Camera (Sciba)
Installation
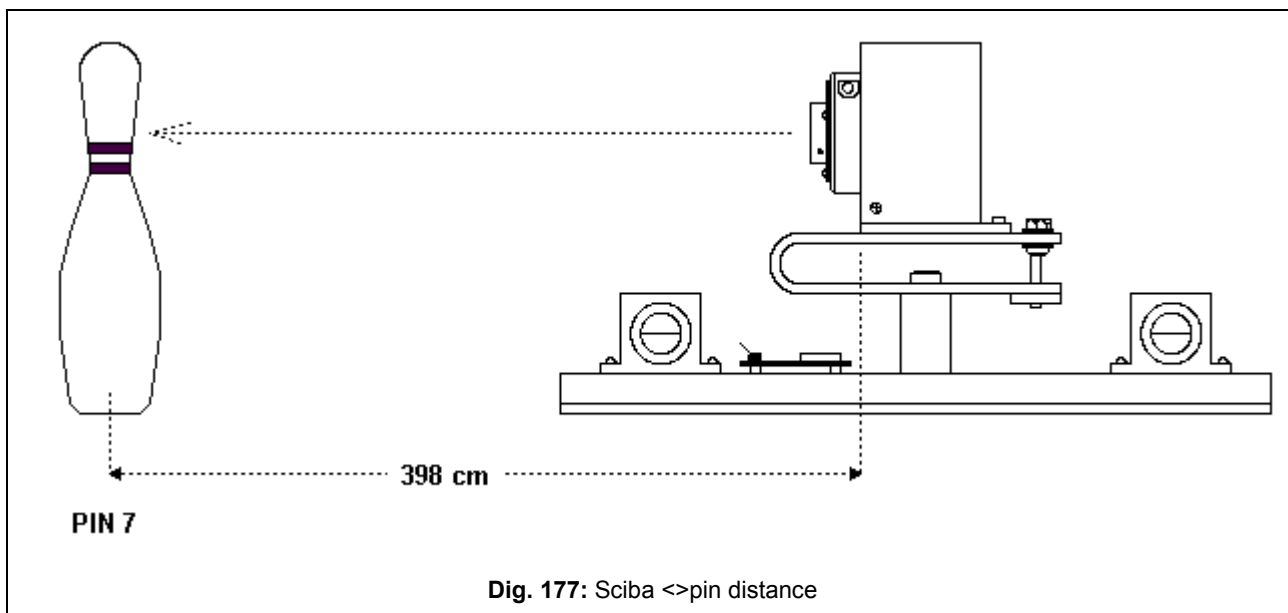
Placing the Camera (Sciba)

The ideal position for the SCIBA is as follows:

$$X= Y \frac{79}{53}$$

Dig. 176: Sciba position
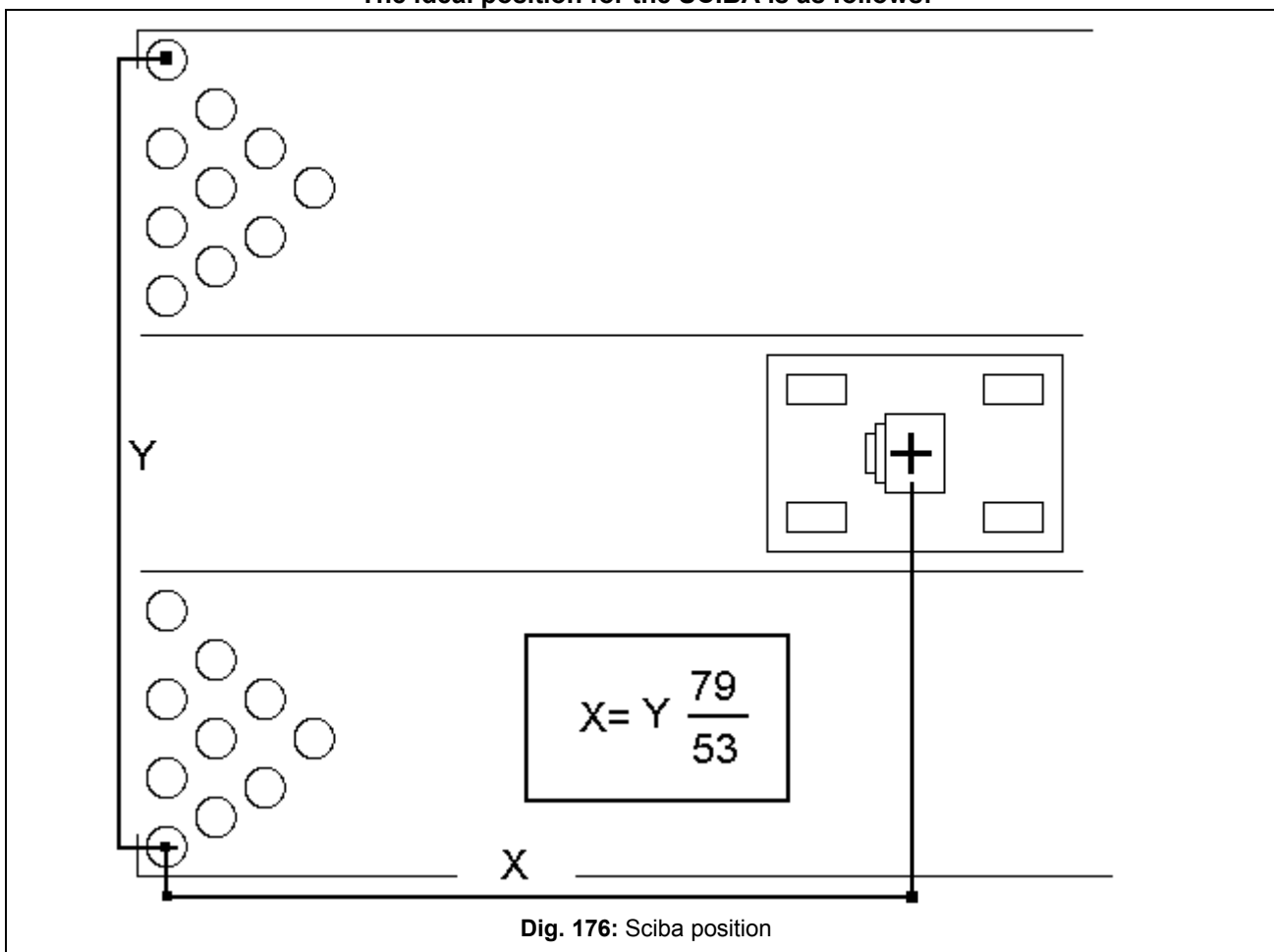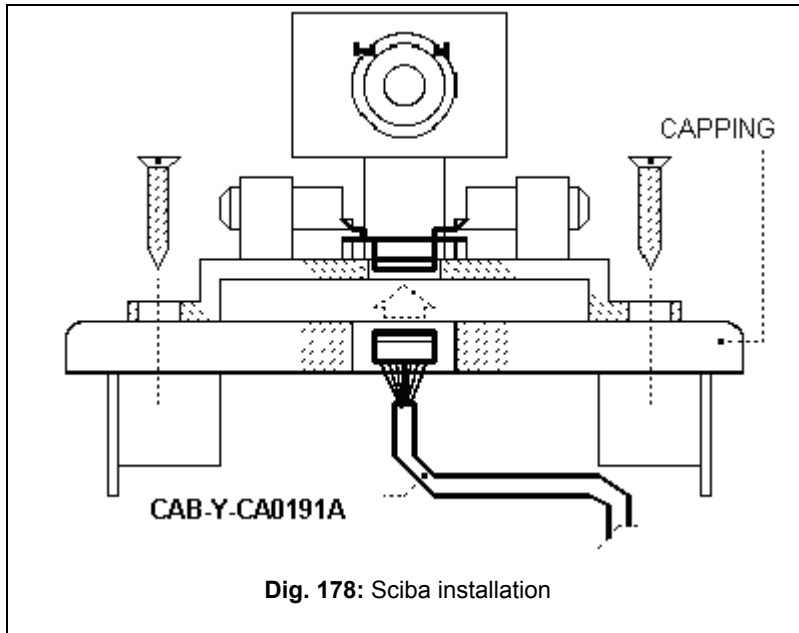
The cross is the Center of the Detection Device 398 cm is the recommended distance. Calculate the distance between the Sciba's centres to the last pins line (pins 7,8,9 & 10).

398 cm

PIN 7

Dig. 177: Sciba <>pin distance

Pass the **CAB-Y-CA0191A** cable through the hole and connect it to A.P.I. device.

Dig. 178: Sciba installation

Warning, *the cable* <u>*must not cross*</u> *the ball return canal, as the returning ball may cut it.*

If the surface on which you are fixing the device (capping) is not flat, use the two plastic strips supplied, to compensate (the Sciba must be level).

Using the six Long Fixing Screws, install the Detection Device (see over diagram). **Note:** All six screws <u>must</u> pierce the capping fully and go through to the wooden slats, in order to guarantee the stability of the device.

WARNING! The 4 edge hole need to be keep to screws the Plastic cover, do not use it for fix the sciba.

Dig. 179: Reflector installation
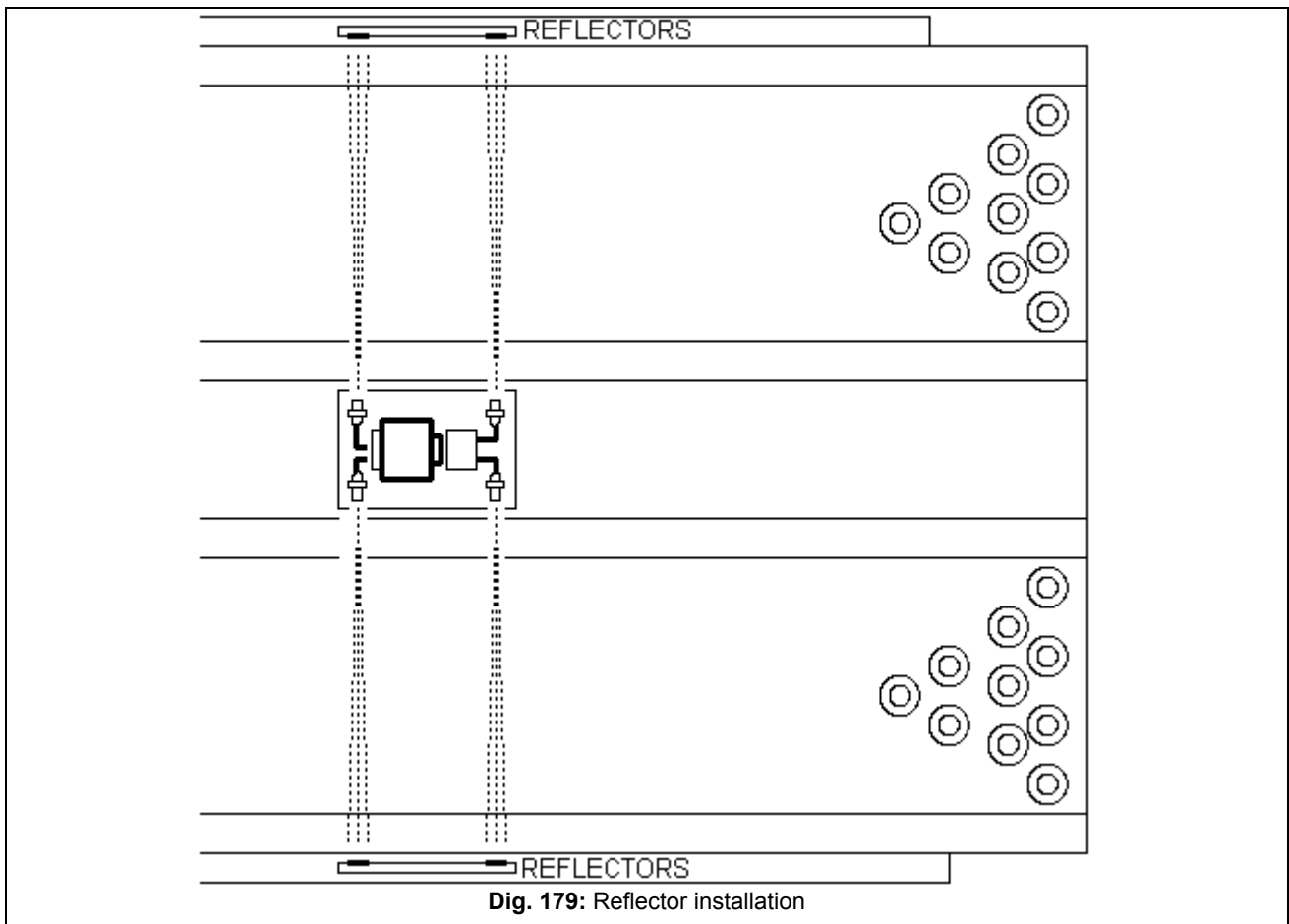
Fix the reflectors directly opposite the sensors. Sensors are in the correct position, when the red LED on the sensor is on.
**Please note:** <u>the sensor must point directly to the center of the reflectors</u>.

Dig. 180: Sciba installation with small pillar
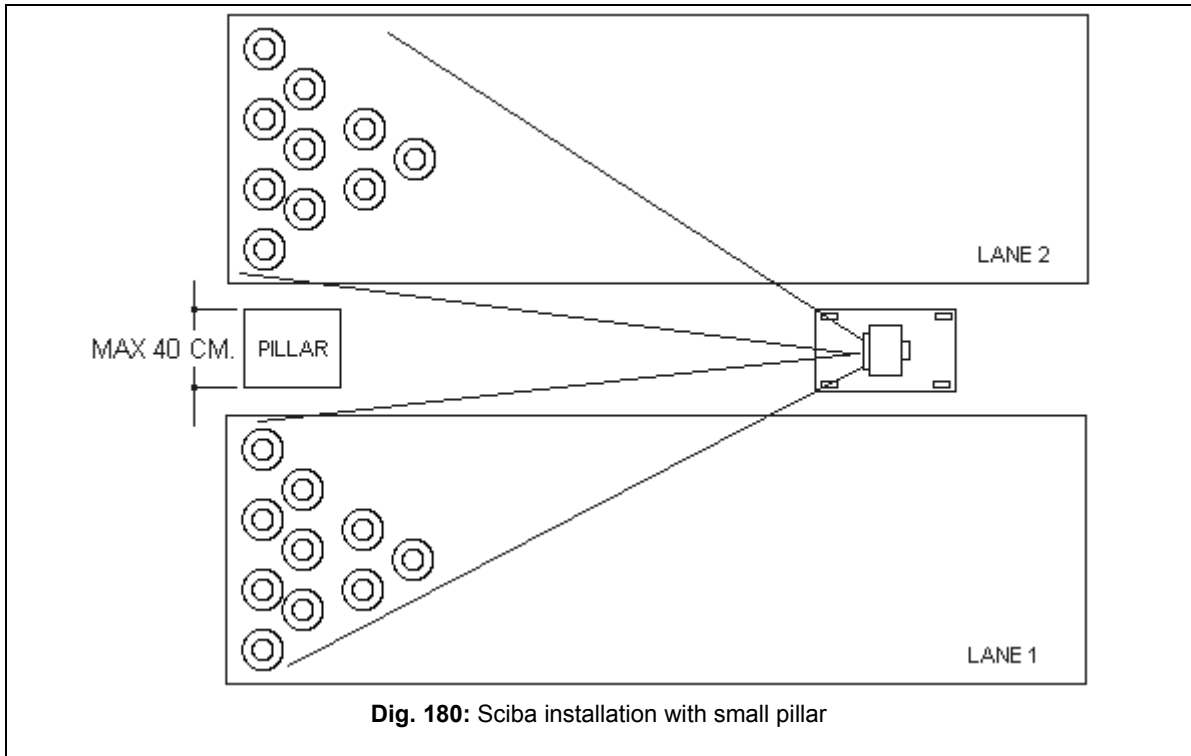
If an object like pillar (or something else is placed between to pair of lane (example lane 1 and 2), its necessary move the Sciba in a different position of standard 396-398 cm.

If the distance between the two lanes are less than 40 centimetres, one Sciba could be provide 2 lanes, simply move the Sciba a little bit far from the original position.

To know where use the formula described at begin of chapter "Positioning the Detection Device".

When the distance between the two lanes are more than 40 centimetres, it's necessary place two Sciba in order to read both lane (see the following diagram)

Dig. 181: 2 Sciba installation with big pillar
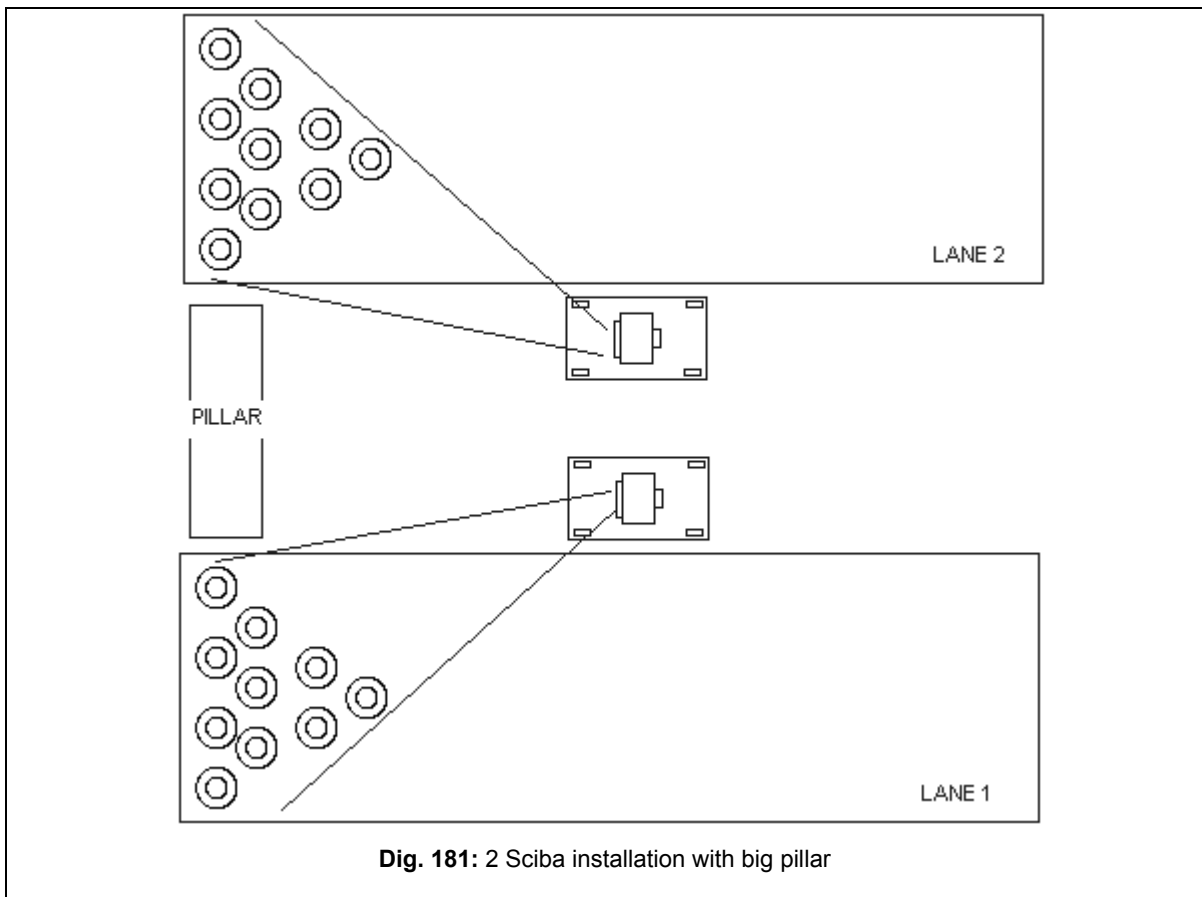
Adjusting the camera (Sciba)

Once the Sciba is correctly positioned between the lanes, the next stage is adjusting the CCD so that it scans the necessary part of the image in order to detect whether or not the pins have been knocked over.

The CCD is of a linear type, which means that the image acquired is a single line split into 2048 sections called pixels. From the distance at which the Sciba is positioned, the image is the following size:

dig. 182
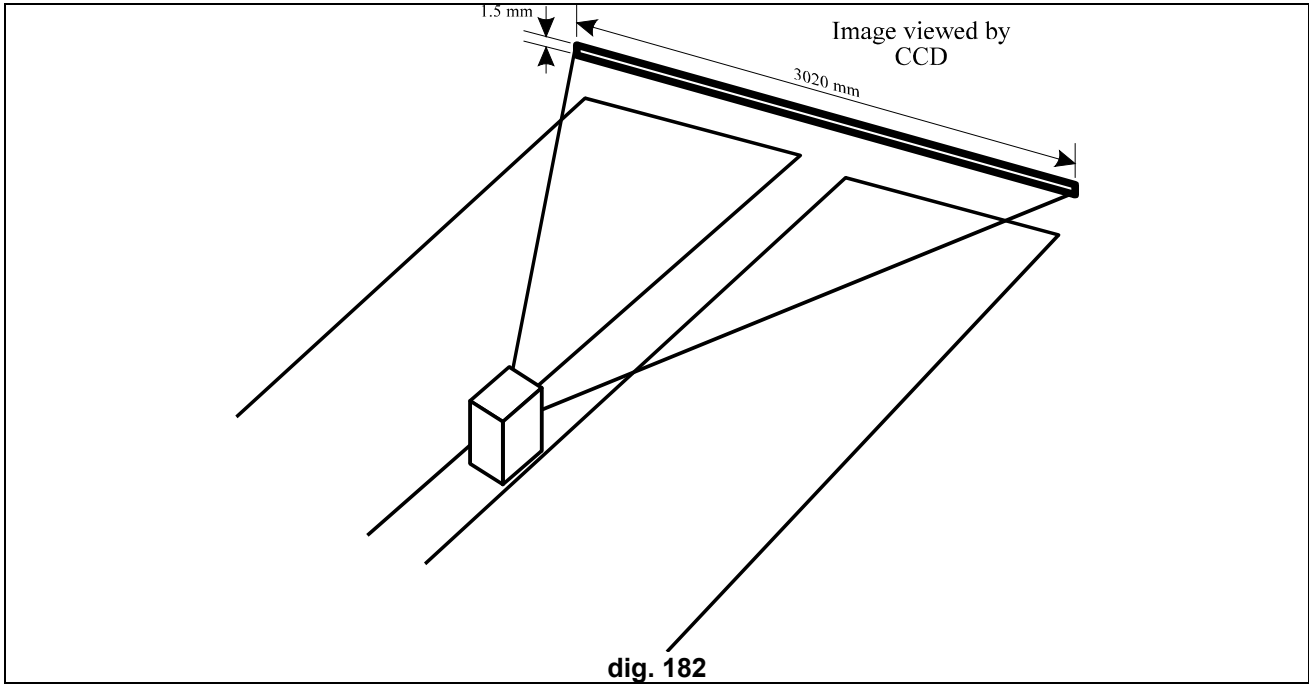
The previous image shows how the Sciba should be positioned, so that the scan line passes through the necks of all twenty pins on the two lanes. It is ideal for the line to pass through the necks of the pins, as the pins are thinnest at that point and thus allow the pins to be viewed as distant from one another as possible.
To position the line correctly, use the two positioning marker sheets as shown.
The marker sheets are as follows (measurements are in mm):
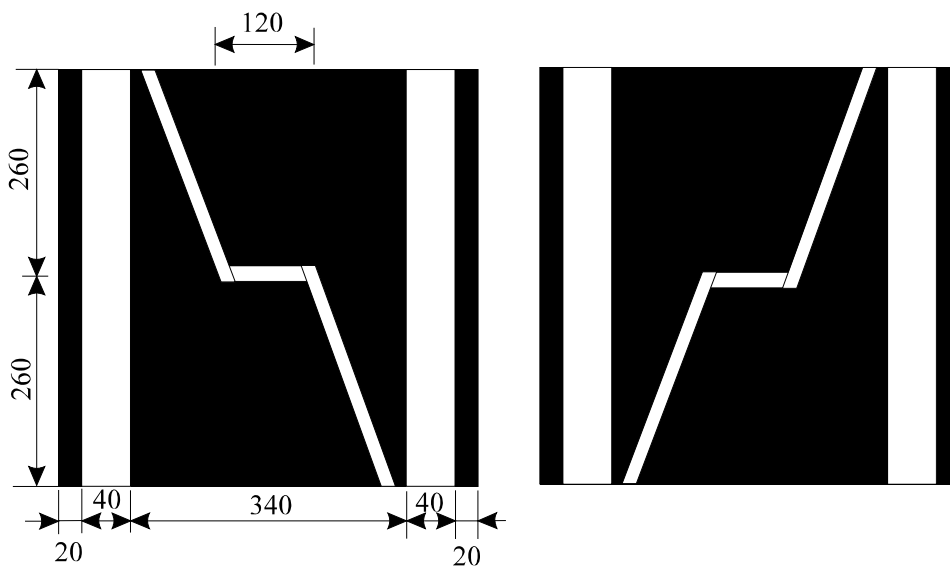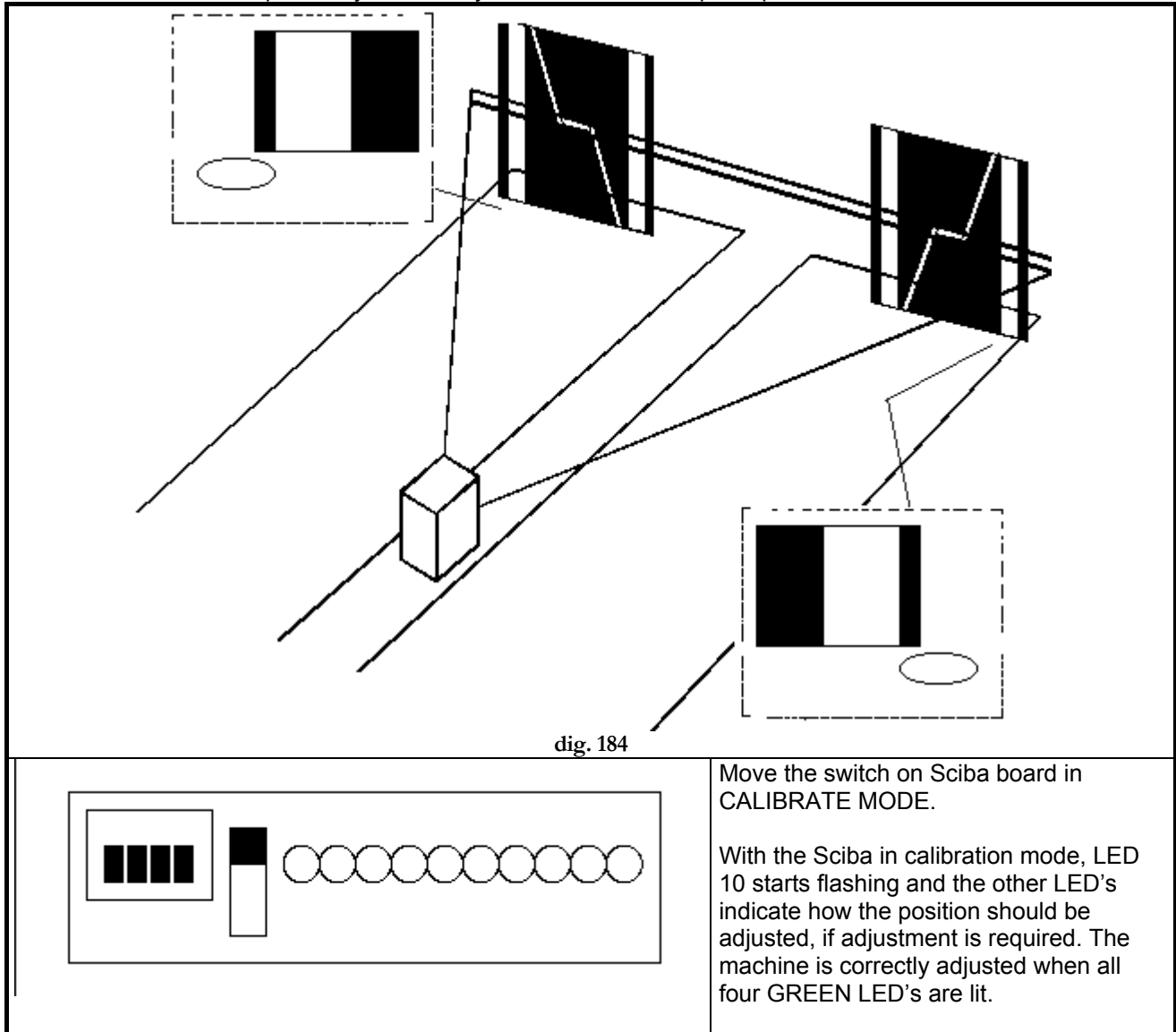

White line in centre is 15 mm thick

dig. 183

DISCONNECT ALL MOTORS FIRST!!

Switch on the 2 pinsetters.
Before to begin, please wait some minutes cause the pit light must be hot.

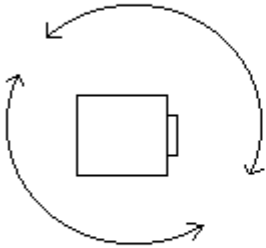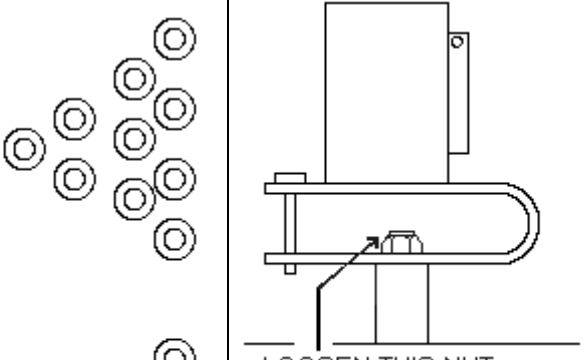The markers should be placed symmetrically at the centre of the pins spot as shown below:

dig. 184

Move the switch on Sciba board in CALIBRATE MODE.

With the Sciba in calibration mode, LED 10 starts flashing and the other LED's indicate how the position should be adjusted, if adjustment is required. The machine is correctly adjusted when all four GREEN LED's are lit.
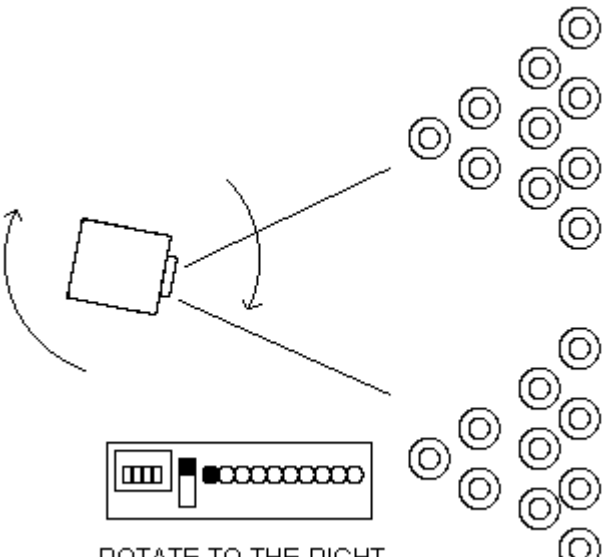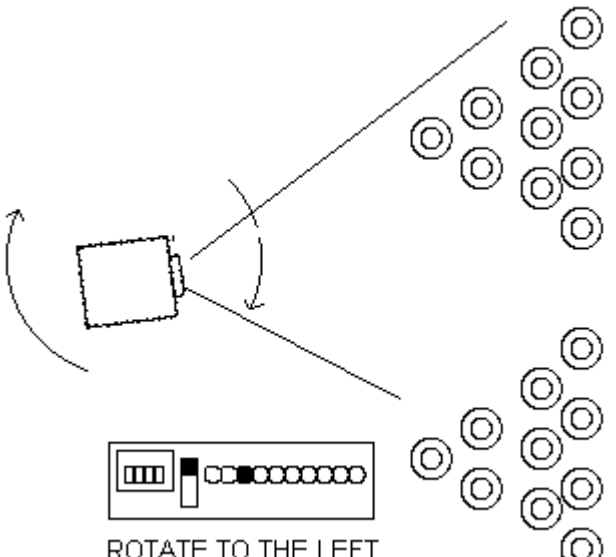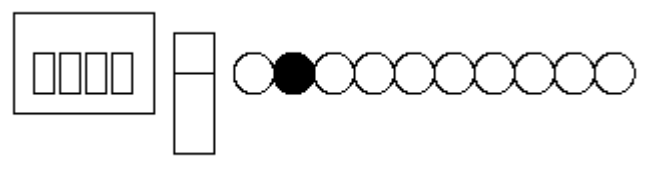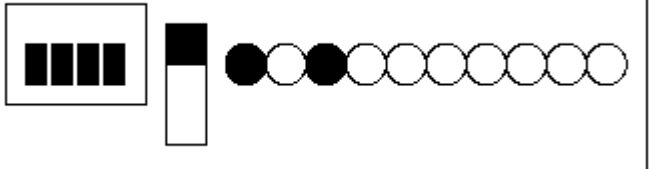
BEGIN TO ADJUST MANUALLY THE SCIBA:

The scan line can be mechanically adjusted in three ways:

Rotation on its vertical axis * Rotation on the optical axis * Raising / lowering the scan line.
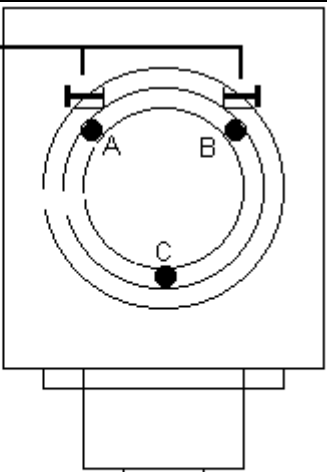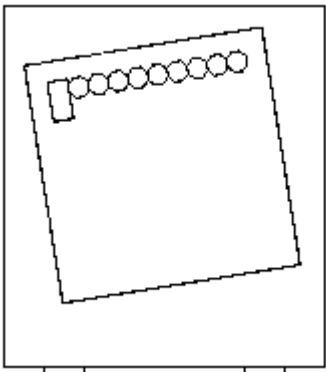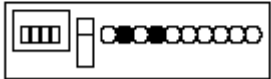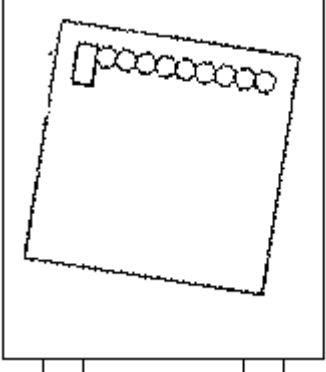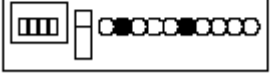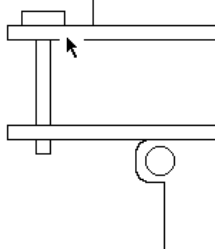First loosen (a little bit) all the mounting bolts. Adjustments should be carried out in the following order - first the vertical axis, then the optical axis and lastly the height. The Led's indicate in which direction the Sciba should be adjusted. After each adjustment, tighten the relative adjustment bolt.
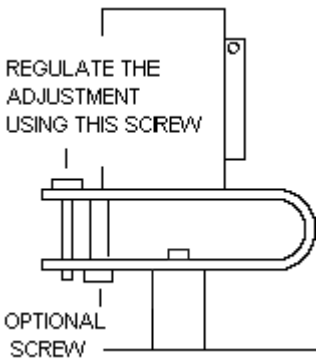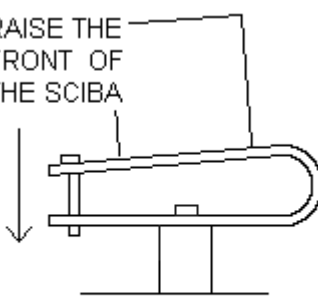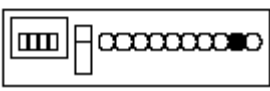
Rotation on its vertical axis
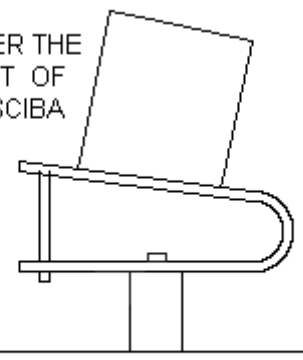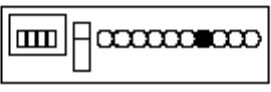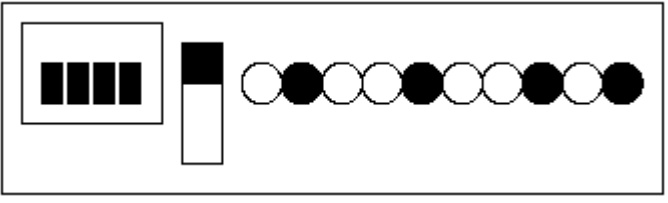
1^ REGULATION

LOOSEN THIS NUT

WARNING! MOVE THE SCIBA
LITTLE BY LITTLE [PUSH VERY
GENTLY THE SCIBA BY ONE
SIDE, WAIT THE RESPONSE
FROM THE LED, THEN PROCEED
AS NECESSARY]

ROTATE TO THE RIGHT

ROTATE TO THE LEFT

OK! THE VERTICAL AXIS IS ADJUSTED
CORRECTLY. LOCK THE NUT.

If both LED 1 and LED 3 are lit, it means that the
Sciba cannot identify the marker sheets

1] Check the Sciba position (maybe the Sciba is
placed at the wrong distance)
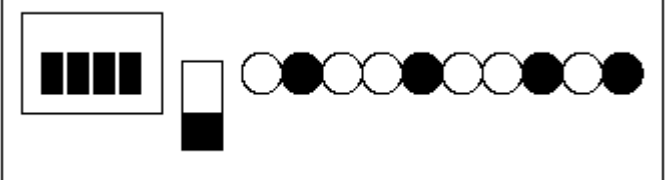
2] TRY TO CHANGE THE INTEGRATION TIME: the neon light (from pinsetter) is not enough or is too much for the
Sciba; try to implement more integration time 10 by 10 or 20 by 20 and try to make the calibration; if the problem
persist decrease the integration time(*SEE THE CHAPTER INTEGRATION TIME)*

Rotation on the optical axis.

USE THIS 2 SCREWS TO ADJUSTAMENT THE AXIS

A B

C

ALLEN KEY BOLTS TO BE LOOSENED BEFORE ADJUSTMENT [A-B-C]

Three, Allen key type bolts, on the front of the Sciba (the three projecting bolts, not to be confused with the two, more flush bolts used to set the lens when it has been focused) must be loosened.

After the adjustment close STRONGLY.

ROTATE ANTI-CLOCKWISE

ROTATE CLOCKWISE

OK! ROTATION ON OPTICAL AXIS CALIBRATE SUCCESSFULLY!
CLOSE VERY TIGHT THE 3 BOLT.

F IS HARD ADJUST THE OPTICAL AXIS, TRY TO LOOSE THE BOLT as indicated in the diagram in left side, then adjust the Sciba.

RAISING/ LOWERING

REGULATE THE ADJUSTMENT USING THIS SCREW

OPTIONAL SCREW

RAISE THE FRONT OF THE SCIBA

LOWER THE FRONT OF THE SCIBA

ALL DONE!

When the Sciba has been correctly adjusted, the above three green LED's (central in each of the settings) remain on, the 10th LED stops flashing also remaining on.

The Sciba is now fully mechanically adjusted.

WARNING!

Replace the calibration switch in OFF position, or the Detection Device does not works and gives message TIME OUT! On the console (in the scanning mode).

Position of the markers with odd lanes (SCIBA mount at the right side of the lane)

POSITION OF THE MARKERS WITH ODD LANES
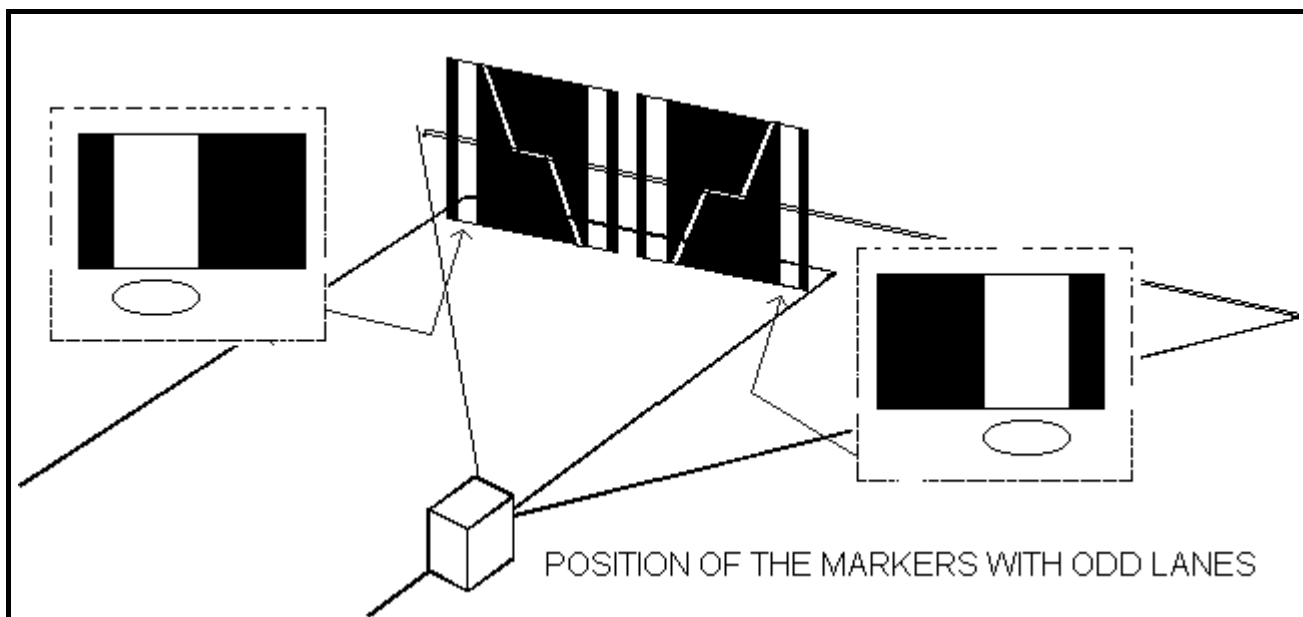
Position of the markers with odd lanes (SCIBA mount on the left side of the lane)

POSITION OF THE MARKERS WITH EVEN LANES
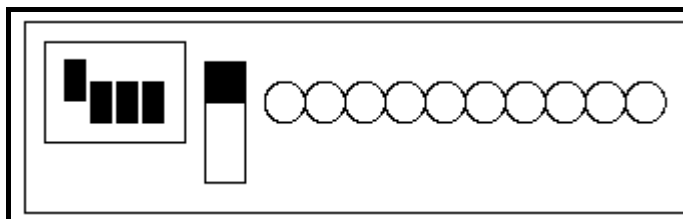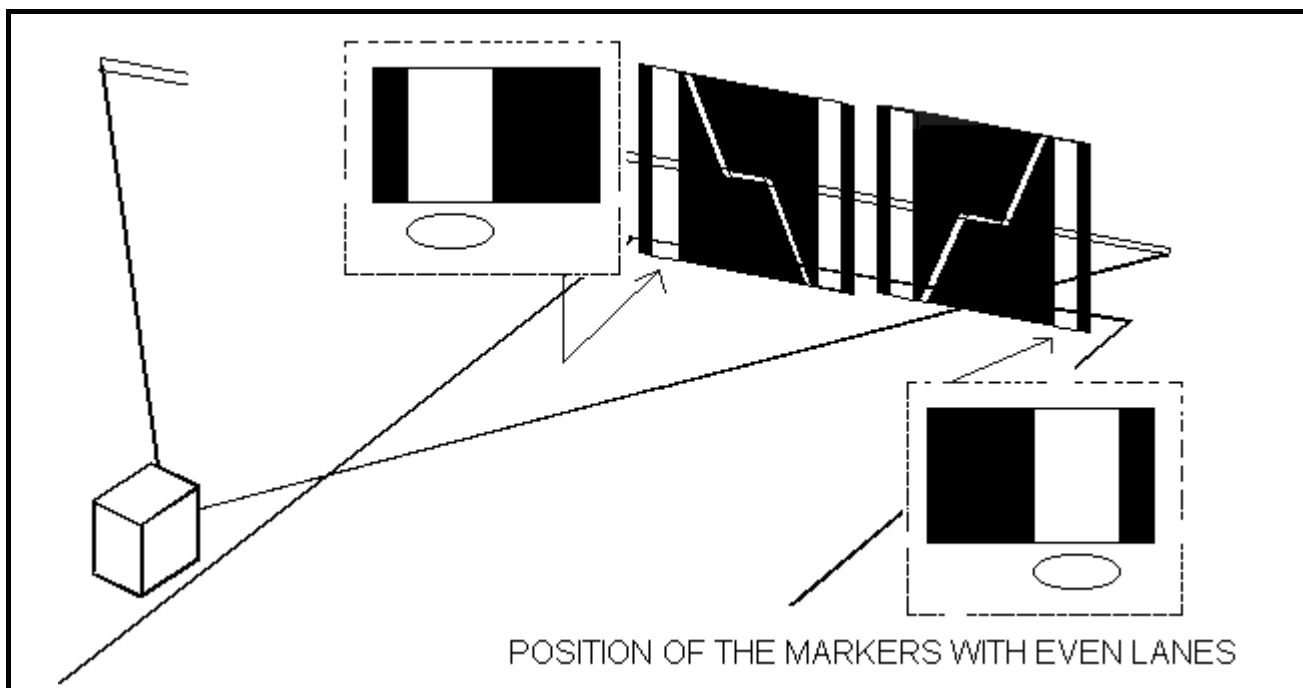
Set the number 1 switch of S1 to "ON" (Dip Switch) and leave it on.

IMPORTANT! WHEN THE SCIBA IS PLACE IN ABNORMAL POSITION (AS THIS SITUATION), YOU MUST SET ALSO THE PARAMETERS IN THE I-RETRO SETTINGS.

SOMETHING ABOUT THE PINS POSITIONS:

Each of the pins must be fully visible by the Sciba (not partly hidden by other pins).
The distance between the following pairs of pins is of **vital** importance:

- ① pins 1 and 8 on the left lane
- ② pins 4 and 7 on the left lane
- ③ pins 1 and 9 on the right lane
- ④pins 6 and 10 on the right lane

The distance between each pair may not be enough, and although moving the Sciba may improve the view, it may, in the same instant make the view of another two pins worse, so it is usually better to move the pins (slightly).
E.g. Improving ① may alter ②and vice versa. As improving ③ may alter the view of ④ and vice versa.

Some problems that may arise, with hard to see pins and how to solve them.

①and ③ (vital)   ➜   Move the Sciba closer to the two pins keeping to the center of the lane, until a point is reached where the situation improves.

②and ④ (vital)   ➜   Move the Sciba farther from the pins keeping to the center of the lanes.

①and ④ (vital)   ➜   If the lanes are not symmetrical, forcing the Sciba to be positioned 'Off 'center, then in this case, move the Sciba to the right and if necessary, a little forward (towards the Pinsetter).

②and ③ (vital)   ➜   Move the Sciba to the left of the center line and if necessary, a little back(towards players table).

Irrespective of how the Pinsetter places the pins, the best position for the Sciba is on the line between the following two points:

Point 1: Where a line passing through the centers of pins 7 and 4, on the left lane meets a line passing through the centers of pins 6 and 10, on the right lane.

Point 2: Where a line passing through the centers of pins 1 and 8, on the left lane meets a line passing through the centers of pins 1 and 9, on the right lane.

If the segment between points 1 and 2 is traced, the ideal position for the Sciba is within the segment and is much closer to point 2 than point 1. The points can be calculated on paper using the pin grid, as actually drawing out the relative lines takes rather a long time!

Scanning the pins

By "scanning" we mean, verify the direction the Sciba is pointing in respect to the position of the pins. This operation is carried out at the Main Desk computer, <u>without any mechanical adjustments to the Sciba CCD itself.</u>
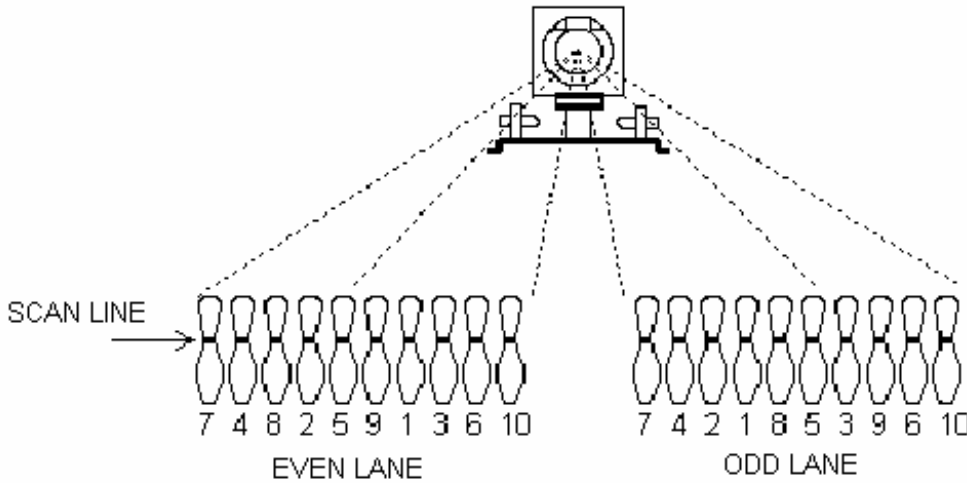
The Sciba CCD is a "Linear camera" which 'reads' the pins on a "ideal line" as can be seen on the above diagram. All 20 pins (2 lanes) can be seen on the 'ideal line'. The 'ideal line' is at the neck of the pins which, seen from 4 meters, is the point that the pins are furthest from one another.

IN ORDER TO OPTIMISE THE PIN COUNT BY THE SCIBA CCD WE ADVISE:

- Change pins that are damaged or broken at the neck.
- The neon lights on the lane pair must have the same brightness and intensity, any changes to lighting should be made per pair of lanes.
- The Sciba is able to read (up to a certain point) even the 'off spot' pins, we suggest that the pinsetter positioning arms be checked on a regular basis.
- Do not use pins which have black or coloured necks.

Turn the pinsetters on that need to be checked.

WAIT: the pinsetter pin deck light needs to warm up before giving the correct light.


CHECK THE CALIBRATION

The pinsetters should be on first ball with ALL 10 pins standing on each lane.

The Sciba CCD is able to see the red pins, we advise however to make the calibration settings with standard white pins.
Switch the hall lights on just like when there are bowlers; sometimes neons placed too close to the pins change the light conditions and therefore the pin detection.

 Click on the SETUP icon, then on the icon of the Sciba to be checked

Click on the **CALIBRATION** icon and wait for the image to appear.
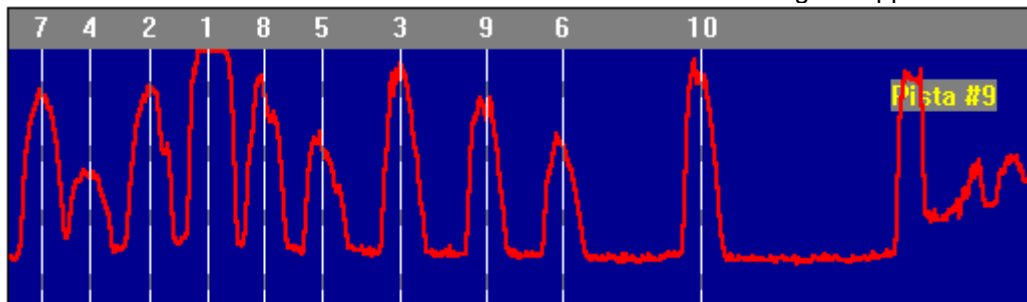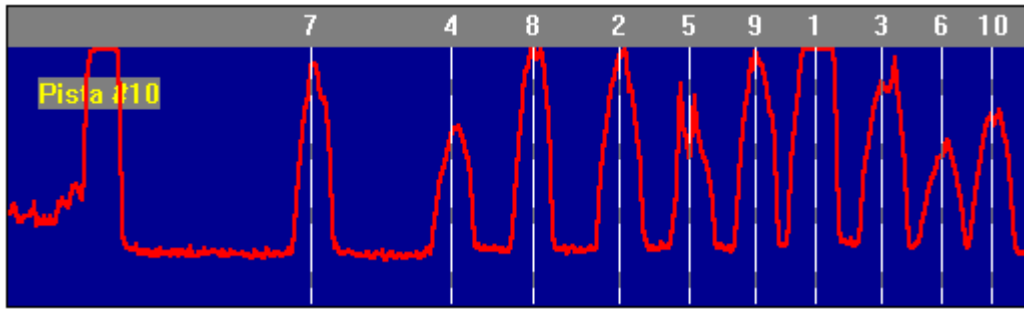
Example of reading

As you can see in the example the pins are represented by the **'peaks'** of different heights. The height depends on the distance from the neon light the pin is. Pins 1,3,2 and 5 are the highest 'peaks' as these pins are closet to the light, while pins 7,8,9 and 10 are further away and therefore receive less light resulting in lower 'peaks'.
As the example shows the 10 pin 'peak' is half the height of the pin 1 'peak', this is okay but a 'peak' lower than the 10 pin would not be detected.

The white vertical line shows the ideal position of the pin. If the line is on one side of the peak it is necessary to center it: click on the line with the left mouse button, keep the button pressed and drag the line to the centre of the peak. **THE CENTRE IS IN THE MIDDLE OF THE BASE OF THE PEAK.**
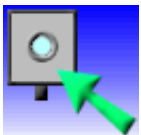
 At the end of the calibration click on the camera button to save the settings.

It is important that the 'peaks' are a good distance from one another so that the pin detection is good. In cases where it is difficult to get good peaks, move the lines slightly to allow more distance between them.

The higher the peak is the more the peak tends to flatten. This phenomenon is known as IMAGE SATURATION when a pin peak is too saturated the Sciba CCD tends to 'see' the pin even when it has been knocked down.

Set the light that enters into the Camera by changing the INTEGRATION TIME.
If the pin 'peaks' are too high, being saturated with light, the Sciba CCD tends to 'see' them all the time, if the pin 'peaks' are too low the Sciba CCD has a hard time 'seeing' them.

Another parameter to consider is the BRIGHTNESS RATIO.

WHAT IS BRIGHTNESS RATIO:
Brightness ratio is the light variation when the pin has been knocked down. In practical terms if the brightness ration is set to 50, the Sciba CCD will detect a pin as fallen when the light, in the area where the pin was when the first photo was taken, varies by at least 50%.

WHAT IS INTEGRATION TIME:
Integration time is the value given to the amount of light in the Sciba area. By lifting or lowering this value you let more or less light into the sciba, just as if it where a standard camera diaphragm.

CHANGING THE INTEGRATION TIME.

Just like the first operation, select the current 'bank' which is needed for this calibration. We advise you to calibrate the Sciba CCD for normal day light bowling, so change the 'bank' and look for a integration time value which is correct for 'glow in the dark' bowling.
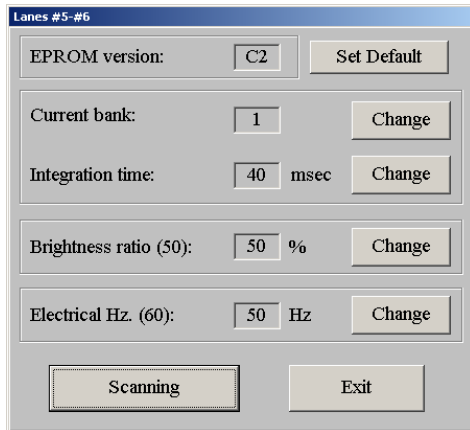
With *SET PREDEFINED* you can set the predefined parameters. ONLY USE THE FIRST CALIBRATION (WHEN YOU CHANGE THE SCIBA CCD).

Select the **CURRENT BANK**.
Create more 'banks' to save different settings for use with different light situations, with glow lights you need a higher integration time (between 150 and 200).

***BANK 2 AND 4 ARE DEDICATED FOR INSTANT GLOW (Pinsetter interface A.P.I. only)***
When the light situation changes (for example from daylight to glow bowling) simply select the preset 'bank' there is no need to change the integration time.
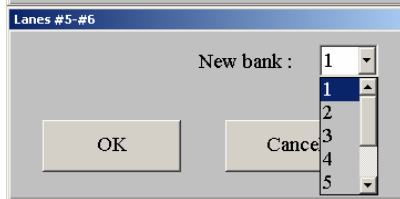
Select the **INTEGRATION TIME** for the 'bank' by clicking on the **CHANGE** button beside the current value.

Chose the value and confirm with **OK**.

AVERAGE INTEGRATION TIME VALUE FOR STANDARD DAYLIGHT BOWLING = 40
AVERAGE INTEGRATION TIME VALUE FOR 'GLOW IN THE DARK' BOWLING = 90
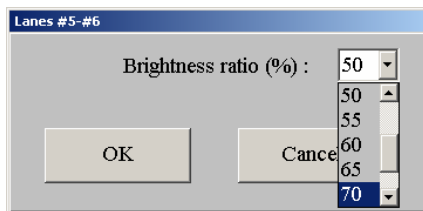
The **network frequency** refers to the amount of 'Hertz' electricity. It is required to avoid surges caused by using neon lights.
EUROPE = 50 HERTZ
USA   = 60 HERTZ
CHINA   = 50 HERTZ

Verifying the PIN SEPARATION.

If the Sciba CCD position is not correct or the 'focus' is out it can be regulated, the worst thing is the overlap of pin peaks, causing the Sciba CCD to detect one pin in place of another on the 'ideal line' and scoring it incorrectly.

It is also possible, when the integration time is too high, that the light saturates the lens and the peaks overlap (they tend to become one line at the top).

If it is not possible to fix the problem by altering the integration time you need to MECHANICALLY CALIBRATE THE SCIBA.

If this does not work, replace the Sciba CCD.

EXAMPLES OF INCORRECT CALIBRATION.
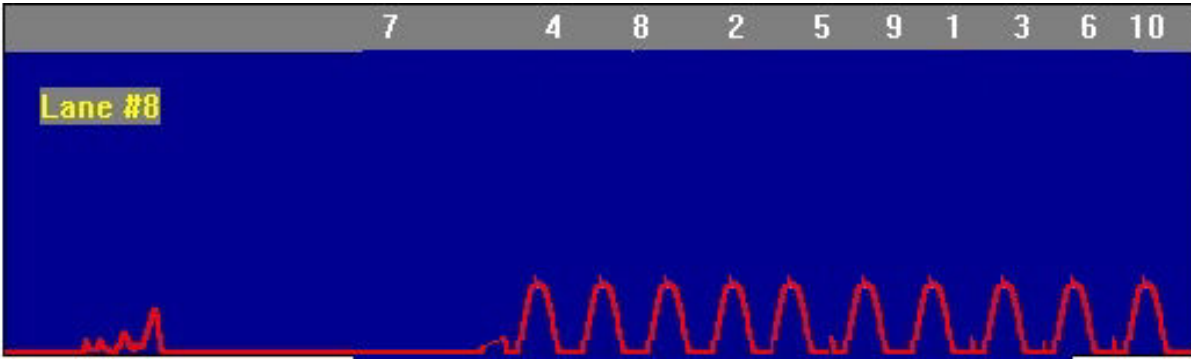
The peaks are too LOW; not enough light is entering the lens and the Sciba does not recognize the pins. LIFT THE INTEGRATION TIME.
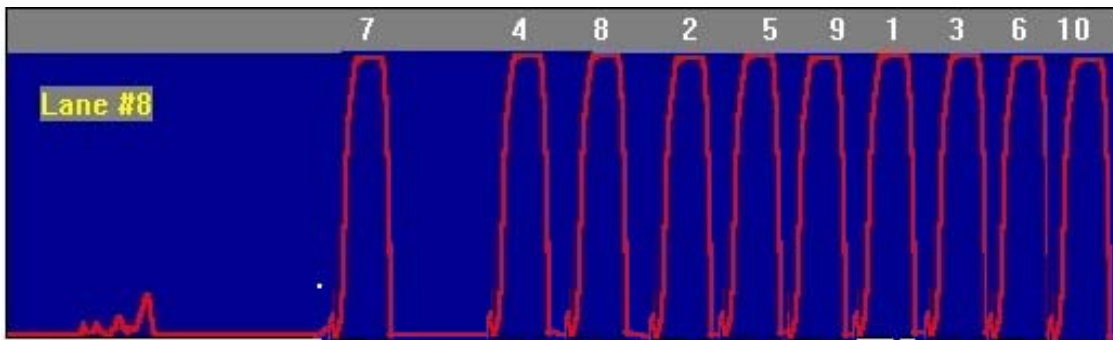
The peaks are too high; too much light is entering the lens; the Sciba recognizes the pins ALL the time, even when they have been knocked down. DECREASE THE INTEGRATION TIME.
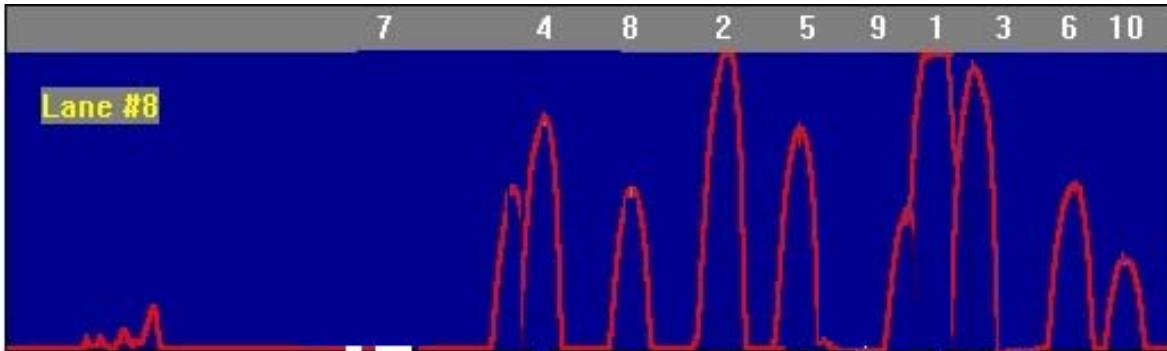
The peaks are overlapped; the Sciba recognizes one pin in place of another, or worse it recognizes the pin in place of the one next to it. The Sciba may be out of focus. LOWER THE INTEGRATION TIME. IF THE OPERATION IS NOT SUCCESSFUL MAKE A MECHANICAL CALIBRATION.

Software settings for sciba
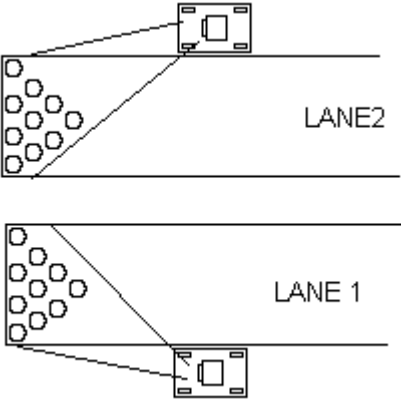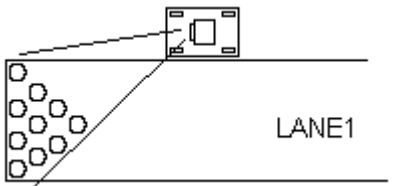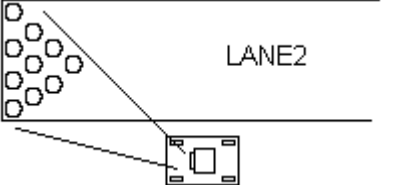
Click on the **PINSETTER INTERFACE** button on the **SETUP** menu for the pair of lanes you need to check and WAIT until the communication starts.

Setting one Sciba per lane

When 2 Sciba are mounted for two lanes, is necessary setup the I-Retro parameters in right way, as follows:

	LEFT SCIBA	RIGHT SCIBA
LANE 2 / LANE 1	☐ NONE	☐ NONE
	■ STANDARD	☐ STANDARD
	☐ CROSSED	■ CROSSED

	LEFT SCIBA	RIGHT SCIBA
LANE2 / LANE1	☐ NONE	☐ NONE
	☐ STANDARD	■ STANDARD
	■ CROSSED	☐ CROSSED

	LEFT SCIBA	RIGHT SCIBA
LANE2 / LANE1	☐ NONE	☐ NONE
	■ STANDARD	■ STANDARD
	☐ CROSSED	☐ CROSSED

	LEFT SCIBA	RIGHT SCIBA
LANE2 LANE 1	☐ NONE ☐ STANDARD ■ CROSSED	☐ NONE ☐ STANDARD ■ CROSSED

	LEFT SCIBA	RIGHT SCIBA
LANE1	☐ NONE ■ STANDARD ☐ CROSSED	■ NONE ☐ STANDARD ☐ CROSSED

	LEFT SCIBA	RIGHT SCIBA
LANE2	■ NONE ☐ STANDARD ☐ CROSSED	☐ NONE ■ STANDARD ☐ CROSSED

	LEFT SCIBA	RIGHT SCIBA
LANE2	■ NONE ☐ STANDARD ☐ CROSSED	☐ NONE ☐ STANDARD ■ CROSSED
LANE1	☐ NONE ☐ STANDARD ■ CROSSED	■ NONE ☐ STANDARD ☐ CROSSED

Wins scoring cycling

1^ BALL SCORE CYCLE:

- The pinsetter is in STAND BY.

- All pins are on the lane.

- 1^ Ball light is ON, 2^ Ball light are off.

WARNING!! IF THE SCORE WAIT TO DETERMINATE THE <u>FIRST SHOT</u> AND THE <u>2^BALL LIGHT ARE</u> <u>ON</u>,
THE SCREEN DOESN'T SHOWS ANY SCORE.
IT'S NECESSARY RESET THE PINSETTER AND REPLACE THE PINS FOR FIRST SHOT.
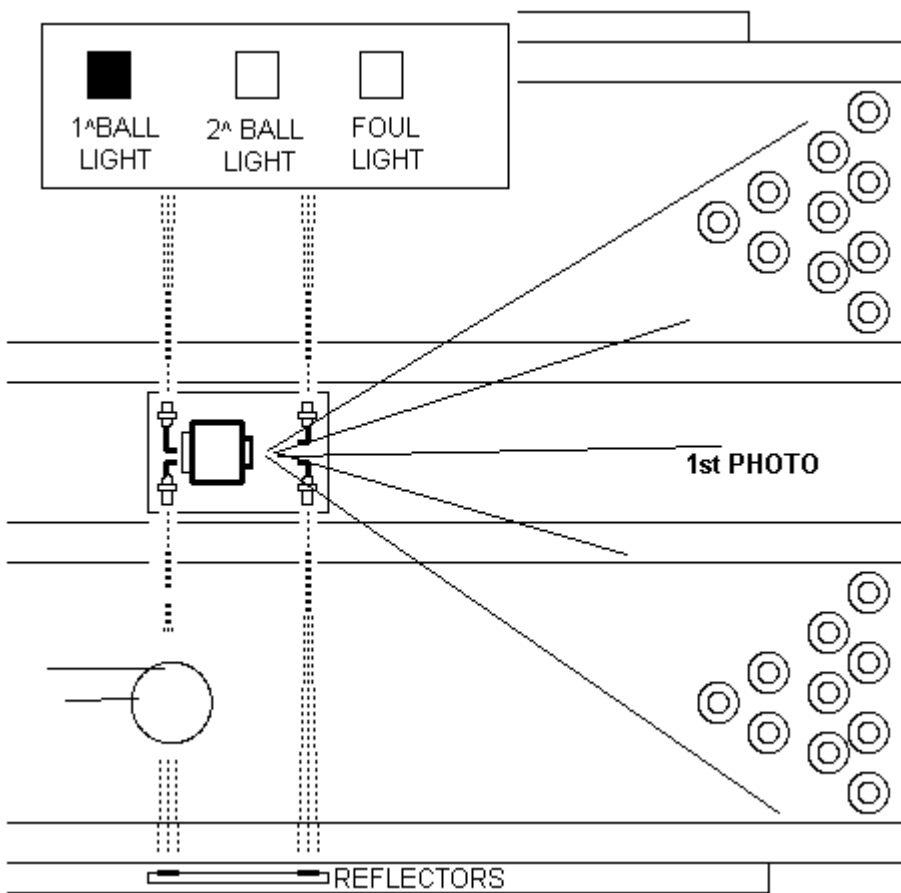
The bowlers do the shot.

- The ball crosses the Speed sensor beam.

- The Detection Device takes the first PHOTO.

- This picture is the sample for determinate the result.

NOTE: the freeze time is set into the factory and is not adjustable.
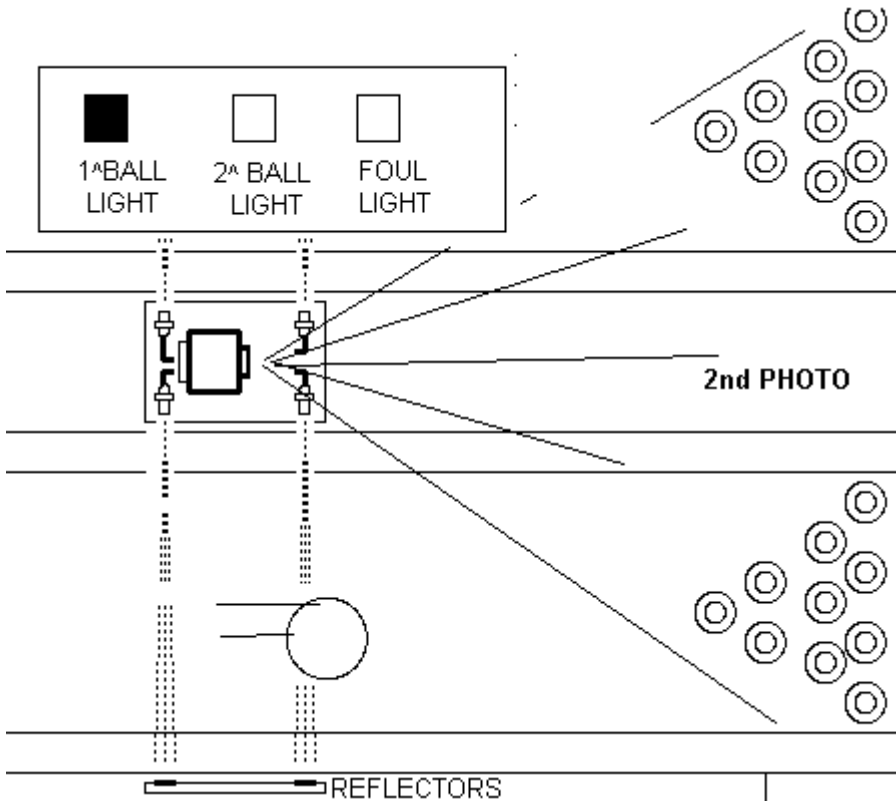
- The ball crosses the Start beam sensor.

  - The automatic score will do:

A) Begin the countdown for PIN READ DELAY.

B) Begin the countdown for AUTOMATIC PINSETTER CYCLE (not customisable by user).

  - At the end of PIN READ DELAY, the Detection Device makes the second PHOTO to determinate the pins knocked.

- At the end of AUTOMATIC START CYCLE DELAY the I-Retro send to the pinsetter the PULSE CYCLE and the pinsetter will begin the cycle.

NOTE: if the START CYCLE DELAY = ZERO (8270,8290,8230/3000,GS10 pinsetter) the Detection Device make the second photo with sweep down in guard position, until the table run.

SWEEP REVERSE CYCLE

If the Wins Scoring System is connected to 8270 uP AMF, STELTRONIC or compatible chassis, is possible send the sweep-reverse signal to the pinsetter, an logic signal via APS connector.

SWEEP REVERSE IS POSSIBLE WHEN:

1)   Bowler makes gutter.
2)   Pin 7 or pins 10 or both pins are knocked.

After the second photo, the detection Device indicates to the Score the numbers of the pins knocked.
If the score is as 1 or 2 (gutter, pin 7 or pin 10 or both knocked), the I-Retro gives to the chassis the Sweep-Reverse code.
The Sweep came back up and the pinsetter doesn't make any extra cycle.

STRIKE CYCLE

When the Detection Device Recognise STRIKE (ALL pins knocked) the screen will shows the STRIKE animation.

FAST STRIKE CYCLE

If the Wins Scoring System is connected to 8270 uP AMF, STELTRONIC or compatible chassis, is possible send the FAST STRIKE CYCLE to the pinsetter, an logic signal via APS connector.
When the Detection Device Recognise STRIKE (ALL pins knocked) the I-Retro send to the Chassis (via APS connector) the Fast Strike Cycle code.The sweep continues the run and takes off the pins from the lane, then the table will load the new pin set.

2^ BALL CYCLE
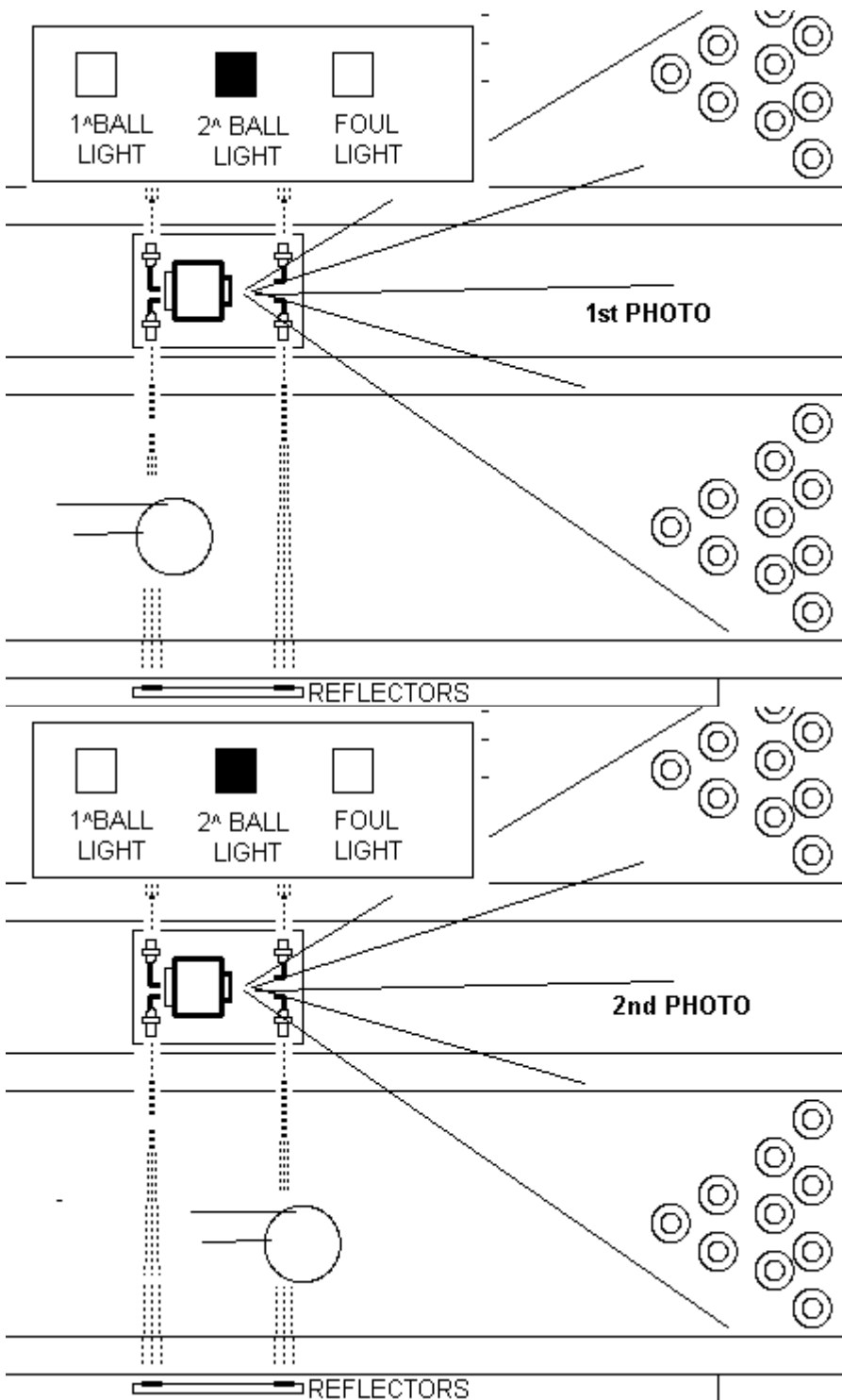
- The pinsetter is in STAND BY.

- The remaining pins are on the lane.

2^ BALL light is ON.

The bowlers do the shot.

- The ball crosses the Speed sensor beam.
- The Detection Device takes the first PHOTO.
- This picture is the sample for determinate the result.

NOTE: the freeze time is set into the factory and is not adjustable.

WARNING!! IF THE SCORE WAIT TO DETERMINATE THE SECOND SHOT AND THE 2^BALL LIGHT ARE OFF, THE SCREEN DOESN'T SHOWS ANY SCORE. IT'S NECESSARY RESET THE PINSETTER TO MAKE IT READY FOR SECOND SHOT.

- The ball crosses the Start beam sensor.

  - The automatic score will do:

  - Begin the countdown for PIN READ DELAY.

  - Begin the automatic countdown for PINSETTER CYCLE.

  - At the end of PIN READ DELAY, the Detection Device makes the second PHOTO to determinate the pins knocked.
  - At the end of countdown for PINSETTER CYCLE the I-Retro send to the pinsetter the PULSE CYCLE and
  - the pinsetter will begin the cycle.

FOUL CYCLE

- The bowler makes the shot.

- The bowler across the foul beam sensor.

- The foul device gives the foul signal to the pinsetters and switch on the FOUL LIGHT.

- The ball crosses the speed sensor.

- The ball crosses the start sensor.

  - The I-Retro send foul to the Lane computer, the photo is cancelled and the score gives FOUL.