

To calculate as accurately as possible, the hardware requirement of a CORTROL LPR Server, we use the [CORTROL LPR Hardware Calculator](#).



| LPR Server configuration | | | | | | |
|--|-------|------------|---------------------|------------------|-------------------------------|-------------------------|
| Channels | FPS | Resolution | Bitrate | Recognition area | Recognition FPS | License plate framespan |
| 1 | 5 fps | 160 X 120 | 64 Kbps | Whole frame | 1 fps | More than 25 frames |
| Recommend me CPU <input checked="" type="checkbox"/> | | | Specify Servers CPU | | | |
| | | | Intel | Celeron G | Intel Celeron G3950 @ 3.00GHz | |

CALCULATE

Anatomy of the Calculator

The CORTROL LPR Hardware Calculator has the following components;

1. Channels: Designate the number of channels (cameras sources: Same resolution, FPS, Bitrate etc.)
 - o 1 ~ 10k

Channels

2. FPS: Related to the frames per second of the video stream being recorded by CORTROL
 - o 5 ~ 60 (In 5FPS increments)

FPS

3. Resolution: Related to the video stream resolution being recorded by CORTROL
 - o Res 160x120 ~ 5120x3200

Resolution

CORTORL LPR Hardware Calculator

Ver. 1.0.0

4. Bitrate: Related to the size of the data captured with in the video stream pulled into CORTORL
 - Bitrate Estimate: Calculated based on Resolution + FPS.
 - Can be manually entered to reflect scene complexity requirement.

| Label | Resolution | Res Index | 30FPS / BR | 15FPS / BR | 7FPS / BR |
|---------|-------------|-----------|------------|------------|-----------|
| D1 | 704x480 | 0.34 | 0.8 | 0.4 | 0.2 |
| 0.46 MP | 960x480 | 0.46 | 1.1 | 0.6 | 0.3 |
| 0.9 MP | 1280x720 | 0.92 | 2.2 | 1.1 | 0.5 |
| 2.1 MP | 1920x1080 | 2.07 | 5.0 | 2.5 | 1.2 |
| 3 MP | 2048x1536 | 3.15 | 7.6 | 3.8 | 1.8 |
| 5 MP | 2592x1944 | 5.04 | 12.2 | 6.1 | 2.9 |
| 6 MP | 3072x2048 | 6.29 | 14.8 | 7.4 | 3.4 |
| 8MP | 3264x2448 | 7.99 | 19.4 | 9.7 | 4.5 |
| 12MP | 3648 x 2736 | 9.98 | 24.2 | 12.1 | 5.6 |

Average bit rates listed. High activity, may require higher bit rates

Bitrate

64 Kbps ▼

5. Recognition area: The expected area of the video source where the vehicle plate will appear
 - Whole frame: the area of the image frame to be scanned
 - Half frame: the area of the image frame to be scanned
 - Third of the frame: the area of the image frame to be scanned
 - Quarter frame: the area of the image frame to be scanned
 - One eighth frame: the area of the image frame to be scanned

Recognition area

▼
 Whole frame

Whole frame

Half frame

Third of the frame

Quarter frame

One eighth frame

Note: the more area of an image frame to be scanned, the more CPU intensive the LPR analytic

6. Recognition FPS: Desired processing rate of the video stream.
 - Recognition FPS: 1fps ~ 60
 - Analyzing more frames gives more reliable result but will increase CPU utilization.
 - A good setting depends on quality of received video stream and speed cars are moving.
 - Minimal recommended recognition frame rates:
 - For still/stopped cars - 6FPS
 - For slowly moving plates - 12FPS
 - For moderate speed - 18FPS, license plate should be visible for 10 frames
 - For fast moving cars - 20FPS, license plate should be visible for 3 frames

Recognition FPS

1 fps ▼

7. License plate frame span: estimated.

- More than 25 frames
- More than 10 frames
- Less than 10 frames
- Less than 5 frames

License plate framespan

More than 25 frames ▼

Note: CORTROL LPR has recognition setting profiles, each parameter is optimized for that specific case.

- The presets are based on the relative vehicle speed:
 - Fast: the license plate is present in 1 to 3 frames
 - Moderate: the license plate is present in 4 to 10 frames
 - Slow: the license plate is present for 1 to 3 seconds
 - Very slow: the license plate can be seen for longer than 3 seconds

8. Recommend me CPU: Related to auto CPU and manual CPU selection.

- Check “Recommend me CPU” If looking for a new LPR Server.
- Uncheck “Recommend me CPU” and select a listed CPU if an existing server is known.
 - Options listed are Intel or AMD CPU based servers

Recommend me CPU

Specify Servers CPU

| | | |
|---------|-------------|---------------------------------|
| Intel ▼ | Celeron G ▼ | Intel Celeron G3950 @ 3.00GHz ▼ |
|---------|-------------|---------------------------------|

Specify Servers CPU

| | | |
|-------|-------|----------------|
| AMD ▼ | A10 ▼ | AMD A10-9700 ▼ |
|-------|-------|----------------|

1. Calculate: Upon completion of configuring the calculator, select “Calculate”



Example of a full Hardware Calculation below;



| LPR Server configuration | | | | | | |
|-------------------------------------|-------------------------------|-------------|---------------------|-------------------------------|------------------------------|------------------------------|
| Channels | FPS | Resolution | Bitrate | Recognition area | Recognition FPS | License plate framespan |
| 8 | 15 fps | 1920 X 1080 | 2.5 Mbps | Half frame | 15 fps | More than 10 frames |
| Recommend me CPU | | | Specify Servers CPU | | | |
| <input checked="" type="checkbox"/> | | | Intel | Core i7 | Intel Core i7-8700 @ 3.20GHz | |
| Recommended licence type: | | | | | | |
| Enterprise license | | | | | | |
| Server Hardware Recommendations | | | | | | |
| Number of Servers | CPU type | | | Number of channels per Server | RAM per Server | Network bandwidth per Server |
| 1 | Intel Core i9-7900X @ 3.30GHz | | | 8 | 21 | 20 |

CALCULATE

Note: The number of threads required for each channel stream depends on 2 factors:

1. Frame processing time and $1000 / \text{FPS}$
2. It depends on average vehicle speed
 - o Higher speed is processed faster, requiring more threads for accuracy
 - o Slow speed is processed slower, requiring less threads for accuracy

LPR threads are logical threads but they are using CPU physical threads. The number of threads per CPU depends on the CPU model.

Example 1; a quad core CPU would have 8 threads.

Example 2; If you have 10 LPR streams on a quad core CPU that offers 8 threads, and the number of cars occasionally increases, frame drop may occur, if the CPU utilization exceeds the 8 threads.