ESP32 Co-Processor Electrical Schematic

12V Battery
+ GND

ESP32
Microcontroller
(3.3V)

Pi Camera
(CSI)

Raspberry Pi 3
(UART
RX/TX)

Ejector
MOSFET

Ejector 4
MOSFET + Diode
GPIO13

ESP32 Pin Assignment
GPIO4 → Ejector 1
GPIO5 → Ejector 2
GPIO12 → Ejector 3
GPIO13 → Ejector 4
GPIO14 → Motor PWM
GPIO16 → UART RX (from Pi)
GPIO17 → UART TX (to Pi)
GND → Common ground
3.3V → Logic supply

Ejector Circuit Details (Each of 4 channels)

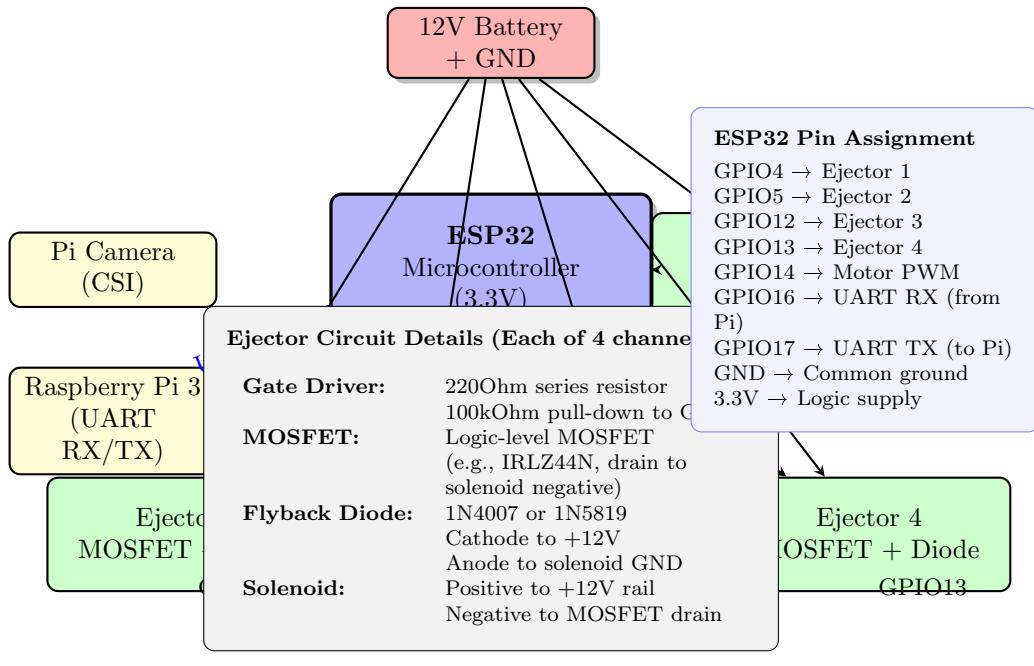|	
Gate Driver:	220Ohm series resistor 100kOhm pull-down to G
MOSFET:	Logic-level MOSFET (e.g., IRLZ44N, drain to solenoid negative)
Flyback Diode:	1N4007 or 1N5819 Cathode to +12V Anode to solenoid GND
Solenoid:	Positive to +12V rail Negative to MOSFET drain

Safety Features:

- Gate pull-down prevents false solenoid firing on startup
- Flyback diodes protect MOSFET from inductive kickback
- All GND returns routed to common point (star ground)
- Fuse on 12V supply recommended (10A main, individual 2A per solenoid chain if high current)