



TRAX 3 MEETS THE REAL WORLD

By Mike Fahl

A new version of TRAX, Dataton's Macintosh control software, is now available. TRAX 3 combines unique timeline-based and interactive control with an intuitive graphic user interface, making it the ideal solution for demanding installations like visitor centers and museums. In this article, Dataton's Mike Fahl walks you through two such typical TRAX 3 installations.

DATATON TRAX®, our Macintosh-based true multimedia integration software was introduced in 1990. Through its intuitive graphical user interface, it provided timeline-based control over virtually any kind of equipment likely to be used in a presentation system.

Together with SMARTPAX—our general purpose device interface box—you could use it to run anything from basic lighting and sound, through multi-screen slide shows, and all the way up to very large presentations including multiple video projectors, lasers, animatronics, etc.

TRAX version 2, presented in 1992, added a wide range of new capabilities and user interface enhancements. It greatly increased the number of devices you could control, and added many time-saving, interactive features, such as the "Live Edit" mode of sound, lighting and video cues. Perhaps the most important new feature was the unique, built in Device Information database, that provides instant access to all information you need in order to control a particular device (see Figure 1).

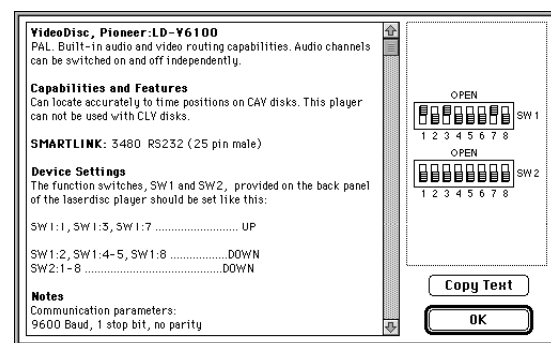


Figure 1. Example of a Device Information Database entry for a laserdisc player.

Despite the dramatic changes between versions 1 and 2, TRAX basically retained its linear, single-timeline structure. While this was appropriate for preprogrammed, "canned", presentations, it didn't lend itself well to more complex or interactive applications, or applications using more than one presentation area. Other products were available to handle interactive and other "input driven" presentations. But those products were difficult to program, and didn't have any built-in support for tightly synchronized, timeline based sections.



TOUCHLINK, Dataton's new touch panel, is configured from TRAX 3. A simulation of the touchscreen look and functions is presented on the TRAX computer screen.



SMARTPAX front panel

TRAX 3 overview

TRAX 3 was designed to unite timeline-based and interactive "roomcontrol" functions, while maintaining the same easy to understand, icon-and-mouse driven user interface. Active inputs—such as sensors, buttons, faders and the new TOUCHLINK touchscreen—in conjunction with powerful triggering conditions based on these inputs and other information, form the foundation of TRAX 3. The Task window (Figure 6) lists the Actions that can be performed as well as the Conditions under which these actions will be initiated.

Such a triggering condition can be anything from a simple switch input to a complex expression involving the current state of the system, sensors and direct user input, the time of the day, etc.

Being a true, real-time, multi-tasking system, TRAX 3 allows you to initiate actions at any time, and run them concurrently. You can use this to run different aspects of the same show, or to run totally independent presentations in separate rooms. A powerful priority mechanism automatically resolves most potential conflicts that can occur in such a complex system.

In addition to those complex actions that you can build by adding cues and timelines to the Task window, you can also program simple, one-to-one remote control of devices by linking buttons and sliders on a touch panel directly to the functions you want them to control.

By fully exploiting the inherent power of the graphical user interface, TRAX 3 allows you to accomplish all this without having to type in lines and lines of cryptic computer commands. Most functions can be created just by clicking and dragging objects on the computer screen.

OK. Enough of the sales-pitch talk. If you've read this far, you're probably pretty serious about these things. And you probably want to know exactly how you can use all this multi-tasking, multi-timeline hoopla to help you solve your every-day control requirements. So here follows some down-to-earth case studies that I hope will prove to you that TRAX 3 means business (literally!).

Managing visitor centers and museums

A visitor center or museum is a typical example of how TRAX 3 can create powerful, flexible and yet cost effective control solutions. This is a list of what constitutes such an installation and its visitors from a control point of view.

- Visitors arrive at the entrance individually or in groups, where they typically pay their admission and get some general information.
- Visitors may be grouped according to age and/or language, or requiring special attention in other ways.
- A holding area. This is useful if you want to create groups of visitors for guided tours, language-specific presentations, etc. It can also be used to create a certain mood or prepare the visitors in other ways. Lighting, sound, and sometimes video are often used in this area.
- The exhibition itself may consist of many smaller areas, through which the visitors are supposed to proceed in a predetermined order, or a larger area in which they can move about freely, or a combination.
- When using a sequence of smaller rooms, you could try to arrange it so that the visitors stay together. Automatic doors between the rooms are effective. Other options include guidance by sound and light, or a real "human" guide.

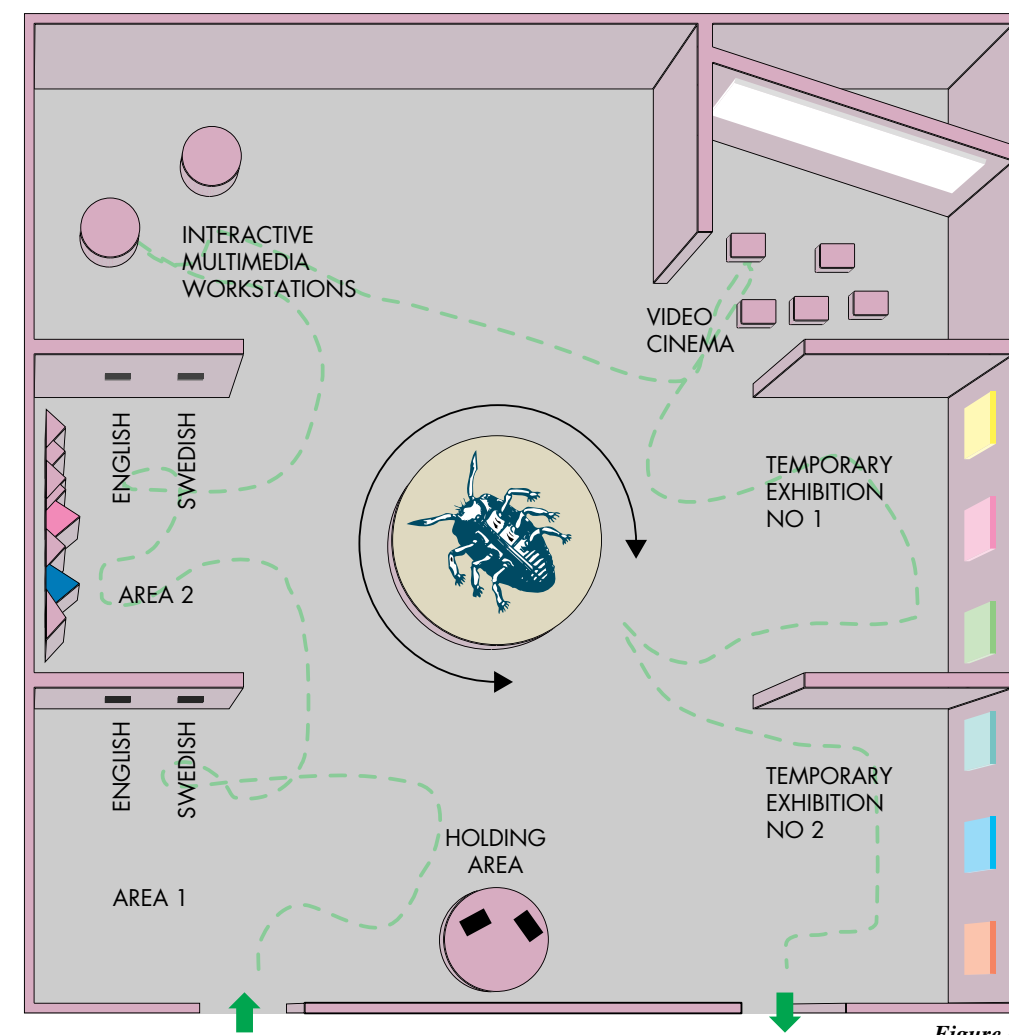


Figure 4.

- You may want to control the "pace" of the presentations, allowing you to push more visitors through during peak hours. This could be determined by time of day, number of visitors, or manually.
- If you allow the visitors to move about freely in a larger area, you may want to provide interactive exhibits that

come to life as visitors approach them, or are started manually by pressing buttons. This may also include manual or automatic language selections.

- You may want some scheduled events, such as a film or video, running every 30 minutes or so. This requires appropriate announcements to gather the visitors. It may also affect the interactive exhibits if they are close by, for example reduce their sound levels or disable them altogether.
- When it's time to close for the day, you want the system to help you gently usher out any remaining visitors. This can be accomplished by sound announcements, turning of exhibits, dimming the lights in the inner rooms, etc.

Let's start with the "move about freely" scenario, as shown in Figure 4. This could be one floor in a museum for modern art. To the left of the entrance door, there are two fairly ordinary exhibits. A short story, accompanied with some basic lighting control and a video sequence, can be started manually by pressing a language selection button. Each such button triggers a short timeline in TRAX which selects the appropriate sound track from a laserdisc or CD and then starts a common timeline. In other words, except for the initial language selection, each presentation is identical.

The centerpiece is an interactive metal sculpture that looks like a big, moving beetle. It turns itself around towards the most active area along its perimeter. This is accomplished using eight narrow-sector motion detectors, mounted in the ceiling above the sculpture. A motor under the beetle turns it around while small pneumatic cylinders drive its legs up and down.

In the far left corner, there are two computers connected to Internet, configured to make it easy to access appropriate web-pages. Here, visitors can browse the virtual word of contemporary art. The computers can also be accessed from the control system to make them change pages automatically when nobody is using them.

In the far right corner, there's a cinema, showing a 10 minute video every 20 minutes, with appropriate announcements a few minutes in advance. The video only runs when there are visitors on this floor. The projection room also serves as the control room for that floor, containing the control system, lighting dimmers, video and CD players, etc.

On the righthand side, there are two areas for temporary exhibitions. These areas are changed every few months or so. Some may be purely static displays, requiring only basic lighting control, while others may require more sophisticated control. They can be pre-programmed off-site on another computer. When the exhibit is installed, its related device icons, timelines and other tasks can be transferred to the TRAX computer in the control room.

Figure 5 below shows the layout in the TRAX Device window. The various functions have been arranged according to their position in the room, even though most of the equipment is actually installed in a rack in the control room.

The first two exhibits are almost identical from a control point of view. There are two buttons in each exhibit which the visitors can press to start a short story. The first one is just sound and lighting, with the sound coming from a CD. The second has lighting control and video from a

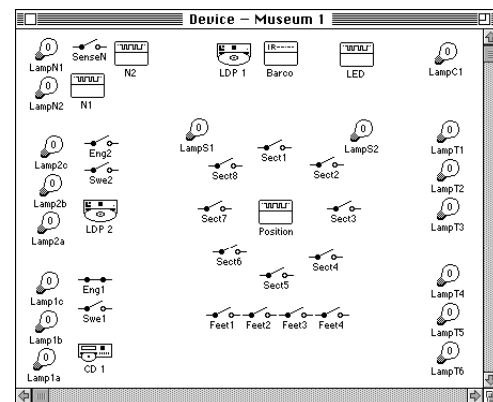


Figure 5. Museum Device Layout.

laserdisc. Each button starts its own timeline, which selects the appropriate sound channel and then starts a common timeline. Thus, there are three timelines for each of the two exhibits, as shown in Figure 6.

ID#	Condition	Action
1	Eng1:Input On	Exhibit 1 Eng
2	Swe1:Input On	Exhibit 1 Swe
3		Exhibit 1 Com
4	Eng2:Input On	Exhibit 2 Eng
5	Swe2:Input On	Exhibit 2 Swe
6		Exhibit 2 Com

Figure 6. Exhibit area 1 and 2 Tasks.

Figure 6 shows you how the Input status of the button named Eng2—which you can see in the Device window in Figure 5—is used as a trigger condition for the timeline named "Exhibit 2 Eng". You attach a trigger condition to a task by clicking in its Condition column in the Task window and then selecting the desired function from a device (in this case, the function named Input On).

Looking inside the timeline named "Exhibit 2 Eng" reveals a very simple task, consisting of only two cues, as seen below in Figure 7. To open a timeline, double-click its name in the Action column of the Task window.

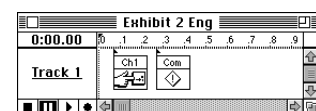


Figure 7. The "Exhibit 2 Eng" timeline.

The first cue tells the laserdisc player to select audio channel 1. The second is a System cue that starts the common timeline that handles all the rest. Remember, all functions except the language selection were the same, so it's more convenient to use a common, secondary timeline than to duplicate the same set of cues in both the primary timelines. Double-clicking the System cue shows you exactly what's going on (Figure 8).

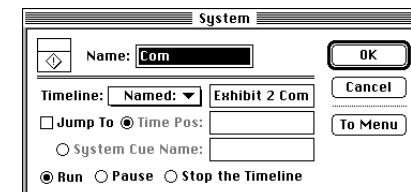


Figure 8. System cue starting another timeline.

While all this seems fairly straightforward, there's one more important question to be asked. This is a question that's often overlooked, resulting in strange behavior from the visitors point of view. What happens if someone presses the Swedish button while the English show is running? TRAX handles this situation automatically using its built-in priority mechanism. Assuming that the English and Swedish shows both have the same priority, one will not be able to interrupt the other. This default behavior can be overridden if desired, either by changing the priority of one of the timelines—allowing one to override the other, but not vice versa—or by adding System cues that specify exactly what's supposed to happen. For example, you may want to allow either the English or the Swedish button to interrupt the other, allowing the visitor to correct the mistake if he pressed the wrong button.

To complete the control system, just keep adding tasks and triggering conditions in this way, one at a time. Many tasks will consist of only a single cue, or a very short timeline. The only longer timeline in this installation is the one running the video in the cinema, which is 20 minutes in total.

The centerpiece is controlled by eight motion sensors, each triggering its own timeline. This timeline contains a cue that rotates the beetle in the direction of the sensor. They all then trigger a common timeline which sequences the beetle's feet, using the four outputs name Feet1 through Feet2. Each output switch controls one pair of feet though small, pneumatic cylinders, resulting in a nice sound effect at the same time.

Controlling the flow of visitors

In some cases, it may be desirable to control the way visitors move through the various areas. Here, the control system can take on a more active role, acting as a guide for the visitors. Figure 9 shows such a visitor center, with an admission desk up front, where you can also buy souvenirs on the way out.

After waiting in line in the holding area, you enter the first room. Automatic doors, together with carefully controlled lighting and sound, ensure that the groups move through the rooms as they should. There can be up to five groups in progress at a time—one per room. The system will make sure that the doors open and close in such a way that the groups will not bump into each other. This maximizes the flow of visitors while at the same time maintaining the illusion that each group gets its own special treatment.

Each group can have its own language selection, and there's a special "kids" version of the show (English only) with the more scary aspects of the story being deleted. The desired show is started manually by the staff from a TOUCHLINK panel in the reception desk (Figure 10).

Notice the "Ready for Next Group" indicator that turns on when the first room is empty. There's also a progress bar showing how many groups are currently in progress. While this page contains the information and

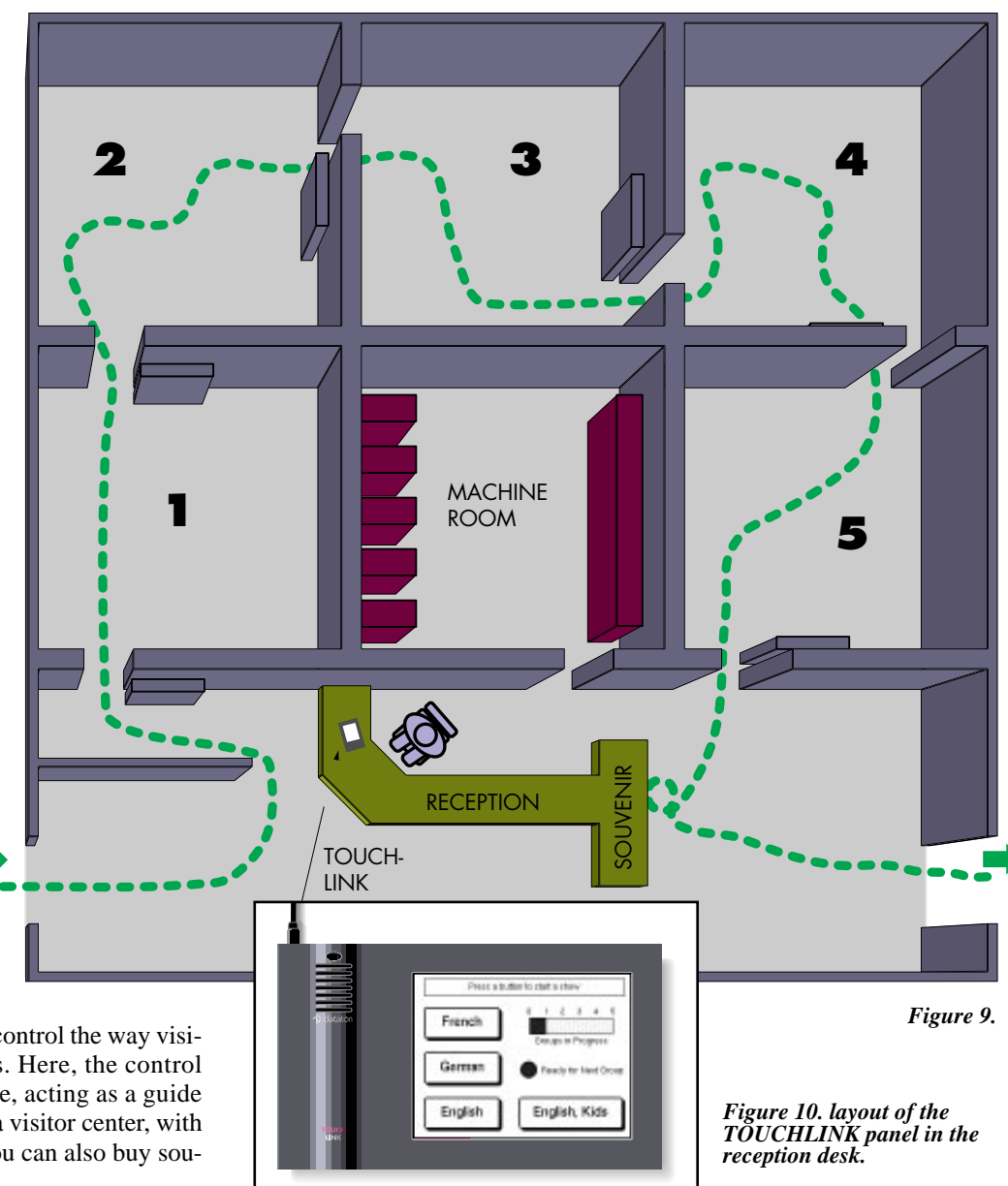


Figure 9.

Figure 10. layout of the TOUCHLINK panel in the reception desk.

► buttons used most of the time, other pages may be provided for more detailed control or other special purposes.

Owing to the arrangement of the rooms, with the control room in the middle, almost all equipment can be located in the control room, which simplifies wiring and maintenance. Each room has a basic set of equipment consisting of a CD player and one or more lighting channels. Most rooms also have video. Some rooms have more than one monitor. The monitors can be controlled, thereby allowing the video to be displayed at either one or both at the same time. The last room also has a small fog machine (see Figure 11).

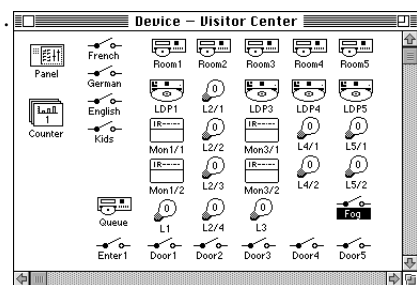


Figure 11. Visitor Center Devices.

Note the icon representing the TOUCHLINK control panel in the upper left corner, with the group counter just below. This counter is used to maintain the "groups in progress" indicator bar on the panel. Other similar counters could be added to accumulate statistics about the number of individuals, groups, language selections, etc. There's an extra CD player for the queue holding area, and a switch to open the first door. The four switches above the Queue CD player are "virtual" switches, used to start the timelines from the corresponding buttons on the touch panel.

The programming of each room consists of five timelines; one for each language, one for the actions common to all the languages, and one for the children version of the show. As all three main versions are identical, except for the initial language selection, they are handled by a common timeline that's started from the language specific timelines after selecting the appropriate track on the CD player. The only exception is the children version, which has its own timeline altogether in two of the rooms. Just before reaching its end, each timeline starts its corresponding timeline in the next room. That timeline starts the CD at the appropriate track, opens the door, and the show goes on.

As the sound track from the CD player acts as the guide for each room, the state of the CD player can also be used as an indicator of the room's state. If the CD player is stopped then the room is idle and ready to receive new visitors. Figure 12 shows an example of how you can use this. As you can see, the triggering condition of task #1 states that in order to start the "French 1" timeline, the input switch named French must be pressed and the CD player in room 1 must be stopped. This is sometimes called a

"logical AND expression". TRAX provides a full range of logical and arithmetic operators on the Symbol menu. They can be used to form complex triggering conditions, including all kinds of input signals and system status.

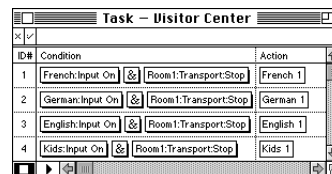


Figure 12. Conditional triggering of tasks based on input signals and the system's current status.

Conclusion

As I hope I've been able to show you, TRAX 3 extends its familiar icon-and-mouse driven Device and Timeline metaphor into a new dimension by adding multiple timelines, powerful task triggering conditions and enhanced System cues. TRAX 3 empowers you to handle control requirements that previously required complex computer-language programming, or—in some cases—couldn't be done at all.

When I started writing this article, I had a long list of applications I wanted to show you, such as conference room automation, AV equipment rental integration and enhancements of in-store displays using interactive lighting, sound and video. But as I see I'm already out of space, I guess I'll save that for the next issue. But by then I suspect some of you will have already come up with new, incredible, applications for our baby. It's always happened in the past. Creative people have a tendency to do wonderful things, given the proper tools.

Surprise me!

Circle 19

Mike



Mike Fahl, R&D manager at Dataton, has been working with development of software for multimedia products at Dataton since 1980.