GPI BOARD
(RELAY ACTUATOR & ISOLATED D/I CARD)

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This document describes the different ways to allow the automation system to close a gpi contact from the transmission list.

CABLE REQUIREMENTS
A male 37-pin d-type connector to the manufacturer's specification for the device that is to receive the contact closure.

CONNECTIONS
Connect the male 37-pin D-type connector to the female 37-pin connector on the PCL-725 card on the device server. Then connect the other end of the cable to the device or devices to be controlled.

RELAY OUTPUT
8 RELAY ACTUATOR OUTPUTS

<table>
<thead>
<tr>
<th>Relay Type</th>
<th>Contact Rating</th>
<th>Breakdown Voltage</th>
<th>Operate Time</th>
<th>Release time</th>
<th>Insulation Resistance</th>
<th>Power Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 SPDT (Form C)</td>
<td>120V AC/DC, 1A</td>
<td>1000V AC/DC minimum</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 SPST (Form A)</td>
<td></td>
<td></td>
<td>8 msec maximum (including Bounce)</td>
<td>8 msec maximum</td>
<td>100 mega ohms</td>
<td></td>
</tr>
</tbody>
</table>

Power Consumption +12 volts, 33mA for each relay, total .264A if all relays are energized. +5v, less than .2A

CONTACT 1 = NO-0/COM-0
CONTACT 2 = NO-1/COM-1
CONTACT 3 = NO-2/COM-2
CONTACT 4 = NO-3/COM-3
CONTACT 5 = NO-4/COM-4
CONTACT 6 = NO-5/COM-5
CONTACT 7 = NO-6/COM-6
CONTACT 8 = NO-7/COM-7

RELAY INPUT
8 ISOLATED DIGITAL INPUTS

CONTACT 1 = DI0H
CONTACT 2 = DI1H
CONTACT 3 = DI2H
CONTACT 4 = DI3H
CONTACT 5 = DI4H
CONTACT 6 = DI5H
CONTACT 7 = DI6H
CONTACT 8 = DI7H

SERVER SET-UP
The GPI card is setup using a Switch Only device. Only eight contacts are allowed on a Switch Only device. If switching is not to be used with the GPI contacts then the AUDIO/VIDEO configuration can be ignored.

Configure a switch only device into the automation system. Select the menu Device Parameters under the Options menu.

   Select Switch Only 1 and press OK
   AUDIO/VIDEO Select Audio/Video by clicking on SWITCH ONLY or cursor to the SWITCH ONLY and press "C" for change.

The Video out section is for playback output.

1. The device column represents the device number that the switcher is using in the Server. Type in the device you wish to use for A,B,C,D. The TAB key can be used to move around the fields more easily. Type in the proper numbers.

2. In the Video Out section the IN Column represents the crosspoint that the SWITCH ONLY video output is in. The OUT column is the destination output number of the switcher. Type in the proper numbers.

3. The Video In area is not used for Switch Only Devices.
   a. The EVENT ID is the ID name for the Switch only. Select and type in the proper name for that crosspoint.
   b. The GPI is used to associate the switch only with a physical contact closure on one of four possible GPI boards. Select GPI button to setup a hardware GPI.

4. Select the PC card that is to be used for the GPI. The GPI CARD is used to choose which card to associate the switch only with. There are four choices, CARD ONE, CARD TWO, CARD THREE, and CARD FOUR. Four cards may be in the system each with a separate I/O address.

5. Select the contact number. CONTACT is the contact closure number. There are 8 contact closures on the board. The contact closures are numbered COM0 to COM7 on the output connector of the card (model PCL-725). You should enter the numbers in the configuration as if they are numbered from 1 to 8. This means that if you connect to COM0, NC0, and NO0 on the board then you would enter a 1 in this field.

6. Select the default pulse width from 1 to 30 frames. PULSE WIDTH is the default width (in frames) to use if this switch only contact closure is used as a primary event. When the switch only is used as a secondary event the duration of the pulse is determined by the event.

7. Press OK when completed.
   a. Press "S" for Save. Save must be selected or your set-up will not be done.

OPERATION
Switch Only Devices are used in ADC for a variety of purposes. The first is to enable an event to be put
into the transmission list, which will switch a crosspoint on a switcher, and then count down some predetermined time and roll the next event. By enabling the AUTO UPCOUNT on an event which is associated with a switch only device, the event will count down to zero and then hold the list while counting up. This allows a user to switch to a live or other feed, and count time until a PLAY or SKIP is issued to the transmission list.

A switch only can be configured with a physical relay such that it can be used to control a contact closure driven device. There are a variety of ways to use the physical relay. The first way is to use a switch only with a relay, as a primary event on the list. On these kinds of events the contact closure occurs at preroll time. This would allow a device such as a parallel-connected VTR to be started at preroll by the list.

The other way to use a switch only with a relay closure is as a secondary event. A secondary event will cause the relay to close at a designated time either before or after the primary event starts running. The duration of the closure can be controlled directly by the event. This can be used to tag a primary event with a video overlay, such as station bug. This can also be used to generate a tone at some predetermined time before entering a commercial break or returning to program material.

**SWITCH ONLY AS A PRIMARY EVENT**

A primary event whose ID matches the ID of a switch only device will cause that ID to be associated with that switch only device. (The switch only device must be assigned to the list the event is on.) This event and switch only device run as any other video device might. The event and device goes through preroll, switches at end of preroll, counts down a duration, rolls the next event. The event, and then goes through postroll. Like any other primary event, you can SKIP the event and roll the next event.

All primary events can be marked with an AUTO UPCOUNTING designation. This is accomplished by editing the event type either with the menu option under EDIT or by putting an 'A' into the event type field. AUTO UPCOUNTING events whose ID can be associated with a switch only device can then count up after counting down. (Enabling AUTO UPCOUNTING on an event that is associated with VTR device will have no effect).

The AUTO UPCOUNTING event will count down its duration and then instead of prerolling the next event, it will count up when it reaches zero. Once the event has started its up count, only PLAY or SKIP will roll the next event. An AUTO UPCOUNTING event can start with a zero duration, which will cause the event to start counting up immediately at the end of preroll.

**SWITCH ONLY AS A SECONDARY AUDIO/VIDEO EVENT**

A secondary audio/video event whose ID matches the ID of a switch only device will cause that ID to be associated with that switch only device. (The switch only device must be assigned to the list the event is on.) This event and switch only device run as any other video device might. The event and device goes through preroll, switches at end of preroll, and counts down a duration. The event then goes through postroll.

All primary events can be marked with an AUTO UPCOUNTING designation. This is accomplished by editing the event type either with the menu option under EDIT or by putting an 'A' into the event type field. AUTO UPCOUNTING events whose ID can be associated with a switch only device can then count up after counting down. (Enabling AUTO UPCOUNTING on an event that is associated with VTR device will have no effect).

The AUTO UPCOUNTING event will count down its duration and then instead of prerolling the next event, it will count up when it reaches zero. Once the event has started its up count, only PLAY or SKIP will roll the next event. An AUTO UPCOUNTING event can start with a zero duration, which will cause
the event to start counting up immediately at the end of preroll.

**OTHER SWITCH ONLY SECONDARY EVENTS**

There are two types of secondary GPI events, which can be put on the list to control a physical contact closure for some amount of time. Secondary GPI events are put on the list using the INSERT OTHER menu option. Select GPI Contact or Back Timed GPI depending on the timing of the secondary event. GPI Contact runs a contact at some time after the primary event. The Back Timed GPI runs a contact before the primary event is run.

The two secondary GPI events are associated with the switch only whose ID matches the ID in the secondary event. Edit the ID field to contain the name of the Switch Only device that has the contact closure that is to be controlled.

On the GPI Contact event, the SOM field is used to control the offset of the secondary event from the beginning of the primary event. The secondary offset can be larger than the duration of the primary event. This might be useful when you want to associate a Secondary GPI within a group of commercials without worrying about the makeup of the group of commercials. As an example, you might want to cause a closure to occur 1:52 into a two-minute commercial break. You would associate the secondary with the first commercial in the break. As long as the total commercial break was 2 minutes in length, the closure would occur correctly.

The DUR field is used to control the duration of the pulse. Normally this might be one frame to cause a one-frame pulse to be sent to the connected device. If you are using a device that is active while the relay contact is closed, then specify the length of the closure in the DUR field.

When a secondary GPI Contact event gets cued, the SOM field will appear in the DUR field for that event. When the event starts running, the DUR field will now count down the time remaining until the closure is made. Once the closure is made, the DUR field then will display and count down the duration of the closure.

If the contact closure of the secondary GPI event is to occur at the start of the primary event, then the SOM should be set to zero.

On a Back Timed GPI event, the SOM specifies the duration of the time before the primary event that the secondary GPI event should run. The DUR is the length of the time that the GPI contact is closed. The duration may be of any length including exceeding the duration of the primary event. The Back Timed GPI makes it easier to associate a contact closure with a group of events without worrying about changes in any of the particular events. In the following example, you might want to generate a 5-frame pulse at 8 seconds before the commercials are to run.

<table>
<thead>
<tr>
<th>PROGRAM</th>
<th>Some duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPOT1</td>
<td>30 second duration</td>
</tr>
<tr>
<td>Secondary Back Timed GPI with SOM value of 8 seconds.</td>
<td></td>
</tr>
<tr>
<td>SPOT2</td>
<td>30 second duration</td>
</tr>
<tr>
<td>SPOT3</td>
<td>30 second duration</td>
</tr>
</tbody>
</table>

In this example, the Back Timed GPI will run 8 seconds before the commercial starts with its duration. If the list is edited and either the PROGRAM or SPOT1’s duration changes, the Back Timed GPI event doesn't have to be edited.

In the Back Timed GPI, the list must be running and not in an UPCOUNTER since we cannot compute the time to start a Back Timed GPI when we are counting up. In current versions of the software the
primary event and Back Timed GPI must both be threaded to work correctly.

**START LIST FROM CONTACT CLOSURE**
The contact closures used to start the lists or events are a one for one. The first closure (DI0H) is for the list one, (DI1H) is for list two, etc. The (DInH) DIGITAL INPUT HIGH n=channel number, needs an low (Gnd) to actuate the closure. The same is true for (DH0L) except it needs a high (+5v) to actuate the closure.

A. Select **Transmission** pull-down menu, then **List Types**, and then choose **Contact Start**.

Event type should be an A auto event. In the case that you want each item in the list to start with an contact closure the Event type should be an AM auto event, manual start event that will provide a break after each event.

**PLAYING SWITCH ONLY DEVICES BACK TO BACK**
A single switch only device (one ID) may actually play back to back events with just it’s ID. This allows a network or camera feed to as run log as several events if it is logically several sections, but play continuously from the same source. To do this the events must be sequential with no frames in between. If there is even a difference of one frame (due to hard starts or other list features like back timed events) they are treated as different devices and must have enough time to Post Roll and Pre Roll and propagate status. This means if two switch only events are next to each other, but not played exactly sequence then in order for the second event to have enough time to get ready, there must be at least Pre Roll + Post Roll + 10 frames from the end of the first event to the start of the second event. Thus, you can not put a hard start or change the timing of the second switch only event with the same ID for the event to be played reliably unless the operator is aware of this issue.
GPI Diagram

The following diagram below shows its pin assignments.

Legend:
- DI\_in\_L: digital input low, channel n
- DI\_in\_H: digital input high, channel n
- GND: ground
- NC\_n: normal close pin of relay n
- NO\_n: normal open pin of relay n
- COM\_n: common pin of relay n

Diagram:

```
NC0.1  20. NO3
COM 0.221. COM 3
NC0.322. NC3
ND14.23. ND4
COM 1524. COM 4
NC 16.25. NO5
NC27.25. COM 5
COM 2.827. ND6
NC2.928. COM 6
NC7.1029. GND
COM 7.1130. DI\_L
DH\_1.231. DI\_L
DH\_1.322. DI\_L
DH\_1.432. DI\_L
DH\_1.534. DI\_L
DH\_1.635. DI\_L
DH\_1.736. DI\_L
DH\_1.837. DI\_L
DH\_1.9
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