Film-Tech

PENNYWISE

P E R I P H E R A L S

CA21
Pennywise™ Cinema Automation
Operating Manual

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Contents

1 Introduction

This manual describes how to operate the Pennywise CA21 Cinema Automation Unit.

The CA21 enables movie sessions to be run automatically. It controls the lights, curtains, slide projector, sound processor, and film projector according to a predefined sequence of operations called a program.

Six different programs each of up to 16 steps can be stored in the CA21. Each program step defines a set of operations to be performed in response to a cue.

Cues can be generated by foils on the film, by the slide projector, by time delays built into program steps, or manually by pressing the CUE key on the CA21.

Typical operations in program steps are START MOTOR, HOUSE LIGHTS PRESET, DIGITAL SOUND, SET FADER TO 7.2.

By choosing the operations in each step of the program, including any delays, and the positions of cues on the film and slide projectors, the projectionist controls how a session will proceed.

CA21 AUTOMATION

PENNYWISE PERIPHERALS

MONO STEREO SR DIGITAL NON SYNC1 NON SYNC2 MUTE

6 5 4 3 2 1

5.9 VOLUME

12.38 CLOCK / TIMER

FADER REM

RUN DOWN | F1 | F2 | INTER LOCK | PROG

GO | EDIT | MAN | EXIT | CUE

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

START | STOP | MONO | STEREO | SR | DIGITAL | NON SYNC | STATIC SLIDE | SOUND SLIDES | TIMED SLIDES | W/S | C/S | 1.66 | HOUSE DOWN | HOUSE HALF | HOUSE UP | CURT OPEN | CURT CLOSE | FOYER | DELAY | VOL CHG

2 CA21 Front Panel Controls

A diagram of the front panel of the CA21 is shown on the previous page. The panel on your CA21 may have slightly different operations from those shown because of variations in cinema equipment or cinema operating procedures. However, the main functions of the CA21 remain the same.

The main area of the front panel is a 16 row by 21 column LED matrix. These LEDs display the details of the program currently selected.

Figure 2.1 The Program Matrix
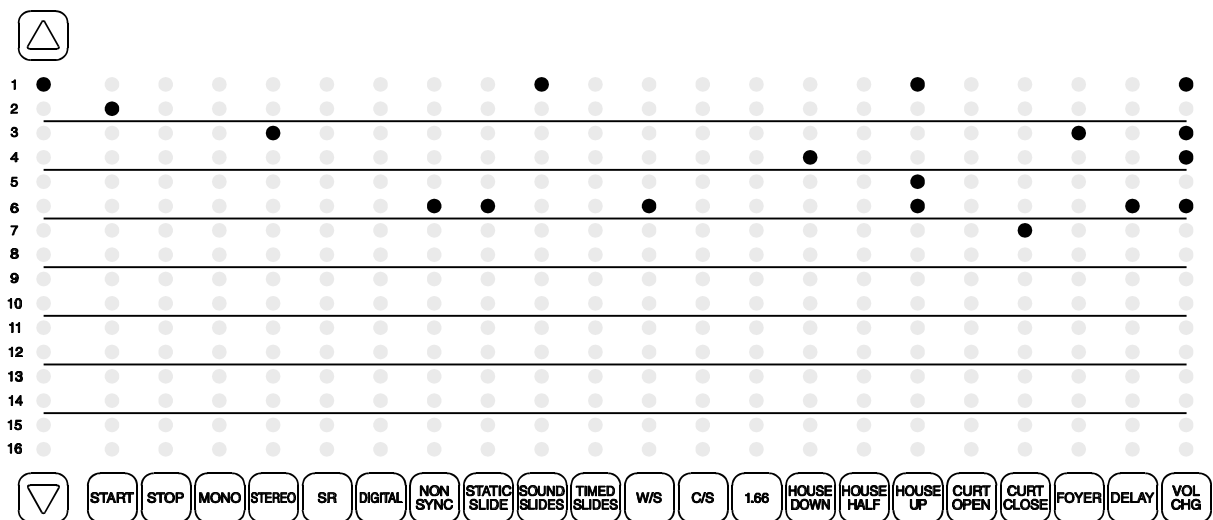
On the left of the panel is a single column of LEDs numbered from 1 to 16, with an arrow key at the top and bottom. These LEDs indicate the step which is currently selected. The step selected in the diagram is number 1.

The current step is the one to be executed next when a session is running, or the step being modified when editing a program. The two arrow keys can be used to change the current step.

At the bottom of the LED matrix are the operation keys. Their names define the cinema control operations they perform. These keys are used to set operations in program steps (edit programs) or to control the cinema manually. A few of these keys, such as SLIDES, are used to set values, such as the number of slides to be shown, when the CA21 is idle.

In the LED matrix, an operation is set in a program step if the LED in the row of the step and column of the operation is illuminated. For example, in the program shown in the diagram, step number 6 is for the end of the feature. This step contains the operations NON SYNC (sound format), STATIC SLIDE (show a slide), WIDE SCREEN (lense), HOUSE UP (lights up), DELAY (till the next step), VOL CHG (new volume setting).

The number of the selected program is shown by the six LEDs on the right of the panel above the PROG key. Pressing the PROG key cycles through the six different programs. The LED matrix will be updated each time to display the selected program. In the diagram program number 1 is selected.

Figure 2.2 Program Number Selection
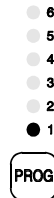
The keys labelled GO, EDIT, MAN and EXIT are used to control the overall operation of the CA21. GO is used to run a session, EDIT is used to edit a program, MAN is used to operate cinema equipment manually, and EXIT is used to terminate these functions and return the CA21 to the idle or standby state.

Figure 2.3 Keys Which Control CA21 Operation
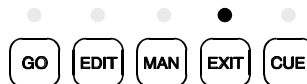
The key labelled CUE can be used to generate a cue manually when a session is running. CUE is also used sometimes as an enter key, for example when setting the time of day clock.

The two-digit display labelled VOLUME indicates the volume set on the sound processor which is controlled by the CA21. The two arrow keys on the right of the display are used to program a volume setting into a program step or to adjust the current volume manually. The volume is currently set to 5.9.

Figure 2.4 Sound Processor Fader

The FADER REM key beside the volume display allows the volume to be controlled by the remote fader in the CA21 or the local fader in the sound processor itself. This key is not necessary with modern sound processors which can be controlled by a serial interface. With these the local and remote faders are always both active..

On the right-hand edge of the front is a column of LEDs labelled with sound processor formats. These LEDs may be driven from the sound processor to indicate the format currently selected. In the diagram digital sound is currently selected.

Figure 2.5 Sound Format Status LEDs

○ MONO
○ STEREO
○ SR
● DIGITAL
○ NON SYNC1
○ NON SYNC2
○
○ MUTE
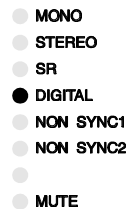
The four-digit display labelled CLOCK/TIMER is used mainly to schedule the starting time of the next session. It is also used to handle delays which have been set in program steps. When the timer is not otherwise busy, it will be showing the current time of day in 24 hour mode.

The two arrow keys to the right of the timer are used to change the value in the timer display. For example they are used to set the starting time of the next session or to set a delay time in a program step.

Figure 2.6 The Clock

$$12.38 \quad \triangle \ \triangledown$$

CLOCK / TIMER

The row of keys above EXIT and with PROG on the right select special functions. They may vary from one version of the CA21 to another.

The RUN DOWN key is normally present. It is used to position the film at the starting point by turning on the projector motor until a cue is detected on the film.

INTER LOCK is also normally provided. It enables a single copy of a film to be shown in several cinemas at the one time by synchronising the projector motors.

The F2 key is used with CA-Link, the central control software which allows CA21s to be networked to a central PC.

The F1 has various functions depending on the CA21 configuration in use.

Figure 2.7 Special Function Keys

○   ○   ○   ●   ●1

[RUN DOWN] [F1] [F2] [INTER LOCK] [PROG]
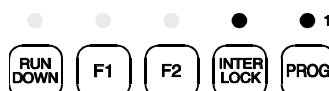
3 Getting Started

Switch on the CA21. The wall mounting model has a power switch on the right-hand end of the cabinet. The console unit may not have a switch but will be turned on when the other equipment is powered on.

3.1 Self Test

When the CA21 is first switched on it carries out a self test and displays its software version.

After the leds are scanned the release date of the software is displayed in the volume display and timer. The volume display shows the last two digits of the year and the timer shows the day and month, eg 2004 means the 20th April.

The CA21 then checks its programs in memory to see if any have been corrupted. If so it will flash the number of the faulty program.

If a program number LED flashes, press EDIT and check the program, repairing it if necessary. Then press EXIT. Repeat this process for each damaged program. (More will be said later about editing programs and the reasons for them becoming corrupted.)

3.2 Setting the Time of Day Clock

Assuming the self test has found no problems the CA21 will start up in the idle state with the LED above the EXIT key on.

The CA21 will display a program and show the time of day.

After a short time the volume will change to the initial setting. The initial setting is normally a setup option.

The correct time is maintained by a battery when the CA21 is powered off. However the clock should be checked when the CA21 is powered on and adjusted if necessary.

To set a new time of day in the clock the CA21 must be idle as indicated by the led above the EXIT key. If the CA21 is not idle press EXIT.

(1)   Use the two arrow keys on the right of the clock display to set the new time. Holding a key down will cause the time to change in larger steps.

(2)   While the time is being set the decimal point on the clock stops flashing.

(3)   Once the new time has been set, press the CUE key twice. The clock will start from the new time on the second press of CUE and the decimal point will start flashing again.

(4)   If EXIT is pressed before CUE is pressed twice, the new setting will be aborted. The clock will revert to its original time and the decimal point will start flashing again.

3.3 When the CA21 is Idle

The CA21 is idle when the LED above the EXIT key is on. Pressing EXIT one or more times will return the CA21 to idle and terminate whatever else it was doing. The CA21 pictured in the diagram on page 2 is idle.

When the CA21 is idle many of the front panel keys will not do anything. In particular most of the operation keys below the program matrix will not respond. However, a few of them may be used for special functions in the idle state. For example, the number of sound slides to be shown is set in this way.

The LEDs above some of the special function keys may indicate the state of their functions. For example if the LED above the INTERLOCK key is on, the CA21 is set for interlocking.

The sound processor fader can be changed using the CA21 VOLUME arrow keys. If the sound processor is driven by a serial interface, volume changes made using the CA21 arrow keys will cause the volume displayed on the sound processor to change in the same way.

The RUN DOWN key will work in idle state (in fact it will work in any state). It will start the projector motor and run it until a cue is detected on the film or until the RUN DOWN key is pressed again. Whilst run down is in progress, the LED above the key will be lit.

4 Manual Operation of Equipment from the CA21

4.1 Manual Operation From Idle

If the MAN key is pressed when the CA21 is idle the CA21 enters manual. The LED above the MAN key will be illuminated.

In manual, cinema equipment can be operated directly by pressing the operation keys at the bottom of the program matrix.

For example, you can operate the house lights by pressing the house light keys HOUSE UP, HOUSE PRESET or HOUSE DOWN.

Operating equipment manually from the CA21 will generally have the same effect as pressing buttons on the equipment itself. But there may be some variations depending on how the cinema has been wired up and on the configuration of the CA21. The CA21 operations may have additional operations built in. For example pressing HOUSE DOWN on the CA21 may also do STAGE DOWN.

The two keys DELAY and VOL CHG do not function manually. They are only used when editing programs (as described in the next Sections).

To return the CA21 to idle press the EXIT key.

4.2 Performing Manual Operations from Run

When the CA21 has been scheduled to run a session or has actually started to run a session it is possible to branch out of run temporarily, go to manual, and then return again. (It is also possible to branch to edit as described in the next Section.)

(1)   To enter manual from run press the MAN key. The LED above MAN will turn on but the LED above the GO key will remain on.

(2)   Operations can then be performed manually in the same way as entering manual form idle.

(3)   To return to the running program at the original point press EXIT once. The LED above the MAN key will then go out leaving only the LED above GO on.

Note that when the CA21 is in manual it will not respond to cues from any source. Any programmed delay will keep counting down but if it reaches zero when the CA21 is still in manual the cue will be lost.

5 Editing Programs

5.1 Editing Simple Operations

Before the CA21 can be used to control a session a suitable program must be set up in its memory. This process is called editing.

An operation is included in a program step when the LED in the step's row and the operation's column is on. For example in the diagram on page 2 the first step contains the operations SOUND SLIDES, HOUSE UP, and a VOLUME CHANGE.

To edit a program, use the following procedure. The DELAY and VOL CHG (volume change) operations are a little more involved and are described in the following Sections.

(1)   Select edit by pressing the EDIT key whilst the CA21 is idle. The LED above the EDIT key will then turn on.

(2)   Select the program to be edited using the PROG key. Once editing has started, it is not possible to select a different program. It is necessary to return to idle by pressing EXIT and then to re-enter edit state by pressing EDIT again.

(3)   Select the step to be edited using the two arrow keys.

(4)   To include or exclude an operation in the step, press the operation key at the bottom of the LED matrix. When the LED in the step's row and the operation's column is on, the operation is included in the step. When the LED is off the operation is not included in the step.

(5)   A check is built in to prevent conflicting operations being set in a program. For example it is not possible to set HOUSE LIGHTS UP and HOUSE LIGHTS DOWN in the same step.

5.2 Editing Delays

Delays are used during a session to execute steps automatically after a certain time. They effectively cause a cue to be generated after the delay time.

When a session is running and a step is performed which contains a delay, the next step of the program will be performed after that delay.

A step contains a delay if the LED is on in the DELAY column of the program matrix. In edit the size of the delay will be displayed in the timer in minutes and seconds. If there is no delay in the current step, "0.00" will be displayed in the timer.

When a session is running and a delay is in progress, the timer counts down in seconds to indicate how much of the delay remains. When there is no delay active the timer shows the time of day.

Setting a delay in the current step involves the use of the DELAY operation key in conjunction with the timer display.

(1)   Set the size of the delay in minutes and seconds using the TIMER/CLOCK arrow keys. Holding down an arrow key will cause the delay to change in large steps.

(2)   Press the DELAY key. If there was no delay in the step previously, the LED in the DELAY column of the current step will turn on. If there was a delay there previously, the LED with go out briefly and then come back on.

To remove a delay from a step, simply press the DELAY key without first touching either of the two arrow keys. The LED in the matrix will then go out and the timer display will return to 0.00 to indicate the delay has been removed.

5.3 Editing Volume Changes

Where a LED is on in the VOL CHG column, it indicates that a fader setting has been specified in the step. When a session is running and that step is executed, the sound processor fader will be set to the new setting.

In edit the volume display shows the volume level programmed at the current step. In other states the volume display shows the sound level currently set on the sound processor.

There does not have to be a volume change in every step of a program. If the current step does not contain a volume change but there is a change programmed into an earlier step, then the volume display will show the setting from that earlier step.

In other words, in edit, the volume display shows the volume which would be set at each step if the program has been run up to that point.

If the volume display is blank, it means that no volume has been set in the current step or any of the previous steps.

To insert a volume change in the current step, or alter an existing volume change in the step, proceed as follows.

(1)   Set the volume display to the desired value using its arrow keys.

(2)   Press the VOL CHG key. If there was no volume change in the step previously, the LED in the VOL CHG column of the current step will turn on. If there was a volume change there previously, the LED with go out briefly and then come back on.

To remove a volume change from a step simply press the VOL CHG key without first touching either of the two arrow keys. The LED in the matrix will then go out and the volume display will change to display the nearest setting in an earlier step.

5.4 Inserting and Deleting Whole Steps

It is sometimes useful to be able to delete a complete step from a program or to create space to insert an additional step.

When a step is deleted, all the following steps move up one to replace the deleted step. The last step (16) is cleared.

When a step is to be inserted, all the following steps move down one to make room for the new step. The new step will be blank and the last step is shifted off the bottom of the program and lost.

To insert or delete a step the CA21 must be in edit.

(1)   Set the current step to where the insertion/deletion is to take place and press the EDIT key. The current step LED will start flashing.

(2)   To delete the current step, press the up arrow key. All the lower steps will then move up one.

(3)   To create space for a new step at the current one, press the down arrow key. All the lower steps, including the current one, will then move down to leave the current step blank.

If you press EDIT and the step LED starts flashing but you decide you do not want to proceed with an insertion or deletion, press any key other than the step arrow keys. The step LED will then stop flashing but nothing else will change.

5.5 Editing When in Run

When the CA21 has been scheduled to run a session or has actually started to run a session (see next section) it is possible to branch out of run temporarily and go to edit..

(1)   To enter edit from run press the EDIT key. The LED above EDIT will turn on but the LED above the GO key will remain on.

(2)   Once in edit, a different program can be selected and the current step can be changed. All normal editing functions can be performed.

(3)   To return to the running program at the original point press EXIT once. The LED above the EDIT key will then go out leaving just the LED above GO on. The program which had been running will be selected again at its current step.

Note that when the CA21 is in edit it will not respond to cues from any source. Any programmed delay will keep counting down but if it reaches zero when the CA21 is still in edit the cue will be lost.

6 Running Sessions

6.1 What Happens During a Session

When a session is running the CA21 operates the equipment in the cinema automatically as specified by the selected program. The led above GO is on.

The CA21 waits until a cue is received (for example from a foil on the film) and then performs the operations in the current program step. The current step advances by one and the CA21 waits for a cue again.

This process continues until all of the remaining steps in the program are empty. The CA21 then returns to idle.

During a session the CA21 monitors fail safe inputs such as film break and xenon fail. If any one of these is detected, a special fault sequence of operations will be performed Fail Safe operation is discussed in Section 8.

The session can be aborted at any time by pressing EXIT.

6.2 Ways of Starting Sessions

Sessions can be started in the following ways.

(1)   By pressing GO.

(2)   By scheduling a starting time using the timer.

(3)   If the CA21 is provided with a remote start button, pressing it will start a session.

(4)   When a CA21 is part of an interlocked group, starting a session on any CA21 in the group will cause the other CA21s in the group to start sessions as well.

A session starting time can be set in two ways.

(1)   The timer can be set using its arrow keys,

(2)   The time of the next session can be obtained from CA-Link (central control PC software) by pressing the F2 key.

There are two setup options which influence the way sessions start.

(1)   Auto Go "AG". Auto Go affects the way sessions start without the use of the timer. If AG = 1, pressing GO will start the session and perform the first program step immediately. If AG = 0, pressing GO will just put the CA21 into run. To perform the first step it is necessary to generate a cue, usually by pressing the CUE key.

(2)   Auto Sessions "AS". This option applies when session starting times are obtained from CA-Link.   If AS = 0, the CA21 returns to idle after it completes each session. To schedule the next session F2 and GO must be pressed again. If AS = 1, the CA21 remains in run after completing a session. It then automatically obtains the starting time of the next session from CA-Link and schedules it.

6.3 Starting a Session Directly

To start a session directly, first ensure the CA21 is idle. Pressing EXIT will return it to the idle state.

(1)   Select the program to be used for controlling the session by pressing the PROG key.

(2)   Select the step where the program is to start. Normally this will be step 1.

(3)   Press the GO key. The LED above the GO key will turn on indicating the CA21 is in run.

(4)   If the AG (auto go) setup option is set to zero the first step of the program will not be performed until CUE is pressed. If AG is set to one the first step will be performed immediately GO is pressed.

6.4 Starting a Session Using the Timer Without CA-Link

To start a session at a specified time, set the timer to the starting time and press GO. The timer then starts counting down.

Timing can be aborted at any time by pressing EXIT.

(1)   First ensure the CA21 is idle. Press EXIT if necessary.

(2)   Select the program to be used for controlling the session by pressing the PROG key.

(3)   Select the step where the program is to start.

(4)   Set the starting time in the timer by using the arrow keys. A starting time can be set anywhere within the next 24 hours. To change the timer in larger jumps, hold an arrow key down.

(5)   Press the GO key but do not press CUE.

(6)   The led above GO will start flashing and the timer will show the time remaining and start counting down. The time remaining is displayed in hours and minutes except during the final minute when seconds are displayed.

(7)   When the timer reaches zero, the first step of the program will be performed automatically.

If the timer is counting down but you want to start the session early, simply press CUE, or if the CA21 has a remote start button press it.

The timer can be aborted by pressing EXIT or by presing the remote stop button if the CA21 is equipped with one.

6.5 Starting a Session Using the Timer With CA-Link

The PC central control software CA-Link allows a data base of session starting times and program numbers to be held on the PC. The time of the next session and the program number to be run can obtained from the PC by pressing F2 on the CA21.

There are two modes of operation depending on a setup option "AS" which stands for auto sessions.

If auto sessions is not set it is necessary to press F2 to get the details of each session and then press GO to stasrt the timer.

If auto sessions is set, once F2 has been pressed the CA21 automatically obtains the details of each session from CA-Link and schedules it.

6.5.1 Starting a Session Without Auto Sessions

When Auto Sessions is not set it is necessary to press F2 for each session to get the starting time and program number.

(1)   First ensure the CA21 is idle. Press EXIT if necessary.

(2)   Press F2 to obtain the starting time and program number of the next session. If there is no session "----" will be displayed in the timer. If CA-Link is not active

"noPC" will be displayed in the timer. These messages are cleared by pressing EXIT.

(3)   If a session is available its time will be displayed and the associatged program will be selected. Press GO to start timing but do not press CUE.

(4)   The led above GO will start flashing and the timer will show the time remaining and start counting down. The time remaining is displayed in hours and minutes. Except during the final minute when seconds are displayed.

(5)   When the timer reaches zero, the first step of the program will be performed automatically.

If the timer is counting down but you want to start the session early, simply press CUE, or if the CA21 has a remote start button press it.

The timer can be aborted by pressing EXIT or by pressing the remote stop button if the CA21 is equipped with one.

6.5.2 Starting a Session With Auto Sessions

When the Auto Sessions option is set it is only necessary to press F2 to get the first session running. From there on as each session completes the starting time and program of the next one will be obtained automatically from CA-Link and be scheduled.

Starting the first session is similar to running without auto sessions.

(1)   First ensure the CA21 is idle. Press EXIT if necessary.

(2)   Press F2 to obtain the starting time and program number of the next session. If there is no session "----" will be displayed in the timer. If CA-Link is not active "noPC" will be displayed in the timer. The message can be cleared by pressing EXIT.

(3)   The led above F2 will remain on to indicate auto sessions mode.

(4)   If a session is available its time will be displayed, the program will be selected and the timer will start counting down. It is not necessary to press GO.

(5)   The led above GO will start flashing and the timer will show the time remaining and start counting down. The time remaining is displayed in hours and minutes. Except during the final minute when seconds are displayed.

(6)   When the timer reaches zero, the first step of the program will be performed automatically.

If the timer is counting down but you want to start the session early, simply press CUE, or if the CA21 has a remote start button press it.

The timer can be aborted by pressing EXIT or by pressing the remote stop button if the CA21 is equipped with one but auto sessions mode will also be terminated. To get auto sessions going again it is necessary to press F2 to restart it as described above.

7 Driving the Cinema Equipment

The actual operations provided on the CA21 can vary from one installation to another, depending on the cinema equipment used and the preferred operating procedures of the cinema.

An additional "Configuration Manual" is normally provided with the CA21. This manual defines the exact functions performed by each front panel operation key for your particular configuration.

The following sections give some examples and strategies for driving the various pieces of equipment in the cinema.

The discussion is fairly general and attempts to cover the various ways of controlling equipment.

7.1 Controlling the Film Projector
7.1.1 Functions Controlled

The CA21 can control the following film projector functions.

(1)   Switch the xenon lamp on and off although the xenon is often controlled manually,

(2)   Start and stop the projector motor,

(3)   Turn the picture on and off using the change over shutter,

(4)   Rotate the turret to one of two or three positions and change the masking to suit.

(5)   Turn the exciter on and off.

The way in which these functions are controlled by the CA21 may vary somewhat from one installation to another.

More than one function may be built into each front panel operation. For example there may not be picture control keys on the CA21 front panel. Instead the picture will be turned on when a film sound format, such as digital, is selected and turned off when a non sync sound format is selected.

Sometimes an AUTO START operation is provided which performs the whole sequence of operations required to start showing a film. It may open the curtains, turn the lights down, switch on the xenon lamp, turn on the exciter, and start the projector motor.

7.1.2 Run Down

When threading the film the RUN DOWN key enables the projector motor to be run until a cue is detected on the film. The film will be positioned automatically at the first cue in readiness for the session.

When run down is in progress and waiting for a film cue, the LED above the RUN DOWN key is lit.

Run down completes and the projector motor is turned off when one of the following events happens.

(1)   A film cue is encountered. This is the normal way run down completes.

(2)   The motor is turned off manually from the CA21 front panel.

(3)   The motor is turned off by the button on the projector itself, providing the CA21 is able to monitor the state of the projector motor. This ability is not provided on all projectors.

(4)   RUN DOWN is pressed a second time. The run down function is then aborted and the projector motor is stopped immediately without waiting for a cue.

7.1.3 Starting the Projector

The film projector motor will usually be started during a session when the last slide is being shown.

When the projector motor is switched on it takes time to come up to speed and stabilise. A sufficient leader must be provided at the start of the film so that the feature is not reached until the projector is running smoothly. Only then should the picture be turned on and the required sound format selected.

Two program steps are normally used. The first step is performed by the slide cue generated by the final slide. It just starts the projector without opening the shutter. The slide projector is not turned off yet so the final slide remains on the screen.

Once the projector is up to speed and the feature is reached a second program step is performed. It switches the sound processor to the appropriate film format and opens the

shutter. At the same time the slide projector is turned off so there is a smooth transition from slide to film.

The cue to perform this second step is best produced by a foil on the film at the start of the feature. But it may be produced by a carefully determined delay in the program step which starts the projector.

In some cinemas the curtains may be closed in between the slides and the start of the film. The procedure is then somewhat different from that described above.

7.1.4 Controlling the Picture

The picture is either controlled by the dowser or the change over shutter. It depends on the projector in use.

There may be PICTURE ON and PICTURE OFF keys on the CA21 but more often control of the picture by the CA21 is linked to the sound format. There is then no need for special picture control keys.

When the CA21 selects a film sound format, such as digital, SR, stereo, it will also turn the picture on. When the CA21 selects a non film format, such as non sync 1 and non sync 2, the picture will be turned off.

It is important to realise that the CA21 provides this dual function. If a sound format is selected using the sound processor controls rather than the CA21, the picture will not be altered.

7.1.5 Changing the Film Format

When the CA21 changes the film format (using keys such as WIDES and SCOPE) it will rotate the turret and may also alter the masking.

To prevent picture being sprayed over the ceiling when the turret is rotated, the picture must be turned off during the rotation.

The CA21 will automatically check if the picture is on when a turret rotation is performed. If the picture is on, the CA21 will close the change over shutter before rotating the turret. The picture will not be turned on again until the turret has stopped in its new position.

Because projectors take varying times to complete the turret rotation, the actual timing of the picture control can be set by options in the CA21 setup.

Some projectionists prefer to splice in black film during a turret change rather than close the shutter. There may be also be a setup option which causes the picture to be left on during a turret rotation.

If the projector itself turns off the picture while the turret is rotating the CA21 does not need to worry about the picture. The CA21 can leave the picture on during the turret rotation.

7.1.6 Stopping the Film Projector

The CA21 can use film break to automatically turn off the projector motor when the film runs out. As explained in section 8 on Film Breaks, the CA21 interprets a film break with the picture shutter closed as the physical end of the film. The CA21 responds by stopping the projector motor.

The last cue on the film should be at the end of the feature. The corresponding step will close the shutter to turn off the picture. It can also turn up the lights and switch to non sync sound. The projector motor is left running.

The CA21 will turn the motor off automatically when the film break is eventually detected at the physical end of the film.

7.2 Controlling the Slides

Not all cinemas show slides. Even when they do, there are various types of presentations. The two most common ones are timed slides and sound (or talkie) slides. The CA21 may also provide an operation to show a static slide.

7.2.1 Static Slide

Often at the start and end of a session a static slide is shown. All the CA21 does is turn on the slide projector. The static slide is the one in the current carousel position and will be shown when the slide lamp turns on.

7.2.2 Timed Slides

The CA21 shows timed slides by advancing to the next slide at regular intervals (usually every 12 seconds). However, some slide projectors may have their own timer. The CA21 then only has to start the slide projector at the beginning, and stop it at the end of the presentation.

7.2.3 Sound Slides

For sound slides, there is an associated tape unit (or perhaps a mini disk) with sound commentary on one or more tracks. Pulses are recorded on another track to mark when the next slide has to be shown.

Different schemes are available for showing sound slides using the CA21. There may be a special control unit which picks up the slide advance pulses from the tape and feeds them directly to the slide projector. The CA21 then only has to be able to start the slide presentation and stop it.

Alternatively, the CA21 can perform the role of the control unit. The tape pulses are fed to the CA21. Each time a pulse is detected, the CA21 instructs the slide projector to show the next slide.

In both cases the CA21 will start the tape at the beginning of the slides and stop the tape and rewind it at the end of the slides. It may also reset the slide carousel to the home position.

7.2.4 Detecting the Last Slide

With both timed and sound slides, the CA21 needs to be able to detect when all slides have been shown so that a cue can be generated to continue with the program. Two methods of detection are available.

The slide projector can be equipped with a cue detector to detect the last slide. The cue detector may require a foil to be placed on the carosel opposite the final slide.

Alternatively the CA21 can be told how many slides are to be shown. It will then generate the cue itself without the need for a cue detector.

When the last slide is detected, the CA21 will stop advancing the sides. But it will leave the projector on still showing the last slide.

7.2.5 Turning off the Slide Projector

Assuming the film follows immediately after the slides, the step of the program which is triggered by the final slide will turn on the film projector motor.

As explained in section 7.1.3 above, the film picture will not be turned on until the projector is up to speed and the feature has been reached. The last slide remains on the screen till then to ensure a smooth transition from slides to film.

An operation which turns off the slide projector should be put in the program step which actually turns on the film picture.

In some cinemas there is no STOP SLIDES key. There may not even be a PICT ON key. Instead both functions (stop slides and picture on) are performed when a film sound format is selected.

The way in which the slide projector is turned off by the CA21 depends on the projector. Some projectors only have a single switch which turns off the lamp and the power at the same time.

More advanced projectors have separate lamp and power controls. The CA21 will then turn the lamp off immediately but keep the power on for some time so that the blower cools the lamp down.

Even more advanced projectors may have a standby mode. The projector is switched on manually at the beginning of the day and left on for the whole day's operation. The CA21 then switches the projector in and out of standby as required. Some Kodak Ektapro projectors have this feature when driven by their serial port.

7.2.6 Specifying the Slide Count

When a slide count is used to determine the final slide, it is necessary to enter the value into the CA21. There may be counts for timed slides, sound slides or both, depending on the types of slides shown.

(1)   To inspect or alter the slide counts, press one of the slide operation keys whilst the CA21 is idle. The actual key used, depends on the front panel operations on the particular CA21.

(2)   Either "nS" or "nt" will appear in the volume display. "nS" means set the number of sound slides, and "nt" means set the number of timed slides.

(3)   The corresponding count will be displayed in the timer.

(4)   Use the timer arrow keys to adjust the count and then press the CUE key to lock the new value in.

(5)   Pressing the volume arrow keys will alternate between "nS" and "nt" (if both counts are available).

(6)   Repeat the process to alter the counts as required.

(7)   Press EXIT to return to idle.

7.3 Controlling the Sound Processor

The CA21 allows the sound level and format to be changed on the sound processor. A set of status LEDs is also provided to show what format the sound processor is currently set to.

However, there are a wide variety of sound processors on the market. Their operation varies somewhat and not all their functions may be able to be controlled from an automation unit. For instance, not all processors provide format status information which can be used to drive the CA21 status LEDs.

7.3.1 Controlling the Fader Level

Most sound processors can have their volume set either by their own local fader or a remote fader. The CA21 simulates the remote fader.

Providing the sound processor allows it, the FADER REM key on the CA21 can be used at any time to switch between the local fader in the sound processor and the remote fader in the CA21. The LED above the FADER REM key will be on when the remote fader is selected.

Sound processors with serial interfaces allow both the local and remote faders to be active together. There is no local/remote switch. The volume display on the CA21 will then track that on the sound processor and vice versa.

In all normal CA21 states except edit, the volume display on the CA21 shows the remote fader level currently set. Pressing the arrow keys will change the level. The arrow keys thus provide a convenient way of adjusting the volume manually.

The CA21 fader provides 100 different levels from 0.0 to 9.9.

When a program step containing a volume change is executed during a session, the CA21 fader will change to the programmed level. The level changes smoothly at the fader slew rate.

7.3.2 Changing the Sound Format

The sound format operation keys on the CA21 allow format changes to be performed in programs or to be changed manually.

In some cinemas the CA21 will fade the sound level down and up again when the sound format is changed. The change from one format to another is then less abrupt. Some sound processors perform this cross fading themselves.

7.3.3 Other Functions Coupled to Sound Format Changes

The sound format used for sound slides is usually non sync 2. There may not be an operation key on the CA21 to select this format. Alternatively the sound processor may be switched to non sync 2 as part of the CA21 operation which starts the sound slides.

Often other functions will be coupled in the CA21 to sound format changes. Often the CA21 turns the picture on when a film format (Stereo, SR, Digital etc) is selected. The picture is turned off again when a non sync format is selected.

The slide projector may also be turned off when a film format is selected by the CA21.

It is important to realise that in these cases the additional functions will only occur if the sound format change is performed by the CA21. If a format change is caused by pressing a button on the sound processor itself, any functions coupled to the format change in the CA21 will not be performed..

7.3.4 The Sound Format Status Display

The CA21 has a column of LEDs which can display the sound format currently selected. These LEDs can only be driven if the sound processor is able to provide status information in a suitable form to the CA21.

7.4 Controlling Lights and Curtains

Your installation may not have stage lights or curtains. Even if it does, they may not have separate CA21 front panel operations.

To minimise the number of front panel operations, the stage lights may be linked to the curtains. If so, the curtain open operation will usually turn the stage lights down and the curtain close operation will turn the stage lights up.

Sometimes there are two different house light preset levels but only one house light preset operation on the CA21 front panel. One preset level will then be selected when the house lights are being brought down and the other level will be selected when the house lights are being brought up.

8 Interlocking

8.1 How Cinemas are Interlocked

Interlocking of projectors is provided for showing a single print simultaneously in more than one cinema. All the projectors showing the print must be synchronised so they start and stop together. Faults on any one of them affect all the projectors showing the print.

8.1.1 Prewired Groups

The original way of interlocking involves wiring CA21s into interlocked groups when they are installed. For example cinemas 1, 2, and 3 may have been prewired in this way.

The actual cinemas in the interlocked group can be selected from the prewired group for each session using the INTERLOCK key on the CA21. Pressing INTERLOCK in idle includes/excludes a cinema from the group. When the led above the key is off the CA21 is excluded from the group.

For example cinemas 1, 2 and 3 may have been wired for interlocking. If only cinemas 1 and 2 need to be interlocked for a particluar session, cinema 3 can be excluded. Press INTERLOCK in idle on the CA21s for cinemas 1 and 2 so that the led turns on. Press INTERLOCK on the CA21 for cinema 3 so the led is off. Cinema 3 will then operate normally and be unaffected by what happens to the projectors in cinemas 1 and 2.

8.1.2 Interlocking Using RS-485 Without CA-Link

8.1.3 Interlocking With CA-Link

8.2 How Projectors Operate When Interlocked

When several projectors are interlocked their motors will all be turned on and off together. Also, if a fault such as film break is detected on any one of the interlocked projectors, the film break sequence will be run in all the interlocked cinemas.

Note that the CA21 can only act on faults which are signalled to it. Some fault conditions may not actually be detected by the equipment so the CA21 will not know about them. For example a broken projector motor belt may not be detected. Ideally the film tension should be checked between each interlocked projector.

No particular CA21 in an interlocked group needs be the master. Any CA21 in the group can be used to start or stop the motors. In fact start and stop can be performed by different

CA21s. But only one CA21 in the group should attempt to start the motor and only one should attempt to stop it.

The RUN DOWN key will operate with interlocking and will start the motors on all projectors selected for interlocking in the group. However only the CA21 where RUN DOWN was pressed will detect the cue on the film and stop the motors.

When cinemas are interlocked all their projector motor functions must be performed from the CA21 and not by using the projector's own controls. That is unless motor feedback wiring has been included in the installation. Only then can the CA21 detect if a projector motor has been turned on or off at the projector itself.

9 Fail Safe

9.1 Film Break

Film break is detected via the film break input. This may come from the platter or a sensor on the projector.

The conditions for a film break fault vary with the CA21 configuration. In general a film break fault only occurs when the projector is running and the picture is on. The film break input will be ignored if the film is being run down (see Section 7.1.2 earlier).

When a film break occurs the action taken depends on whether the picture is on. Again there are variations depending on the CA21 configuration.

(1)   If the picture is off when film break is detected it is assumed that the physical end of film has been reached and that a fault has not occurred. The projector motor is just turned off.

(2)   If physical end of film is detected on an interlocked projector, only the motor on that projector is turned off.

(3)   If a film break is detected when the picture is on, a fault is assumed to have occurred. The film break sequence of operations is performed and the projector motor is turned off. The beeper sounds on the CA21 and "Fbr" is displayed in the timer. Associated status panels flash their red led for the cinema and beep.

(4)   When a film break fault is detected on an interlocked projector, the motors on all the interlocked projectors are turned off. The film break sequence is also performed on those interlocked CA21s which have their pictures on. The CA21 which detected the fault beeps and displays "Fbr" in its timer. Associated status panels beep and flash their red led for the cinema which detected the fault.

(5)   To clear the fault condition on a CA21 (stop the beeping and restore the timer) press any key on the CA21.

9.2 Xenon Fail

Xenon fail is detected via the xenon fail input. The input works in reverse. When the xenon lamp is on the input is off and vice versa.

The conditions which lead to a xenon failure depend on the configuration for the CA21. Variations occur as some CA21s do not control the xenon directly. But generally if the picture is turned on and the xenon fail input indicates the xenon is off a fault is taken to have occurred.

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(1)   When a xenon failure occurs without interlocking, the CA21 turns off the projector motor and performs the film break sequence. The CA21 indicates a xenon failure has been detected by beeping and displaying "LFL" in its timer. Associated status panels beep and flash their red led for the cinema which detected the fault.

(2)   When a xenon failure occurs on an interlocked projector, the film break sequence is only performed by the particular CA21 which detected the failure. All the motors of the interlocked projectors are left running and no other CA21 in the group performs the film break sequence. The CA21 which detected the failure beeps and displays "LFL" in its timer. Associated status panels beep and flash their red led for the cinema which detected the fault.

(3)   To clear the fault condition (stop the beeping and restore the timer) press any key on the CA21.

9.3 Emergency Shutdown

An emergency input may be provided so that if there is a reason to evacuate the cinema, such as a fire alarm, a special emergency sequence will be performed. This sequence of operations is built into the CA21 and depends to a certain extent on the actaul configuration.

The normal emergency sequence shuts down the projector, turns the house lights up, and mutes the sound. The beeper on all the CA21s receiving the emergency signal sound their beeps and display "EGY" in their timers. Associated status panels also beep.

10 Setup

This is a special state which can be used to perform privileged functions, such as clearing all programs, and to set values such as time delays which are built into some operations.

As an example, consider the operation which rotates the projector turret to a new lens position. The typical procedure followed by the CA21 is as follows (although it may vary for different projectors).

(1)   Turn off the picture if it was on.

(2)   Wait a short time to ensure the picture is actually off.

(3)   Instruct the turret to rotate.

(4)   Wait sufficient time for the turret to reach its final position.

(5)   Turn the picture back on if it was initially on.

The time delays in steps (2) and (4) above may vary from one projector to another. They are best determined once the projector has been installed in the cinema. The resulting values are entered into the CA21 using setup.

To restrict access to setup, a PIN security scheme is provided. Each digit of the PIN is set as a step number and then entered by pressing the CUE key as follows.

(1)   With the CA21 in idle state set the step number to the first digit of the PIN and press CUE.

(2)   Set the step to the second digit of the PIN and press CUE.

(3)   Repeat this procedure for the remaining digits of the PIN.

If the PIN is verified by the CA21, setup will be entered and indicated by blanking out all the LEDs above GO, EDIT, MAN, and EXIT. The volume and timer displays will also change.

Figure 9.1 Setup Option "FS" with a Value of 3
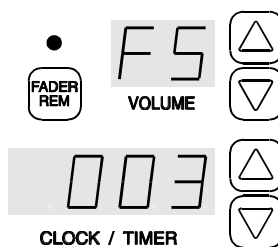
Each setup function is identified in the volume display by a two-character code. Pressing the volume arrow keys will step through the various functions which are available.

At the same time any value associated with the function will be displayed in the timer digits. Pressing the timer arrow keys will step through the permitted range of values.

If the CUE key is pressed, the function whose code is displayed will be selected. For example if the function enables a time to be set, the value currently displayed in the timer digits will be entered. If the function clears all programs, pressing CUE will erase all the steps of all programs.

Once a value has been entered using setup, the value remains stored in the CA21. It is preserved even when the CA21 is switched off. Of course the stored value may be changed at some later date by re-entering setup.

After CUE is pressed to perform a function, setup will display the next available function.

To leave setup press the EXIT key. The LED above EXIT will then illuminate to indicate the CA21 has returned to the idle state.

In setup most of the functions performed will depend on the actual configuration of the CA21 provided. However, two functions are normally always present.

(1)   Clearing all programs, (volume display shows "CP"),

(2)   Setting the fader slew rate, (volume display shows "FS"). The fader slew rate is determined by a number from 0 to 6. A value of 0 gives the fastest slew rate and 8 the slowest.

Figure 9.1 above shows how the option to set the fader slew rate will appear.

10 Checks on Stored Programs

The memory used to store the six programs and setup values is checked regularly to ensure nothing has been corrupted. If the battery used to backup the memory goes flat, the memory contents can get damaged. The battery is a long life lithium cell and should last at least five years.

If the CA21 detects that a program has been corrupted it flashes the number LED of the damaged program. The EDIT key must then be used to select edit state. The program can be checked and corrected if necessary. Nevertheless when EXIT is pressed to return to idle the fault condition on that program will be cleared.

The above procedure must be repeated for all programs which have been corrupted.

If the programs are severely corrupted as they will normally be after changing or disconnecting the battery, they can be cleared by executing the "clear all programs" function described above in setup. However, errors in the individual programs will have to be remedied first as just described.

11 Instructions for Installing New Firmware in CA21s

When installing new firmware PROMs in a Pennywise CA21 Cinema Automation Unit, the following procedure should be followed.

Follow the same procedure, but omit step (2), if the battery is ever disconnected.

(1)   Switch the CA21 power off.

(2)   Remove the old PROM and install the new one the correct way around. The notch marking the pin-1 end of the PROM must face the notch on the circuit board overlay. Also, ensure that all the PROM pins plug into the socket and that none are bent under.

(3)   Power on the CA21.

(4)   It is possible that errors will be detected in some session programs. Errors are indicated by flashing a program number led. To clear an error in a program press EDIT. Edit the program to fix any errors and then press EXIT. This procedure must be repeated for each program in error. (See Section 10 above for details.)

(5)   Enter Setup and check the values of all the options. There may be additional options in the new firmware which have to be set.   Section 9 above explains how to enter Setup. The "Configuration Manual" will gives details of all the options.

(6)   Whilst in Setup, the "CP" option can be used to clear all the session programs.

(7)   Turn the CA21 power off and then on again to ensure everything starts up again correctly.