Film-Tech

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TA-10

THEATRE AUTOMATION

INTRODUCTION

Concept

Component Engineering's TA-10 Theatre Automation System
is a moderately priced hybrid system which uses a sequencer
to perform those tasks which are the same in all programs,
and a simple cue coding scheme which allows the film itself
to carry commands for other functions. There are not many
dedicated functions, but there are lots of outputs. They
just have not been assigned. The idea, rather, is that the
functions will be determined by the theatre's engineer. It
is a box full of tools with which each individual
installation can be tailored to its own needs.

Description

There are two parts to this system. One part is the
sequencer and its outputs, and the other part is the cue
decoder and its outputs. The sequencer creates outputs at
any of 5 Events, and the decoder creates outputs from any of
7 discrete cues on the film.

We shall describe the "events", the event outputs, and
then do the same for the decoded discrete outputs.

The 5 "Events" which occur in all programs are:

        1)   START (when the button is pushed)
        2)   START plus 7 seconds
        3)   INTERMISSION CUE
        4)   End of INTERMISSION SEQUENCE
        5)   Film RUN-OUT

Each of these Events puts a pulse (all pulses in this
system are of about 1/3 second duration) on an output "line"
to which can be connected one or more of the 6 pilot relays
provided. This is done by means of jumpers or diodes on the
main circuit board. This matrix is programmed by the
installer according to the design plan for the theatre.
These contacts are rated at 300mA.

There are also some fixed outputs controlled by most of these Events. These take the form of large relays capable of handling directly the elements they are intended to control (i.e., drive motor, douser coils, etc.). The normal operation of each of these will be described below. Things are different in the "Interlock" mode, but that will be discussed in the appropriate chapter.

MOTOR RELAY (K1)
        This relay is energized at Event 1 and stays closed until Run-out. Its contacts are SPDT Break/Make with all contacts brought to the terminal strip.

LAMP RELAY (K2)
        This relay is energized at Event 1 and stays closed until Run-out. The available contacts are SPST Make.

DOUSER CLOSE RELAY (K3)
        This relay is pulsed at Event 1 (just for insurance) and also pulsed at Event 4. The available contacts are SPST Make and the common is shared with the Douser Open relay.

DOUSER OPEN (K4)
        This relay is pulsed at Event 2. Its contacts are just like the Douser Close with which it shares its Common.

INTERLOCK RELAY (K5)
        This optional relay is intended for switching "Selsyn" motors or other interlock control. All units have this socket, but the relay is installed only on request

UTILITY RELAY (K6)
        This relay can serve several purposes. It comes connected as a "Show Running" relay. As such, it is operated at Event 2 and released at Event 4. (In other words, it energizes when the Douser opens and releases when the Douser closes.) Its contacts are SPDT Break/Make with all elements available. (Possible uses would be such things as dousers which require maintained current, exciter lamp switching, etc.) By means of a strapping change on the circuit board this relay can be used as a "Show End" or "Motor Off" relay. In this mode it will pulse at Event 5, and might be used to release the self-latching circuit of a motor contactor. Other configurations will be discussed in the design section.

INTERMISSION SEQUENCE
        This is a user determined time interval which begins with a cue from the film, and ends when the time interval has elapsed. The interval is set by means of DIP switches on the Micro Controller Unit (MCU) plug-in assembly.

CODED CUES

Up to 7 different discrete cues can be put on the film,
each one of which has its own output. The 7 outputs
are possible because of the FM-35 Cue Detector which
incorporates a sensor capable of reading 3 different
cue patches on the film. The trick is to not think of
them as three cues, but to think of them as the
elements of a 3 bit binary code. This means that from
combinations of the three cues on the film, there are 8
possible outputs (or "states"). One of these "states"
is 0, which leaves 7 more for us to use. All of these
outputs pulse pilot relays. The contacts are rated a
300 mA.

DATA LINK

Multiple TA-10 systems can be tied together via a
standard 2 conductor shielded cable. This feature
allows them all to talk to each other and/or a central
control and monitoring station. Also, this is how 2 or
more houses are run interlocked with each other.

These are the tools. The next step is to design your
own system.

DESIGNING A SYSTEM

What do you want to happen when?

Write out the most complicated program you are likely to have to run, but do it in two columns. One column will show those things which will always happen at the same point in the program, and the other column will show those things which are governed by the film. Now, while checking the list of "Events", give each of the "always the same" entries an "E" number.

Next you will want to refer to Figure 1. and assign "Q" numbers to the list, but first, there are a few things to consider. It is a good idea to try to make the most frequently used cues the ones that are easiest to apply. Try to save the edge-only cues for those functions which might have to be triggered while there is picture on the screen. Don't get too fancy. You have only 7 cues and one has to be reserved for "Intermission".

At this point you need to know more about the "Intermission" cue. This cue is used for several purposes besides beginning the Intermission Sequence. It all depends upon where you are in the program. After the douser is open and the show is running, triggering "Intermission" will begin the Intermission Sequence as you would expect. After the douser has closed, but the film has not run out, another "Intermission" cue will re-start the show by initiating the normal 7 second Start Sequence. This feature can be used by those who like to put a "Curtain Call" in their program. It also can be used when making a lens change. See "Operating Instructions" for more on this Cue.

After you have made your choices you can go back to your list and fill in the "Q" numbers. Please see the next page for a sample list with all the assignments made. Note that the dedicated functions are not listed.....only the user defined ones.

You can see how it works. The standard parts of the show are controlled by the events, but the mid-show changes are controlled by the discrete cues. For this example, it has been decided that the house standard is to Mute the Non-Sync at show start, so this function is tied to an Event (E1) rather than a Cue. It is also tied to another Event (E4) at the end of the show

As most trailers now are in a Stereo format, we save cueing by using E2 to bring in Stereo Sound. (Mono Sound can be called for by Q2.) If there is a mono trailer or Logo, a Cue will have to be added.

As both the event relays and the "Q" relays are double pole relays, functions that are always preformed together can be wired to the separate poles of the same relay. An The following example assumes a dimmer system that allows for half-light, which is triggered by E1. Q3 takes them down the rest of the way, while Q4 will bring them back to Half during the closing credits.

Sample Program

```
Lights to Half     E1
Mute Sound         E1
Stereo "A"         E2
```

                    (Previews now on screen)

                                      *
                         Lights Down Full Q3
                         SR/Digital sound Q7

                    (Feature now on screen)

                         Light to Half   Q4
                         Intermission   Q1

```
Mute Sound         E4
Non-Sync Sound     E5
```


    * Should you have a lens changer you might add the
following after the previews.

                         Curtain Call   Q1
                         Lens Change   Q6
                         End Curtain Call Q1

    In summary:

    The Cue assignments are: The event relays are:

        Q1   Intermission   Mute Sound
        Q2   Mono   stereo "A" Sound
        Q3   Lights Down   Non-Sync Sound
        Q4   Lights to Half   Lights to Half
        Q5   Stereo "A"   Lights Up
        Q6   Lens Change
        Q7   SR/Digital sound

    Q1 was used for "Intermission" because it is probably
needed more than any other, is easy to put on, and is easy
to trip manually. Q2 for Mono is admittedly in the picture
area, but sound cues tend to be applied on or near the
head-end splice where it is likely to be black.

    Q3 is another which is probably going to be placed in
the black between the end of a trailer and the beginning of
the feature. Q4, on the other hand, is most apt to be
wanted just before the start of the closing credits where it
might show on the screen.

Q6 is another which will be used when the screen is dark.

There are bound to be needs not provided for in this system, and others which may well be possible but not outlined in these instructions. If you have questions or are not sure just how to attain your design goals, please call us at (206) 284-9171 and let us try to help.

INSTALLATION

Mounting

MAIN ASSEMBLY
>   The main circuit board, its relays, and the control
>   panel, are produced in two different formats. In
>   addition to the self-contained wall mount unit, there
>   is a mounting package for use in consoles.

FM-35 CUE DETECTOR ASSEMBLY
>   A copy of the instructions for this unit, including
>   mounting and alignment instructions, is included in
>   this manual.

Power Connections

INPUT POWER
>   The actual power requirements for this unit's own
>   operation are small. Note that the fuse is 3/16 amp at
>   110 VAC. (1/4 Amp at 110 VAC. if you have the "clock"
>   version) Therefore, 18ga. wire would be sufficient as
>   long as the insulation is adequate. Observe the "HOT"
>   and "NEUTRAL" terminals, as well as the "GROUND", which
>   is connected to the chassis. A "ring" type of terminal
>   and a lock washer should be used under this screw. If
>   not already connected, the wiring to the power switch
>   and fuse are merely plugged into the mating connector
>   on the circuit board. This connector is polarized and
>   can't be plugged in incorrectly. The wiring harness
>   for the manual control switches is likewise simply
>   plugged into the 9 pole receptacle on the relay circuit
>   board. This plug also is polarized.

MOTOR RELAY
>   Wire the motor hot lead through this relay with the
>   power source to the "COM" terminal and the motor to the
>   "N.O." terminal. The manual switch on the control panel
>   is wired in parallel with the relay contacts for
>   emergency operation. In most cases, only the "Make"
>   contacts of this relay will be needed, but the "Break"
>   contact is also available for those who, for example,
>   like to switch their "Non-Sync" Off and On this way.
>   Power will be fed

out the "N.C." terminal when the relay and the manual switch are Off. There are simple ways to modify the motor control circuit to accommodate projector motors that are switched by a contactor requiring only momentary control. Contact Component Engineering for details.

LAMP RELAY
Wire the remote switching circuit from your lamp to the "COM" and "N.O." terminals.

DOUSER RELAYS
The contacts of the two relays are interconnected such that the input power hot lead should go to the "COM" terminal and the two douser coils then connected to their respective "OPEN" and "CLOSE" terminals. Power Neutral goes to the **douser coil common**. An accessory board is available for maintained dousers. (See Chapter 11 TA-10 Accessories.)
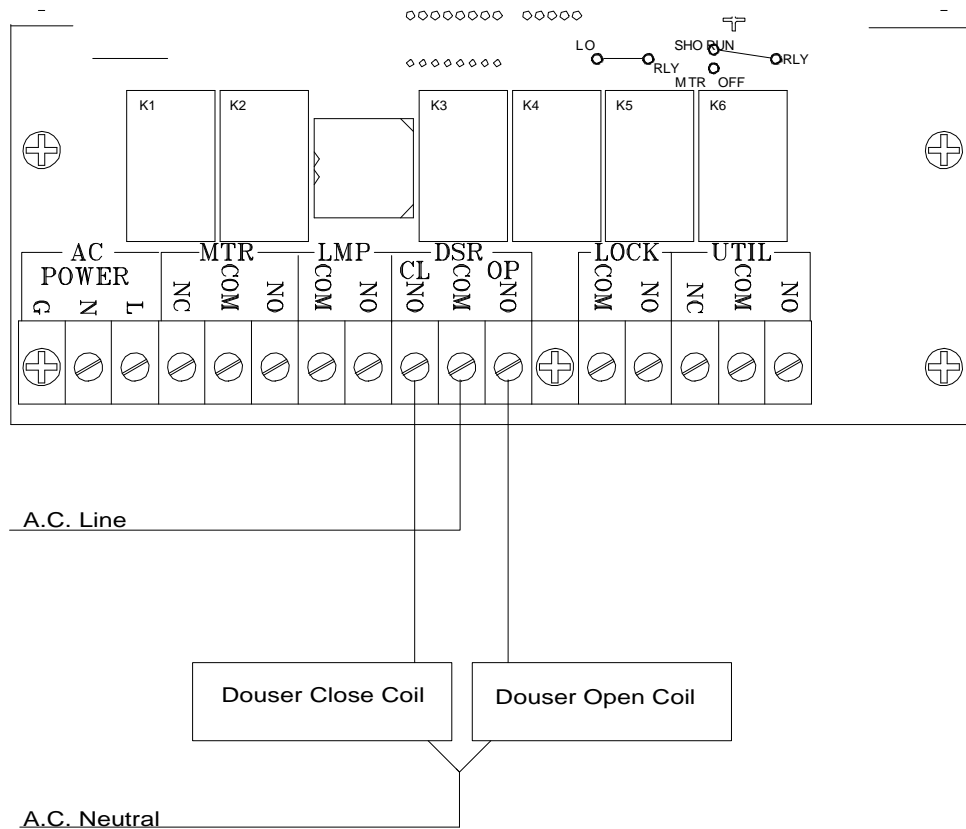
INTERLOCK RELAY

> The primary purpose of this relay is to energize a "Selsyn" when that type of interlock system is employed. By breaking a circuit board trace, however, it can be strapped for other purposes. These options are described below. While the socket is in all units, the relay itself is installed only upon request

UTILITY RELAY

> As originally wired, this relay is a "SHOW RUN" relay. That is, it energizes on Douser Open, and releases on Douser Close. Possible uses might be for rotary solenoid types of dousers which require maintained current, or for installations that like to switch their Exciter Lamp Off and On. If manual control is desired it must be wired parallel with external wiring as there is no "built in" provision for manual control of the Utility Relay or outputs.

> Referring to the figures below, you can see that by cutting a circuit board trace and installing a jumper wire, this relay can become a "Motor Off" relay. This is intended for those projectors whose motors are switched by a contactor which has a self-latching circuit. By using this relay's "Break" set of contacts, the contactor latching circuit can be interrupted. Note also that the figure below shows how both the "Utility" and the "Interlock" relays can be reassigned.
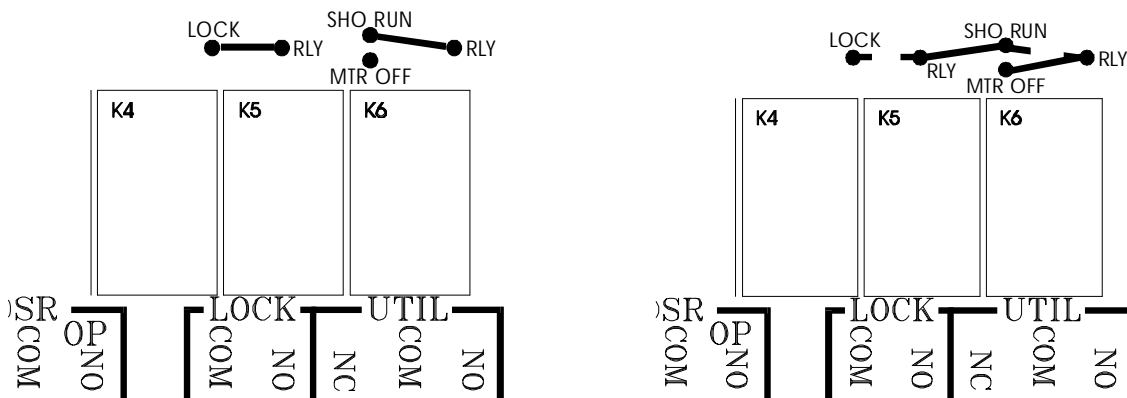
CONTROL CABLES

The cable from the Push Button Control Panel is terminated by two plugs which go onto headers at the top of the main circuit board. These headers are just above the plug-in Micro Control Unit (MCU) sub-assembly.

The "Intermission Cue" wires come connected to "Q1", but if your system design calls for a different Cue, they can be relocated.

The 15 conductor cable from the FM-35 cue detector assembly is terminated in the strip on the left side of the main board. The terminals are marked with the color code matching the conductors in the cable.

Note: For ease in installing and/or servicing this unit, Film Presence and Film Motion defeat switches are provided. These are the small switches immediately to the right of the lower end of the FM-35 terminal strip.
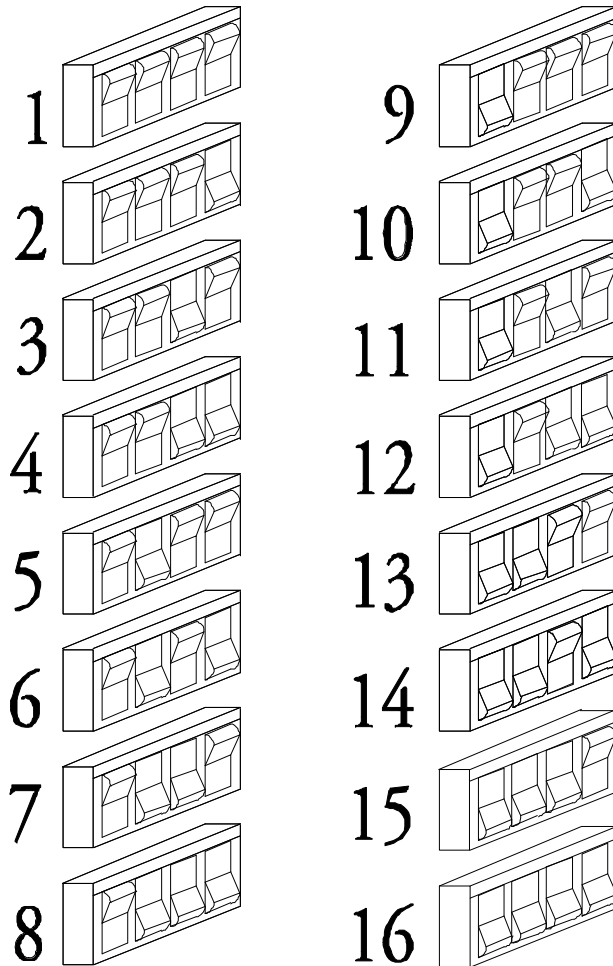
DATA LINK

Any TA-10 Theatre Automation system can communicate with any other TA-10, and/or a Remote Control Station, via the "Data +" and "Data -" connections. See the figure below. This is an RS-485 bus which is capable of operating over fairly long distances and is quite immune to noise. This link is particularly useful in that it is the only interconnection required between units operating in the "Interlock" mode. ("Selsyn" interlock systems obviously have to have their own 5 conductor interconnecting wiring.) Standard 2 conductor shielded wire (such as you would use for audio wiring) is recommended. Be sure to observe and maintain the polarity. Unlike audio wiring, both ends of the shields must be terminated to chassis ground. Depending upon the length of the electrical ground runs and the tightness of wire and conduit connections, there is the possibility of a voltage difference between the grounds of any two chassis. Therefore, before actually connecting the second end of a shield to the ground terminal, it is wise to check for voltage between the unattached shield and the ground terminal. If there is any voltage indicated, a 47 to 100 ohm resistor should be soldered on the end of the shield with the other end of the resistor going to the ground screw.
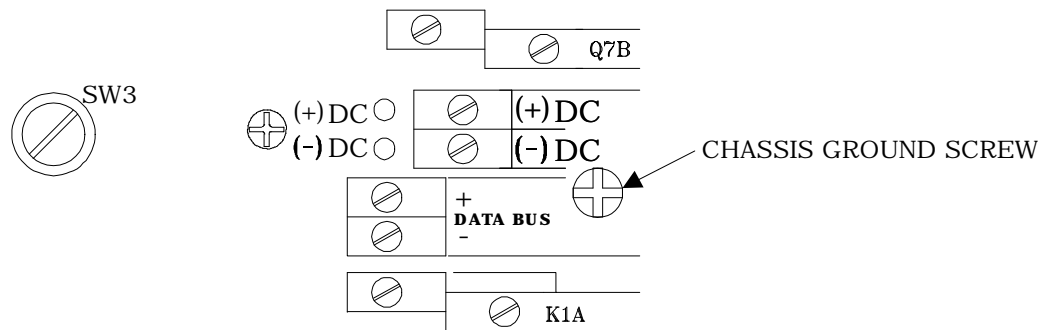

For reliable operation the RS-485 data bus protocol requires that the bus be properly loaded. The normal recommendation is that the load be about 75 ohms with half of this load at the extreme ends of the run. Every TA-10 has a switchable 150 ohm resistor installed so that no external resistors are needed. The switch that does this is SW3 (indicated on the drawing above) which looks like a screw head on a short black plastic stud. When the screw is down, two leads are tied together, and when the screw is backed out a half turn or so, the circuit is opened.

When installing the data bus make sure that all screws
are backed out (switch open) except those at the
ends….be it a TA-10 or a Remote Box. This will leave
two 150 ohm resistors across the data bus for a total
parallel load of 75 ohms. It is a good idea to check
the bus with an ohmmeter (with all units powered OFF)
to confirm.

When two or more TA-10's are tied together via the Data Link, **it is essential** that each one be assigned its own discrete address or the various units will confuse each other. This address is set by means of the 4 pole DIP switch in the upper left corner of the MCU circuit board. (The MCU board is the small circuit board which plugs into the main circuit board.) the figure on the left will show you how to set the switches for each of the sixteen possible assignments. The important thing is that no two of them are alike. All TA-10's and remote boxes are wired in series, there can be no tees. You must have the **one** remote box that is enabled as "master" at one end of the bus.

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RIGHT

WRONG
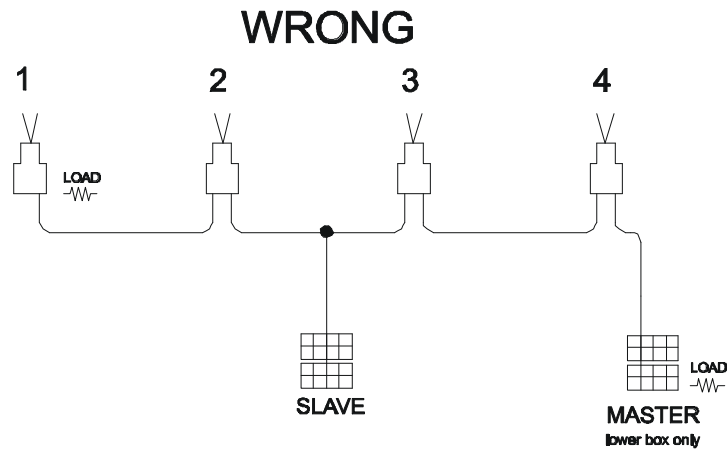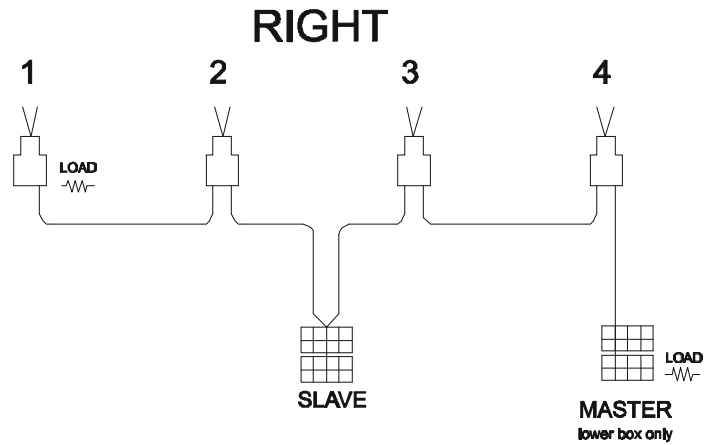
REMOTE CONTROL

The Remote Control system connects to the individual automation through the RS-485 bus. But, a hard wired control of "Start", "Stop", and "Interlock" can be had by using the terminal strip in the upper right appropriate terminal is all that is required. The "Start" function could be connected to a timer and the "Stop" could be connected to an in-house system for "Panic" shut-down. (It is often connected to a Fire Alarm system.) A Cue could be used to have the system shut itself down.

Programmable Output Connections

OUTPUT RELAYS

All of the programmable control outputs (either the Cues or the Events) from this automation are by means of pilot relays. Their contacts are rated a 300 mA. ac, or 1 Amp dc. The relays are closed for approximately 1/3 second. Circuit voltages of more than 48 are not recommended.

As normally installed, each relay has 2 sets of "Make" contacts brought out to the terminal strips. If "Break" contacts are needed., One set can be had by unplugging the relay, moving it one position to the right and reinstalling it. Now, the top pair of contacts will still provide a "Make" set of contacts, but the lower pair of terminals will provide a "Break" set of contacts. These can be used independently of each other, or wired to form a single SPDT contact set. This illustration will show you how to wire to each of the contact sets. The left figure shows the terminals for one set of contacts, and the right figure shows the terminals for the second set. The pattern just repeats for the rest of the relays, and is the same for either the Cue relays or the Event relays.
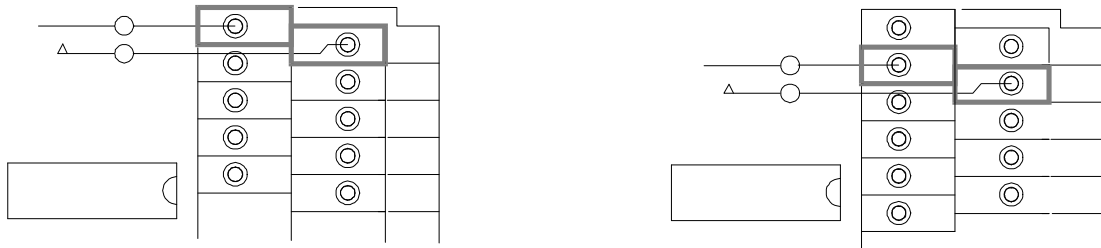
PROGRAMMING THE "Event" RELAYS
    The figure below pretty well tells the story. To have a relay operate from an Event, you put a jumper from the hole associated with that Event over to one of the three holes provided for each relay.
    IMPORTANT: If you want a relay to be operated by more than one Event, you must use diodes instead of plain jumpers! Use any general purpose diode you like as long as it is rated at **1 Amp or better**. The Cathode end points to the left as indicated by the symbol printed on the circuit board.

    Note: Soldering these jumpers can be done from the top
           of the circuit board as long as you are careful to
                          not let the lead ends go down
                          through the holes too far.
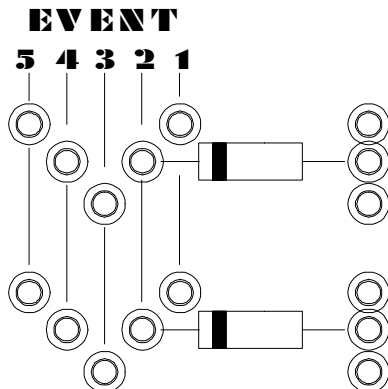
INTERMISSION SEQUENCE
The time interval between the Intermission Cue and the
Douser Close (Events 3 and 4) is determined by the
installer. On the top of the small circuit board which
is plugged into the main board, there are 2 DIP
switches. The six pole switch is the one we want here.
The six individual switches are arranged in a binary
format such that the left switch is 1 second, the next
one is 2 seconds, the third is 4 seconds, and so forth
until the sixth switch which is 32 seconds. Just decide
how many seconds you want for your Intermission
Sequence and flip switches until they add up to the
number you have chosen. (For example, if it takes your
curtain 11 seconds to close, flip the 4th switch [8
seconds], 2nd switch [2 seconds] and the 1st switch [1
second] for a total of 11 seconds.) If you don't flip
any the system will default to 7 seconds.

Addendum

MANUAL CONTROLS
Manual controls for motor, lamp and douser are provided
on the front panel. These switches are in parallel
with the power relays and thus will operate the device
in question even when the TA-10 is off. These are the
only assigned outputs and as this system is designed to
give the user flexibility, it is difficult to provide
manual override switches for such things as dimmers,
curtains, masking or the like. The need for such
manual switches, however, is real. Therefore, six
unassigned switches have been provided which the
installer can assign and wire as desired.

A selection of labels is also provided with which to
identify these switches. The panels are normally
loaded with two SPDT maintained contact switches, and
four SPDT center off momentary switches. Other
configurations may be had upon request. .187 X .032
push-on terminals are required for connection to these
switches and a supply comes with the unit. When
installing these terminals be sure to put a hand
against the outside of the switch as its plastic
retaining springs may not be strong enough to withstand
the force necessary to seat the terminal on the lug.
If more terminals are needed, please be sure that they
are meant for the .032" thickness of the male lug. The
.187 X .020 terminals have the potential of ruining the
switch if they are forced onto the lugs.

DEFEAT SWITCHES
"Film Presence" and "Film Motion" defeat switches are provided for ease in working on the system. These are small slide switches located on the main circuit board immediately inside the lower portion of the terminal strip to which the FM-35 cable is connected. These switches parallel the relay contacts of the FM-35. The front panel L.E.D.s will come on and serve as a reminder that the switches have been operated.

OPERATING INSTRUCTIONS

Cue Application

The foil cue patches required for this system are simply little pieces of 3/16" or 1/4" wide aluminum foil tape. The illustration shows how each of the individual cues should look. This diagram shows the multiple position cues as single pieces of cue tape because they are easier to apply, but discrete patches could be used. Remember that any cue in the center position is in the center of the film, not the center of the picture area. You may perforate the cues with your splicer if you like, but it really isn't necessary. The foil may be put on either the emulsion or the base side of the film, and you can even seal it in with a piece of splicing tape. In some cases, a good location is right under the splice between two parts of your program (such as between the trailers and the feature). This is particularly effective for sound change cues and helps remind you to remove the cues when you break down the film.
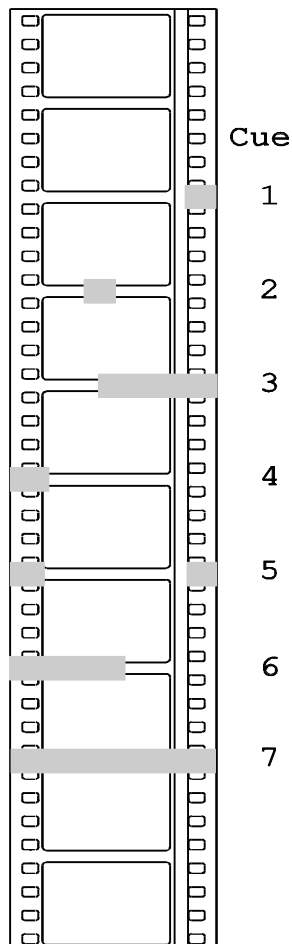
All of the patches for a given cue should be on the same frame line. The decoder can tolerate some linear displacement, but if you are off more than about 1 frame they will not be read correctly.

The decoder can handle only one cue at a time, but successive cues can be placed as close as 1 foot apart. (Using the same example of the transition from trailers to feature, you might have a Stereo Sound cue under the splice and a Lights Down cue 1 foot earlier.) If, continuing with our example, you also have to add lens and/or masking change cues, consider making up already cued standard slug leaders that you can cut into your program as needed.

Cue

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The Intermission Cue

This is a busy cue. True, its primary purpose is to initiate the Intermission Sequence, but it does other things as well, depending upon where you are in the program. Suppose your program calls for a "Curtain Call" (or "Mini Intermission"). As you come to the end of the trailers, put on a regular Intermission Cue just as you would at the end of the program, but in this case the film is not going to run out and stop the projector. 7 seconds before you want the next part of the program to appear on the screen, put another Intermission Cue on the film and it will behave just like pushing the Start button.

One of the dangers of the above scheme is that after the Intermission Sequence has timed out and the douser has closed, the system thinks that it is at the end of the show and is looking for Run-Out so that it can shut down the motor. This means that the alarm is disabled, and so, if you have a film break during your "Curtain Call", you won't know it. If you don't want to trust to luck, there is an answer, and it is the Intermission Cue again. If you put on still another Intermission Cue before the douser closes, (1 foot after the first cue is a good place) the alarm will be re-enabled. Once the show has re-started itself, everything will be normal.

This cue is also used to Start the show when you are in Interlock. The "Interlock" section will discuss this feature in greater detail.

Running The Show

You can pretty well monitor the status of your program by observing the lights in the indicator column on the control panel. The red light at the top shows that the system is On. When the film is threaded and ready to run, the Film Presence light will come on. When the Start button is pushed, the motor and lamp will be turned on, the Motor On and the Lamp On lights on the panel will light up, the Power On light will start pulsing to show that the program is running, and the normal 7 second Start Sequence will begin. Shortly thereafter, the Film Motion light should come on, and at the end of the 7 seconds as the douser opens, the Show Running light will come on.

If you push the Start button when the film is not ready, the alarm will sound for as long as you hold the button down.

If, during running of the show there is a film break or a loss of film motion, the alarm will sound and all Intermission functions will be activated. Pushing the stop button will silence the alarm. After you fix the problem, push the Start button and you will go through a normal 7 second sequence. You will want to check the status of any program changes that might have been made earlier in a normal show (such as Sound format, House Lights, etc.) and re-establish them manually.

During the Start Sequence there is a 3 second bobble delay during which the Film Presence detector is disabled to allow for settling of the film handling machinery.

Film Motion monitoring begins after this same 3 second point.

Maintenance

The only maintenance required is to the mechanical parts of the FM-35 detector assembly. A full set of instructions for this unit are included in this manual, so, please read through them.

INTERLOCK

Description

If you have read all of the foregoing, you have a
pretty good idea of how the TA-10 handles the interlocking
of two or more projectors. This chapter will bring it all
together.

Any two or more projectors on the same Data Link can
communicate with each other for purposes of running in
unison. The mechanical means by which the projectors
synchronize with each other is up to you, be it synchronous
motors, Selsyns, or bicycle chain. If needed there is a
relay which will help you with the control of your part, but
you may have to add some extra circuitry. More about this
later.

Installation

Please review the databus wiring recommendations in
Chapter 3 pages 5 and 6.

Interlock Zones

Each TA-10 MCU board can be set for zones A,B,C, or D.
If you have permanent interlock groups you would set the
links as necessary. If your groups will change with
conditions we recommend that you install a rotary selector
switch on the front panel and wire it to the pins. We will
supply the switch and connector upon request.
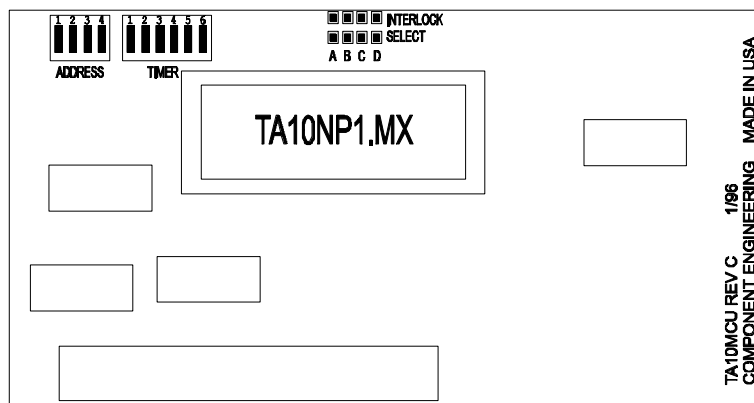
TA-10 MCU Board

Operation

A "run-through" of a typical presentation might be the best description. Thread up each projector as you would for any Interlock presentation, and when it is ready to go, push the "Interlock" button on the control panel. The bottom blue lamp on the control panel will light.

Then go on to the next projector, thread it, push its "Interlock" button and so on. When all machines are ready to go, push any "Start" button and all machines will roll together.

Because they are in the Interlock mode, only the motor relays will operate when the "Start" button is pushed. Each system is waiting for something to tell it when to start the rest of the show, and that something is the Intermission cue. When the cue arrives at each projector in turn, each will begin its normal 7 second cycle starting the show.

As the show is running, all Events and Cues will happen normally. At the end of the Intermission Sequence (Event 4) on a given projector, faults will no longer be transmitted on the Data Link because that particular system is looking for a Run-Out. When the film does run out, that one projector will shut down as usual, and drop out of Interlock. Any other machine still on the bus will continue normally.

Faults

If a projector in the Interlock mode receives a Start command from the Data Link, and is not ready to go, it will immediately put a Stop command back onto the Data Link and sound its alarm. Likewise, at any time during the show, a loss of Film Presence or Film Motion will cause a Stop command to be transmitted to all other projectors in Interlock. Each will shut down and trigger their Intermission functions, and the alarm on only the initiating projector will sound so that you know where the trouble lies.

In this case, because you are presumed to be in mid-show, and the projectors will remain in the Interlock mode. This means that when you next push the Start button, each machine will start up and go immediately into the 7 second start cycle. It <u>won't</u> be looking for a Start Cue. If any of the systems on-line have been taken out of Interlock and then put back in, they <u>will</u> assume that it is a new start and will look for a Start Cue.
In this case, it would probably be best to toggle all of the projectors out of Interlock and then back in, and then go around and manually trigger each of them after restarting. As is the case with any stop caused by a fault, you will also need to manually reestablish some things such as sound format and house light level.

External Wiring

If you are using synchronous motors, there is no need for any other wiring. You don't even need K5, the Interlock Relay. However, if you are using Selsyn Interlock, the Interlock relay can be used to energize the individual Selsyns which you will have connected together by the required 5 conductors. If you are tying together no more that two projectors, the easy way is to wire the 117 V.A.C. to the Selsyns through both of the Interlock relays in series. If, however, you are putting more machines on the bus, then you may want to add a three pole relay for each Selsyn motor. If you switch (via the interlock relay) only the excitation voltage to the Selsyns, in many cases there will be enough induced current from the secondaries to cause them to sort of try to follow each other. So, if you install a three pole relay such that you switch not only one leg of the primary circuit, but two of the secondary legs as well, each unit will be fully isolated from the others. The Interlock relay would be used to operate this three pole auxiliary relay.

TA-10

Fire Alarm Interfacing

The only real need for connection between the TA-10 and a Fire Alarm System is for an automatic shut-down triggered by the alarm system. Provision is made on the main circuit board of the TA-10 for external control of the "Stop" function, and if you are using the Remote Box there is a "Panic" input available which will stop all TA-10's on the data link.

In the upper right corner of the TA-10 main circuit board there is a four pole terminal strip. These terminals parallel the manual push buttons and allow for external control of "Start", "Stop" and "Interlock". The fourth terminal is "Ground". Connecting "Ground" to any of the others will call that function. When connecting the "Stop" function to the Fire Alarm system it is best to do so by means of relays. One tidy way of doing this is to have the alarm system give you a low voltage pulse (or maintained*) which is connected to the coil of a small relay at each TA-10 location. SPST Normally Open contacts on the relay are then connected to the "Stop" and "Ground" terminals on the TA-10. The control line from the alarm system and the TA-10's can then be just one line running from one unit to the next. Relays would be selected to match the voltage available from the alarm system, and they can be small as the current required to operate the "Stop" circuit is 25 mA. or less.

A second scheme would be to put multiple contact relays at the alarm system location and then each TA-10 would have to have a home-run to that location. In such a case, each TA-10 should be connected to its own set of contacts on the controlling relay(s). The idea is to try to keep the Grounds of the various TA-10's separated just to prevent any possible cross-talk or interference problems.

If Remote Boxes are wired into the system, the "Panic" capability can be used. Inside each Remote Box is a two pole terminal strip labeled "Panic". When these two terminals are connected an immediate code is put on the data link which will instantly initiate a "Stop" at each TA-10. Please note that this method will not work if the Remote Box is not turned on. If this scheme is used it is wise to have the Remote Box powered from the same (or similar) uninterruptable circuit as the alarm system.

*   A maintained "Stop" command will have to be released before
the projector can be re-started. The system will try to start,
but will immediately stop again. When the "Stop" command is
received by the TA-10, whether it comes from the data link, an
external contact closure or from a finger on the "Stop" button,
several things happen simultaneously. The Motor relay is
released, the Lamp relay is released, the Douser Close relay is
pulsed, the Show Run relay is released, and Event lines 3 and 4
are pulsed. This means that the projector itself is shut down
with its lamp off and the douser is closed just to be sure.
Then, all functions tied to all of the normal End-of-Show
sequences are triggered. You should have all of the lights
fading up, curtains closing, and sound muted.

INTERLOCK RULES

Be sure the Blue Button has been pushed and the "Interlock" light is on for all projectors you want tied together.

When in "Interlock", pushing the **START** button will start only the motors. The system will now be looking for an Intermission Cue which will initiate the rest of the start sequence.

Once the show is running on all screens, a failure on any one of them (or pushing the **STOP** button) will cause all to shut down, but remain in "Interlock".

When starting in this mode, the systems will go right into a full start sequence. Any projectors that have been taken out of "Interlock" and re-entered, will again be looking for an Intermission Cue.

When the show is running, the Intermission Cue reverts to its original function and will trigger the intermission sequence.

After the intermission sequence (the show is off the screen), the system will no longer recognize a failure on that projector, but is looking for run-out at which time the motor will stop and that machine will drop out of "Interlock".

DO NOT turn off the A.C. power to any TA-10 that is operating in INTERLOCK. A TA-10 that is not "ON" cannot send fail/stop codes to the remaining TA-10's that are interlocked with it. The other TA-10's will not fail/stop in this circumstance until a film break occurs.

<u>TA-10 REMOTE BOX</u>

<u>Instructions</u>

<u>IT WON'T WORK</u>

If you don't follow the instructions

You must have the right controller chips in both the TA-10 and the Remote Box

You must have the wiring exactly right

You must have the address switches in the TA-10 set correctly

You must have the switch that selects which range of TA-10 addresses to monitor, set correctly.

You must have the master/slave link correct in the Remote Box

You must have the load switches set properly

**Now it will work, and nicely.**

MCU Chip Compatibility

As of this writing we are shipping the "TA10NP-2" in the main unit, and the "TA10NP-2.MX" in the full function remote. The "TA10NP-2A.MX" is in the status only Remote Box. In each case the chip in question is the large 40 pin integrated circuit. In the TA-10 this chip is on the small plug-in board at the top of the main circuit board perpendicular to the main board. In the Remote Box it is the largest chip on the lower board. Other versions of these two programs will not work together.

Remote Box Jumper

Any remote box can be configured to be either a "Master" or a "Slave". Only **one** (1) remote box on any data link can be the master. The advent of the 16 TA-10 bus with 2 gang boxes does **NOT** change this rule. Only one individual box can be configured as the Master. All other remote boxes on any data link must be slaves or chaos will result. Look at the lower circuit board in the Remote Box, just to the right of the large 40 pin integrated circuit there is a small jumper on two of the pins of a three pin header. If the jumper is connecting the lower pair, then it is the Master. If the jumper is connecting the upper pair, then it is the Slave. (Actually, the jumper is not needed at all for Slaves, it is merely stored in the upper position.) Remember, only one Remote Box per data link can be a Master. How do you decide which one is the master? It has been found that the best choice is the one at the end of the line. In other words, the one at the end of the longest cable run. Usually this will be the one downstairs in the box office or in the managers office. There will be confusion on the line if the master is in the middle trying to send information requests out in both directions.

TA-10 Selector Switch

The Switch that selects which TA-10's will be monitored is located above and to the left of the master/slave link. If the slide is to the left it is 1-8. To the right is 9-16.

Load Switch

PANIC

DATA
+
−
G

AC
L
N

GND
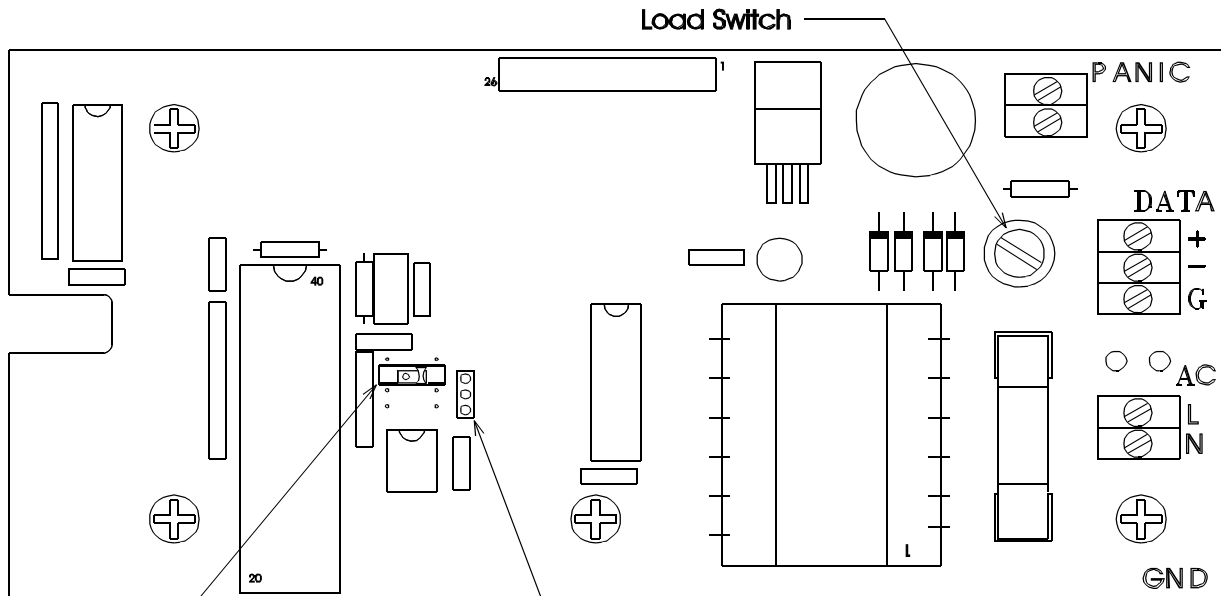
Master/Slave Link
    Lower Pair for Master
    Upper Pair for Slave

Switch position for reporting
projectors 1 through 8

Switch position for reporting
projectors 9 through 16

Location of Remote Box selector switches.

Things to Know

The lamp indications at the Remote Box are as follows:

> No lights = no film in projector
> Red light on steadily = film threaded and ready
> Red light flashing = seven second start sequence running
> Green light on steadily = show running
> Green light flashing = intermission/stop sequence running
> Blue light on steadily = projector in Interlock
> Red and Green lights flashing = failure

None of the pushbuttons on the Remote Box will do anything unless the "Enable" button is held down simultaneously. The "Enable" button is the black one in the upper right-hand corner. If there is a failure at any projector the Red and Green lights for that unit will flash and the alarm will sound. To silence the alarm push the "Enable" button and the appropriate "Stop" button. The lights will continue to flash until the alarm at the projector is silenced. Canceling the alarm at the Remote Box does not cancel the alarm at the projector. If the projector alarm is canceled first, however, the Remote one will soon stop.

Projectors in Interlock cannot be started from the Remote Box. It is felt that to do so would be a little too risky. Interlocked units can be stopped remotely.

Because this data link has to handle the traffic from not only the Remote Box, but any projectors in Interlock as well, a time sharing arrangement is employed. Failure information is given top priority, action commands come next (i.e., "Start" or "Stop") and then at approximately two second intervals, if nothing else is going on, the Master Remote Box polls each of the projectors for a status report. This means that in some cases the indications at the Remote Box may lag a little behind what is actually happening at the projector, but it will catch up within less than two seconds.

Placement of Remote Modules

The position of the remote module in the Remote Box determines which TA-10 address it will respond to. In a Remote Box configured for TA-10's 1-8, the top left position is for the TA-10 with address #1. The bottom right is for address #8.

In a Remote Box configured for TA-10's 9-16 the top left is for TA-10 with address #9 and the bottom right is for address #16.The numbered stickers can be placed anywhere that you wish.
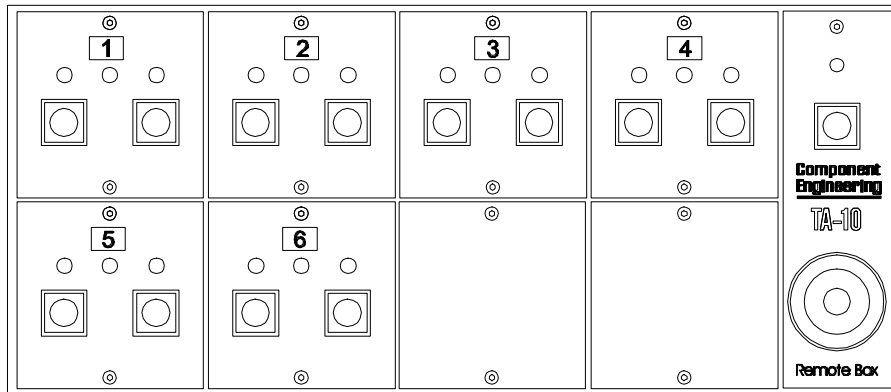
TA-10 Remote with 6 full function modules
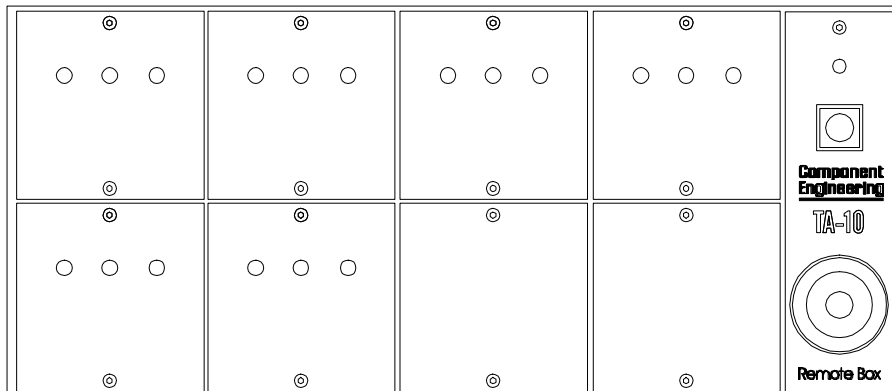
TA-10 Remote with 6 status only modules

TA-10 Automation With
Auto-Start Clock

Operation Instructions

      Using the Auto-Start clock is really very much like an ordinary bed-side digital alarm clock. It tells you what time it is and it lets you select when you want it to wake you up. The Auto-Start timer does exactly the same thing except that it starts the show instead of waking you up.

      When you power up the system for the first time, you will need to set the clock for the time of day. Press the small black push-button and hold it down while you rotate the knob until you get to the current time. The knob can be rotated in either direction so that you can either advance or retard the reading. The clock will now keep time even when the unit is turned off.... for as long as several days.
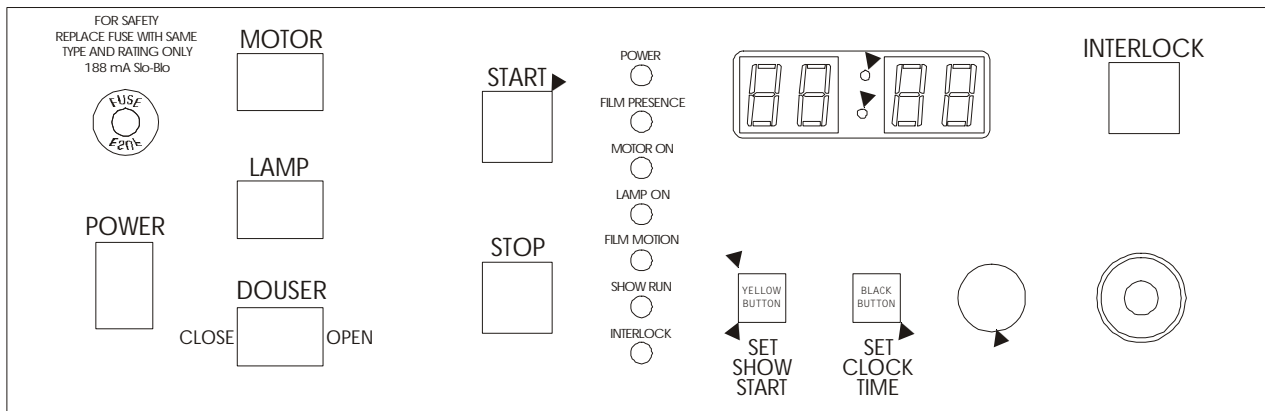
      Setting the Auto-Start Time is just as easy. This time you press the <u>yellow</u> button and turn the knob to the time at which you want the show to start. When you have set the show start time you next must arm the system. This is done by first pressing the same yellow button and holding it down while you press the large green start button. When you release both buttons the colon in the clock will be flashing to indicate that the system has been armed and will start automatically when the appropriate time is reached.

      Should you wish to cancel the automatic start you can do so by first pressing and holding the yellow button and than pressing the stop button. Upon release the colon will no longer be flashing and the system will not start automatically.

      If you are operating in the Interlock mode, the automatic start is not allowed....the beeper will sound to warn you that you can't do that.

Hold set show start button
and press start to arm timer

colon will blink
when timer is armed

FOR SAFETY
REPLACE FUSE WITH SAME
TYPE AND RATING ONLY
188 mA Slo-Blo

FUSE

MOTOR

START

STOP

POWER

LAMP

DOUSER

CLOSE   OPEN

POWER

FILM PRESENCE

MOTOR ON

LAMP ON

FILM MOTION

SHOW RUN

INTERLOCK

YELLOW
BUTTON

SET
SHOW
START

BLACK
BUTTON

SET
CLOCK
TIME

INTERLOCK

Timer adjust knob

Hold down and turn
timer adjust knob
to set show start time

Hold down and turn
timer adjust knob
to set clock time

FM-35 Maintenance

The only maintenance required is to the mechanical parts of the FM-35 detector assembly. The Film Presence and Film Motion detectors operate by shining infra-red light onto the film and then detecting the light when it is reflected back. If the L.E.D.'s from which the light comes, the phototransistors which receive it, or the roller get too dirty, the detectors can't work. The newer sensors and FM-35's with the FMPU upgrade kit will sense film presence if the roller is allowed to become too dusty. It is a good practice to wipe the optical area with a clean dry cloth between each show or at least once a day. If you find an excessive amount of dust, lint, or film wax accumulating, it would be a good idea to check the alignment of the film path through the unit. If the alignment is not correct the film will scrape on the roller flanges and create debris which can be deposited on the optical sensors. Also, watch for too much oil. If this is combined with the dust problem, a sort of "mud" is produced which may require stronger cleaning measures. Stay away from the more exotic solvents such as acetone, MEK, or those things which have "chloro" or "fluoro" in their names. These (and others) have the potential of attacking the plastics in the sensor assemblies, which could ruin them and require their replacement.

If it is time for a real bath. Remove the large black roller and then remove the two small Phillips head screws which hold in the optical assembly. With the screws out the whole assembly can be unplugged by pulling it straight out. Spray the sensor area thoroughly with one of the stronger household cleaners such as "Formula 409", "Fantastic" or the like. Allow the detergent to work a minute or two and then scrub it lightly with a toothbrush. Then rinse it off with a strong stream of good hot water. If it doesn't look clean, do it all again. Dry it all off and put it back together.

TA-10 Accessories

Lens Change/Douser Close Timer

Installation Instructions

The purpose of this device is to close the douser during the rotation of the lens turret and re-open the douser after a predetermined time period. The device can be programmed for use with either the normal dual-coil douser which is operated by current pulses, or with the maintained type of douser control. The closing of the douser is initiated by whichever cue commands the lens turret to start. An adjustable timer is also started which re-opens the douser at the end of its cycle.

The unit mounts by means of a connector which plugs into a header which in turn is to be installed on the main TA-10 circuit board. If the timer is installed by Component Engineering at the time of manufacture, the header will be a straight one so that the timer unit itself will rest parallel to the main circuit board. A field installable version is available which uses a right angle header which can be soldered into the main circuit board from the top.
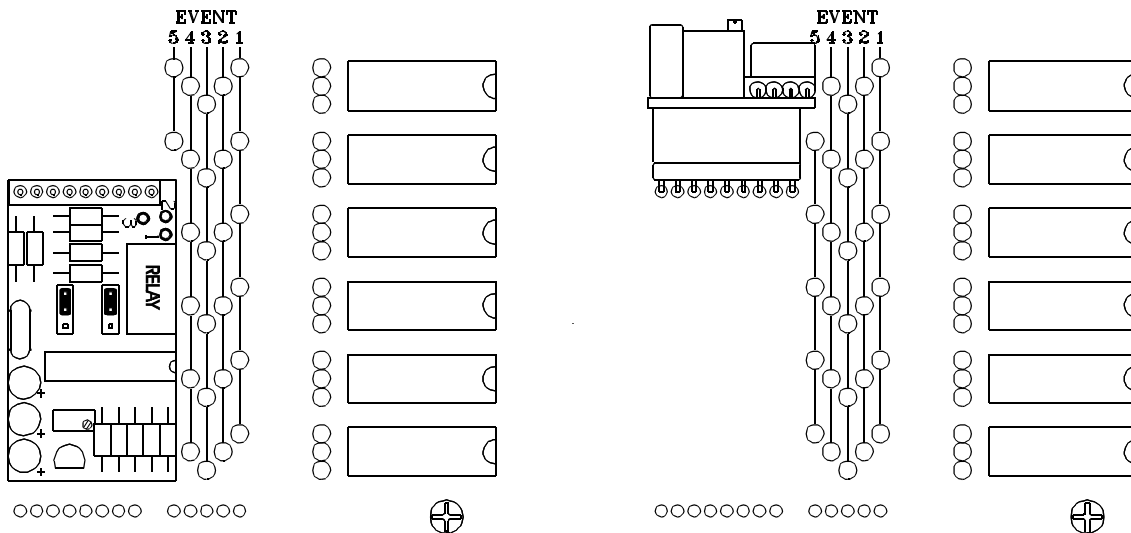

Factory Installation

Field Installation

We will start with the field installable version. Refer to the drawing and note the set of nine holes in the TA-10 main circuit board into which the header is to be soldered. You will have to remove the solder in the holes with a solder sucker or "Solder Wick". With the circuit board plugged into the header, slip the header pins into the nine holes and apply solder to the middle pin. Loosen the solder as necessary and position the assembly so that it sits square to the main board and has enough clearance so that the timer board can be unplugged. Solder the rest of the header pins.

In the upper right corner of the timer board are three pads labeled "1", "2", and "3". Number "3" is not used for this purpose, so, ignore it. Numbers "1" and "2" are the input triggers and they are identical. If you wish to be able to go both from "Flat" to "'Scope" and "'Scope" to "Flat" you will need both inputs. If, however, you return your turret to "Flat" during the intermission, you will need only one input and it can be either one.


Typical Cue pick-off point

Trigger Lines

Magnified view
of board section
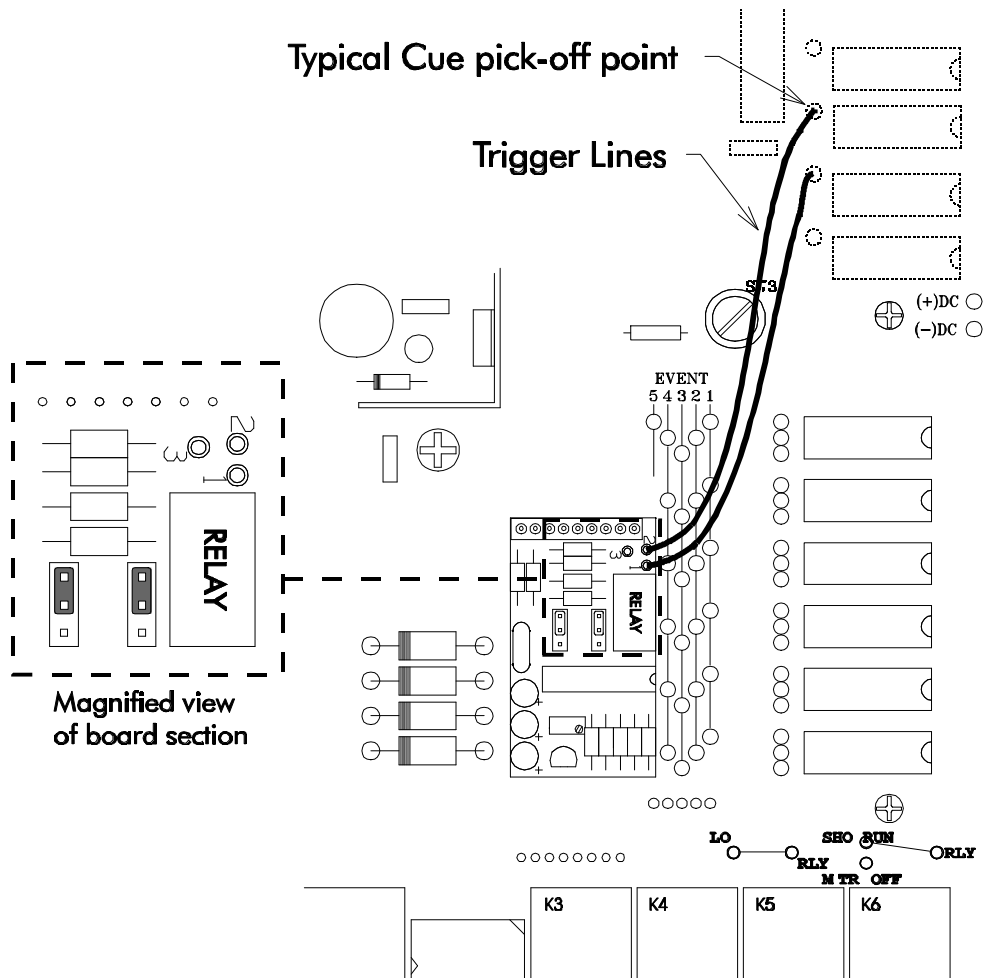
Connect a short (4″ or so) piece of wire to one or both inputs. The other end will go to whichever cue you have assigned to start the lens turret. Rather than connecting to the cue relay contacts, however, we will connect to the coil side of the relay thus saving all the contacts for external controls (such as masking). The drawing shows the location of the cue relay coil connections and it is to one of them that you need to solder the input wire(s). It is easier to get your soldering iron in there if you unplug some of the cue relays. This is the only wiring required.

Check the location of the programming links with the illustration. See the notes below if you are using the maintained style of douser

The adjustment of the timer is mostly a "set and try it" proposition. With the machinery running, initiate a lens change which will also close the douser and start the timer. Note when the douser opens again and adjust the timer to suit. Turning the timer control counter-clockwise will shorten the time. You are finished!

Notes related to maintained dousers: If your system is using the "Utility" relay for this purpose you need to move over to the "Douser Open" relay. Use the "DSR COM" and "OP NO" terminals. Operation will be exactly the same as it is now. If you have a wire connecting from the "Sho Run" solder pads on the board over to one of the small pads above the large relays and already have your douser connected to the "DSR OP" terminals, you need to remove this wire as it will now be replaced by the circuitry in the timer board.

Timer Adjust

Timer Adjust

Jumper Location
for Pulsed Douser

Jumper Location
for Maintained Douser
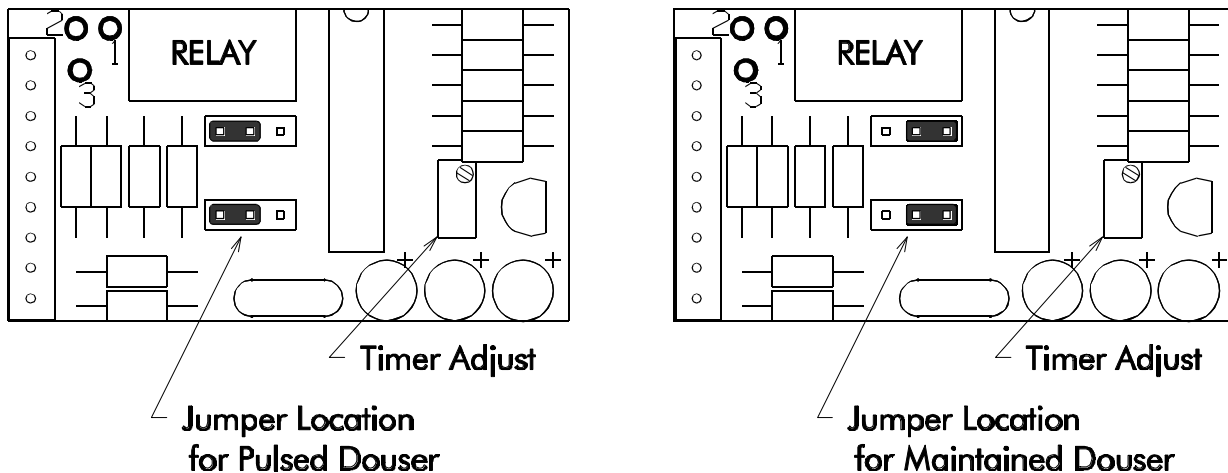
Component Engineering
TA-10 Automation System

Adaptor Relay Kit for Dousers
requiring maintaintained coil current

To Maintained
Douser Coil