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PENNYWISE
PERIPHERALS

Pennywise™ Cinema Automation Unit
Patching CA21 Operations

Revision 1.1

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Patching CA21 Operations

1 Introduction

A Patch feature is now available on the CA21. Functions associated with various operations can be expanded using patches entered via the CA21 front panel.

The CA21 is supplied with preset functions. These functions are built into the firmware in PROM and define the various relay operations and other checks which are performed.

Patching allows the preset functions to be enlarged, thereby adding to the flexibility of the CA21.

Preset functions in the firmware cannot be removed by patching.

The following operations can be patched.

(1) Operations in the program matrix except for DELAY and VOL CHG can be expanded by patching. When these operations are performed manually or in steps in session programs, the patch will also be performed.

(2) Some of the special function keys (F1, F2, etc) can be assigned functions by patching. These keys do not form part of session programs but will perform their assigned functions whenever they are pressed.

(3) Special sequences such as Film Break and Emergency Shutdown can also be expanded by patching.

For example, the “Projector Motor On” function preset into the firmware may just pulse relay 1. If it is decided later that Motor On should also turn on the xenon lamp, by closing another relay, the Motor On operation can be patched. It is not necessary to change the firmware PROM.

Patches are stored in RAM on the CA21 Processor Board and preserved by the battery when the CA21 is powered off. If the battery is replaced or disconnected for any reason, the patches will have to be cleared and re-entered.

2 Details of Patches

Each patch has up to 8 steps. Each step has the following structure.

<time delay> <relay number> <function>

The relay number is from 1 to the highest numbered output (relay or transistor) on the relay board. On the screw terminal relay board the relays are numbered from 1 to 40 and the transistor outputs are numbered from 41 to 56.

On the DIN connector relay board, relays are numbered from 1 to 48 (although relays 1, 17 and 33 do not exist.) There are no transistor outputs on the DIN connector relay board.

The time delay in a patch step is the time in seconds from the previous step until the current one is performed. Delays up to 10 seconds can be set in 0.1sec steps. Delays over 10secs are in units of 1 second up to a maximum of 99secs.

The function in a step is a type of relay operation. Each function is defined by a two-character code. Currently the following functions are available.

Patch Functions

Code	Function Performed
PU	Pulse relay. The relay will be closed for 0.5sec then opened again.
CL	Close relay. The normally open contact will close and the normally closed contact will open.
OP	Open relay. This function is the opposite of the CL function.
TG	Toggle relay. The state of the relay will be reversed. If it was initially open, it will be closed, and vice versa.
--	No function. A patch step with "--" is blank and does not operate any relay. However, its delay still has effect. Any blank functions at the very end of a patch are automatically deleted as they cause no action.

3 Patching

3.1 Accessing the Patch State

A special state is provided in the CA21 for manipulating patches. This state is accessed in essentially the same way as Setup. A PIN security code is entered using

the step arrow keys and the CUE key.

Different PIN codes are used for Patch and Setup. The state which is actually selected by the CA21 (Patch or Setup) depends on which PIN code is detected.

The Patch options are displayed in the Volume display when Patch is first selected. To cycle through the available options use the volume arrow keys. To perform an option press CUE when its code is being displayed.

Two options are available in Patch.

"CL" will clear all patches.

"PA" allows patches to be viewed and edited.

3.2 Clearing Patches

The "CL" option clears all the patches for all operations. It should be performed when a CA21 is first installed and switched on, or when the battery is disconnected.

The patches should also be checked and cleared if necessary when new firmware is installed in a CA21.

As a safeguard, if the CA21 detects that any patch has been corrupted, it will disable all patches and not perform any of them.

3.3 Editing Patches

3.3.1 Selecting an Operation to Patch

When the PA option is first selected, all patches are checked for errors. If any are found to be in error, the leftmost operation or function in error is selected automatically by lighting the LED above its key. The first step in error is selected and displayed.

If no errors are detected in any of the patches, the code "SEL" will appear in the Clock/Timer display. This code indicates that the CA21 is waiting for an operation to be selected for patching.

(1) To select a program matrix operation or function key to patch, press its key. The LED above the key will light and the first step of the patch will be displayed.

(2) To select a special sequence to patch (such as Film Break) press the PROG key.

A code identifying the first sequence will then be displayed in the Clock/Timer. Pressing PROG will step through the sequences which are able to be patched, displaying their corresponding code. The program number LED will also advance.

To select the displayed sequence and start patching it, press EDIT. The program number LED will indicate the number of the selected sequence and the first step of the patch will be displayed.

When patching of an operation or sequence is complete, press EXIT. The code "SEL" will then be displayed and another operation or sequence can be selected for patching.

3.3.2 How Patches are Manipulated

Patching is accomplished using the volume and timer displays and various keys.

(1) The step number of the patch currently displayed is shown by the LEDs in the step column on the left of the program matrix. Different steps can be selected using the step column arrow keys. It is not possible to advance past the last useful step of a patch.

(2) The details of each patch step are displayed in the Volume and Clock/Timer displays. The patch delay is shown in the Volume display. The patch function and relay number are shown in the Clock/Timer display.

(3) The patch delay can be changed using the Volume arrow keys.

(4) The patch relay number can be changed using the Clock/Timer arrow keys.

(5) The patch function is selected using the MAN key.

3.3.3 Editing a Patch

When an operation is initially selected for patching, its first step will be displayed.

If the patch is empty, the Volume display will show "--" and the Clock/Timer display will show "End". The step arrow keys will not advance the step number beyond 1.

If the step of the patch contains a function, its details will be displayed in the Volume and Clock/Timer displays.

To change the delay or relay number of a patch step, use the arrow keys for the Volume or Clock/Timer displays.

To change the function in the step, press the MAN key. The next function will be selected each time the key is pressed.

If the patch step is initially empty ("End" is displayed) a function must be selected before a new step can be created. The delay will then be initialised to 0.0 and the relay to 01. The delay and relay can then be changed.

When the patch for an operation has been finalised, press EXIT. The CA21 will then display "SEL" and wait for another operation to be selected for patching.

Pressing EXIT a second time will return to the Patch options.

Pressing EXIT a third time will return the CA21 to idle.

3.3.4 Cleaning Up Patches

Patch steps which have a blank ("--") function do nothing except wait for any delay set in them. Any blank steps at the end of a patch are redundant and will be deleted automatically when EXIT is pressed to complete editing the operation.

4 Examples of Patches

Suppose the Motor On and Motor Off functions preset in the firmware simply pulse relay 1 and pulse relay 2 respectively.

It is desired to switch the xenon lamp at the same time as the motor. The xenon is to be controlled by a relay which closes when the motor is turned on and opens when the motor turns off.

It is also desired to pulse a status relay which indicates when the motor has been running for at least 5 seconds.

The xenon and status relays can be switched by patching the Motor On and Motor Off operations.

Assume that relay numbers 35 and 36 are spare. Relay 35 is to be used to control the xenon lamp and relay 36 is to be the status relay.

The two patches are as follows.

Motor On Patch

Delay	Relay	Function	Comments

0.0	35	“CL”	close relay 35 immediately
5.0	36	“PU”	pulse relay 36 after 5.0 secs

Motor Off Patch

Delay	Relay	Function	Comments
0.0	35	“OP”	open relay 35 immediately