TAPE OUTPUT OFF
MON	MAG TAPE OUTPUT ON
MSV	MAG TAPE SAVE
MTD	MAG TAPE DUMP (SP V)
PIF	POSITRAK INPUT OFF
PIN	POSITRAK INPUT ON
POF	POSITRAK OUTPUT OFF
PON	POSITRAK OUTPUT ON
STL	SET LEVELS
VER	VERIFY (MSV ONLY)

COMMANDS FOR EXPANDED ROAD RUNNER PERIPHERAL EQUIPMENT

RAVEN PROGRAMMING COMMANDS

FFxx	FILM FWD @ xx FRAMES PER SECOND
FRxx	FILM REV @ xx FRAMES PER SECOND
	NOTE: 1,2,3,4,6,8,12,18 OR 24 FPS
FFS	FWD STEP THE FILM ONE FRAME
FRS	REV STEP THE FILM ONE FRAME
FS	FILM STOP
FB	FILM BEGIN POINT
=	xxxxx (1-65535)
FE	FILM END POINT
=	xxxxx (1-65535)
FTN	FILM TRACKING ON
FTF	FILM TRACKING OFF
Fx	FILM SPEED CHANGE BY +x% 1 THROUGH 6
F-x	FILM SPEED CHANGE BY -x% 1 THROUGH 6
F.x	FILM SPEED CHANGE BY +x% .1 THROUGH .9
F-.x	FILM SPEED CHANGE BY -x% .1 THROUGH .9
F0	FILM SPEED NORMAL
MN	MOTOR ON
MF	MOTOR OFF
LN	LAMP ON
LF	LAMP OFF

RAVEN EDITING COMMANDS

AF	ASSIGN FILM SCREEN NUMBERS
FS+	FILM FWD ONE FRAME
FS-	FILM REV ONE FRAME
FOCx,y +/-	FRAME OFFSET CUES + OR -

X-15 PROGRAMMING COMMANDS

XS	SHORT PULSE
XL	LONG PULSE
XN	LATCH ON
XF	LATCH OFF

APPENDIX 3. AVL DIGITAL SYSTEMS CUE CHART

LEVEL	D	D	D	D	C	C	C	B	B	A
	EXPRR	RR	EAGLE	D DOVE +Cyoti	QD	SPVC	SPVB	PD	SPVA	SPIII
HARD CUT	X	X	X	X	X	X	X	X	X	
CUT	X	X	X	X	X	X	X	X	X	X
1 SEC DIS	X	X	X	X	X	X	X	X	X	
2 SEC DIS	X	X	X	X	X	X	X	X	X	X
3 SEC DIS	X	X	X	X	X	X	X			
4 SEC DIS	X	X	X	X	X	X	X	X	X	X
6 SEC DIS	X	X	X	X	X	X	X			
8 SEC DIS	X	X	X	X	X	X	X	X	X	X
16 SEC DIS	X	X	X	X	X	X	X	X	X	
32 SEC DIS	X	X	X	X	X	X	X	X	X	
FAST ALT	X	X	X	X	X	X	X			
ALTERNATE	X	X	X	X	X	X	X	X	X	X
1 SEC ALT	X	X	X	X	X	X	X	X	X	X
2 SEC ALT	X	X	X	X	X	X	X	X	X	
3 SEC ALT	X	X	X	X	X	X	X			
4 SEC ALT	X	X	X	X	X	X	X	X	X	
6 SEC ALT	X	X	X	X	X	X	X			
8 SEC ALT	X	X	X	X	X	X	X	X	X	
16 SEC ALT	X	X	X	X	X	X	X	X	X	
32 SEC ALT	X	X	X	X	X	X	X	X	X	
AUX	X	X	X	X	X	X	X	X	X	X
BLINK GO	X	X	X	X						
BLINK STOP	X	X	X	X						
FREEZE	X	X	X	X	X	X	X			
HOME	X	X	X	X	X	X	X	X	X	X
LD FILExx	X		X							
LOOP GO	X	X	X	X						
LOAD LOOP	X	X	X	X						
LOOP STOP	X	X	X	X						
NO OPERATION	X	X	X	X	X					
PROJ. FWD	X	X	X	X	X	X	X	X	X	X
PROJ. REV	X	X	X	X	X	X	X	X	X	X
PRESET	X	X	X	X	X	X	X	X	X	
REPEAT	X	X	X	X	X					
REPEATX	X	X	X	X	X					
SPEED 10	X	X	X	X	X	X	X			
SPEED 20	X	X	X	X	X	X	X			
SMOOTH GO	X	X	X	X						
SMOOTH STOP	X	X	X	X						
TABxx	X	X	X	X	X					
TIME CUES	X	X	X	X	X					
TIME X	X	X	X	X	X					
WAIT	X	X	X	X	X	X	X	X	X	X
WAIT X	X	X	X	X	X					
GO/START	X	X	X	X	X	X	X	X	X	X
STOP	X	X	X	X	X	X	X	X	X	X
PROCEED	X	X	X	X	X					

APPENDIX 4. EXPANDED ROAD RUNNER SYSTEM SPECIFICATIONS

ROAD RUNNER

SIZE 3 3/4"H X 16 3/4"W X 11"D
WEIGHT 8LBS
ELECTRICAL 115/230 VAC, 50/60HZ, 1 AMP MAX

RX1 EXPANDER BOX

SIZE: 2 3/8"H X 15 1/4"W X 8 3/4"D
WEIGHT: 10 LBS
ELECTRICAL: 115/230 VAC, 50/60HZ, .5 AMP MAX
(EXCLUDING DRIVE AND MONITOR)

VM5 MONITOR

SIZE: 5"H X 6 1/4"W X 9 1/2"D
WEIGHT: 7 LBS
ELECTRICAL: 12VDC, 1.8 AMP MAX, 5VDC, .7 AMP MAX

FD1 DRIVE

SIZE: 3 1/2"H X 6"W X 9 1/2"D
WEIGHT: 6 LBS
ELECTRICAL: 12VDC, 1.8 AMP MAX, 5VDC, .7 AMP MAX

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