

ECU Start-Up Requirements

Natalie A. Wienckowski

May 2017



GMC



GENERAL MOTORS

BACKGROUND 3

ECU START-UP EXAMPLE 1 4

ECU START-UP EXAMPLE 2 6

CONCLUSION 8

BACKGROUND

- In the automobile, customers have come to expect “instant” gratification. Push a button and you see the response “instantly”.
- Responsiveness is linked to quality in many people’s minds.
- In most cases, “instant” means 100 to 300 ms.
- ECUs generally take about 30 ms to recognize a “wake-up”. This is to ensure it’s a valid wake-up and not noise.
- It then takes 70 to 100 ms for the μ P to perform its initialization and be ready to execute the requested function.

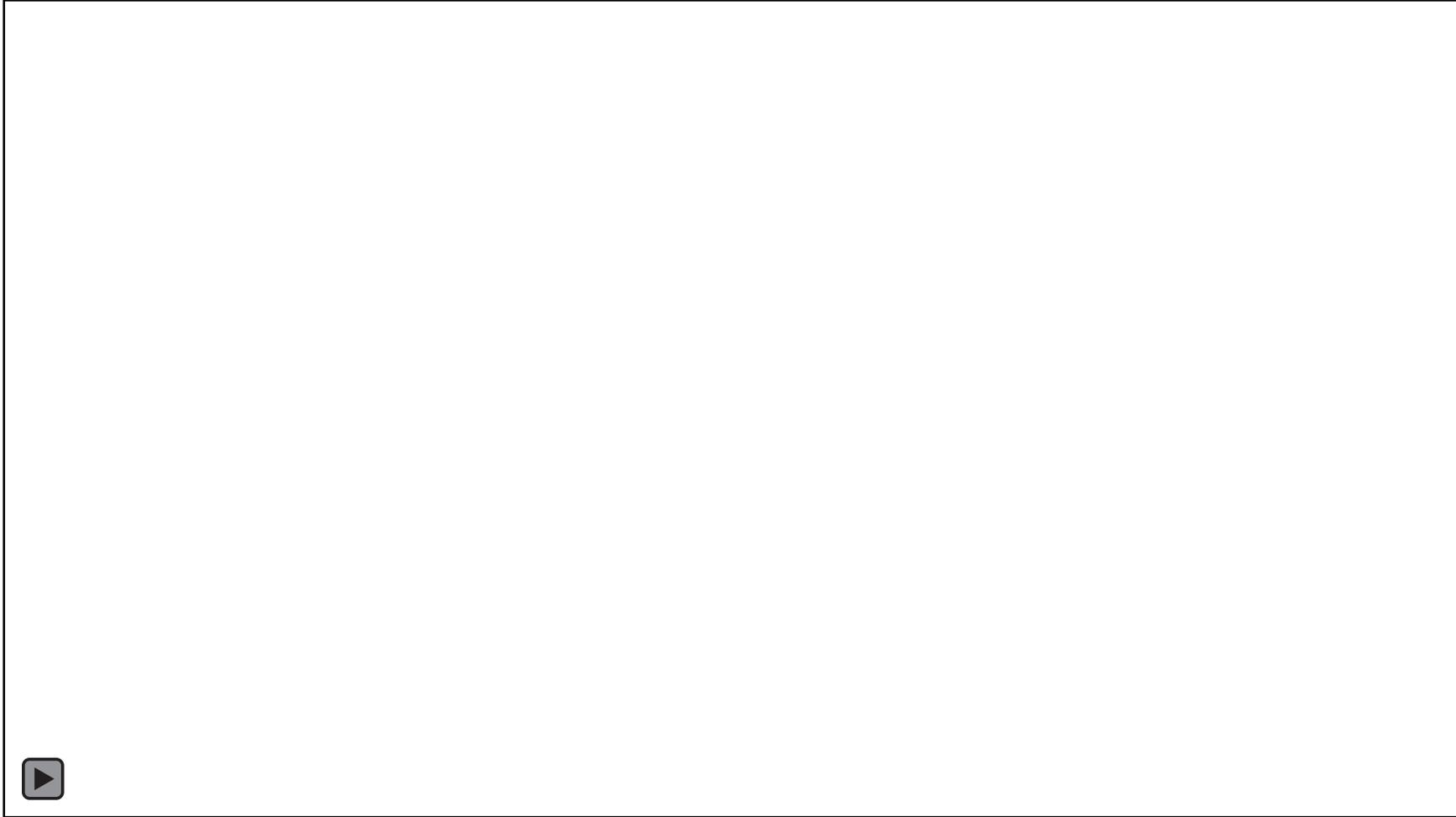
ECU START-UP EXAMPLE 1

PHY MASTER/SLAVE PRE-CONFIGURED

- In this example, the PHYs are pre-configured to be the clock Master or Slave. (3 options in order of preference.)
 1. Program by μ P when ending a communication session. Expected to be maintained until next usage cycle (90 days or less). Can be changed in the vehicle by changing μ P code.
 2. Input pin with internal pull-up (Slave) that can be connected to ground (Master) to indicate configuration.
 3. Programmed when ECU is built. Fixed configuration for the life of the vehicle.
- The PHY link procedure occurs in parallel with the μ P initialization.

ECU START-UP EXAMPLE 1

PHY MASTER/SLAVE PRE-CONFIGURED



ECU START-UP EXAMPLE 2

PHY MASTER/SLAVE **NOT** PRE-CONFIGURED

- In this example, the PHYs are not pre-configured to be the clock Master or Slave. This is done by the μ P during its initialization routine.
- Configuration of the PHYs is generally late in the initialization routine.
- The PHY link procedure occurs mostly in series with the μ P initialization.

ECU START-UP EXAMPLE 2

PHY MASTER/SLAVE **NOT** PRE-CONFIGURED



CONCLUSION

- Providing a method to all for Master/Slave Pre-configuration significantly reduces the amount of time it takes an ECU to be “communication ready”.
- This may:
 - Allow more time for functional software to perform the requested action.
 - Reduce the delay seen by the customer to their request.
 - Eliminate customer retries which may cancel the request.

QUESTIONS?

Contact Natalie Wienckowski for questions: natalie.a.wienckowski@gm.com