First contact with tractors

- **FUNCTIONS**
  - This chapter describes quickly the mains components and functions in a tractor:
    - Engine
    - Transmission
    - Rear Axles and Front Axles
    - Park Lock and Power Take Off
    - Rear Hitch and Electro Hydraulic Valves

- **CABIN**
  - This chapter presents the main changes the product requires for the new cab:
    - Armrest
    - Terminal
First contact with tractors (Functions)

ENGINE

- Deere Power System Engine Tier III fitted with L14 ECU
- High Pressure Common Rail fuel injection system from Denso with timing and fueling control

- Variable Geometry Turbo
  An emission control device that allows better control of the intake airflow into the engine.

- Exhaust Gas Recirculation Valve
  Method of emission reduction by blending exhaust gas with fresh air prior to combustion
First contact with tractors (Functions)

**ENGINE**

- **PowerBoost Management**
  - Assessment of power consumed in hydraulics and PTO
  - Additional power is then supplied by engine **within the torque limit of the rear axle** transmission

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**Without Boost**

- Alternator
- Cooling Fan
- Rear Axle (Drive Wheels)
- Rear PTO & Hyd pumps
- Engine power output (nominal)
- Drive

**With Boost**

- Alternator
- A/C Comp
- Cooling Fan
- Rear PTO & Hyd pumps
- Engine power output
- Rear Axle (Drive Wheels)
- Work

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"With Boost" indicates the additional power supplied by the engine to meet the torque requirements in the rear axle transmission.
First contact with tractors (Functions)

- **TRANSMISSION**

  - **ReverShift**
    
    Change direction by using a power shuttle without using the clutch pedal.

  - 4 Robotized Ranges x 6 Power Shift: 24 gears available
  - 6 power shift under torque per range.
  - 50 kph available with upgraded braking system
First contact with tractors (Functions)

➢ REAR AND FRONT AXLES

- 4 Wheel Drive
  Automatism activates it at each braking and disables it at high speed in order to prevent wearing tires and wasting fuel.

- Differential lock
  Automatism disables it once the implement is high, the user brakes, the steering angle is above 5° or the speed is high.

- Suspended Front Axle
  Once activated it enables thanks to an hydraulic circuit and a position regulation to absorb shocks. It improves comfort and road holding.
First contact with tractors (Functions)

➢ PARK LOCK AND POWER TAKE OFF

• Park Lock
  - Immobilize the rear axle just by pressing a button.
  - Automatic disengagement when moving power shuttle

• Power Take Off
  - Start and Stop available from fender controls
  - Automatic function regarding the hitch position (“AutoPTO”)
First contact with tractors (Functions)

- **REAR HITCH AND ELECTRO HYDRAULIC VALVES**
  
  **Rear Hitch**
  
  - control implement position either with cab or fender controls
  
  - Electronics control enables to work as close as possible to the set depth regarding slip and traction conditions.

  ![Diagram of Rear Hitch Controls]

  ![Diagram of Electro Hydraulic Valves Controls]

  **Electro Hydraulic Valves**
  
  - Used to pilot up to 5 hydraulic jacks
  
  - Configurable fender controls.
  
  - Configurable control mode proportional/ timer/continuous
First contact with tractors (Cabin)

- CEBIS: the multi function terminal
  - Configurable Display windows
  - Claas look and feel
  - Settings of:
    - Transmission parameters
    - Hydraulics parameters
  - Tasks Management
- Claas Sequence management
- Implement management
- Video
First contact with tractors (Cabin)

- ARMREST: the new ergonomics of the controls
  - “Everything under finger control”
  - Intuitive Drivestick
  - Hydraulics controls

- WORKING LIGHT PANEL: a clever box
  - Working Lights
  - Beacon
  - Rear window defrosting
  - Cabin Interior lighting
ARCHITECTURE

This chapter describes how has been designed the AXION electronic architecture:

- **Heritage from Ares 500/600** – Classical tractor control
- **Heritage from Xerion** – Multiple Bus Architecture + Claas Bus
- AXION architecture

SOFTWARE DEVELOPMENT

- UBM
- Auto 5
ARIES 500/600 Architecture
XERION Architecture

- **Vehicle CAN Bus**
  - **XIM** (IAV / Cebis)
  - **XIF** (Claas / CAB)
  - **VDC** (ZF / FMGR)
  - **HYD** (Claas / CAB)
  - **EHL** (ME / SLC)
  - **EXT** (Claas / CAB)

- **J1939 CAN Bus**
  - **CAT** (Caterpillar / Engine Control Module)
  - **TCU** (ZF / ECCOM3.0 gearbox controller)

- **Hydraulic CAN Bus**
  - **EV1** (Rexroth / EHM18)
  - **EV5** (Rexroth / EHM18)
  - **EHC** (Bosch-Rexroth / EHR-C)
  - **PTO** (PTO control module)
  - **HC1** (Claas / RIO)
  - **HC2** (Claas / RIO)

- **ISO 11783 CAN Bus**
  - **Agrocom / Claas communicator**
AXION N3 Architecture

Vehicle CAN Bus

J1939 CAN Bus

DSB

Preh / TdB5

Hydraulic CAN Bus

GPS CAN Bus

Danfoss / PVED

Danfoss / Steering Column Sensor

Trimble / GPS Receiver

ASG / Gyro-Inclinometer

IAV/Cebis mobil

MFA

IAV / Cebis

Maxima

TR1

Selco / Auto5

TR2

Selco / Auto5

TR3

Selco / Auto5

SFA

Selco / Auto5

REH

Selco / Auto5

ENG

DPS / HPCR14

Lord / Z+

Z+ CAN Bus

Preh / TdB5

SimProp / UBM Type5

SimProp / UBM Type1

SimProp / UBM Type7

SimProp / UBM Type

ISO 11783 CAN Bus
UBM

Tools =>

<= Issue

26.06.2008 PH-Speicherfehler in CEBIS
26.06.2008 PH-Speicherfehler in CEBIS

Devlopment

AUTO5

Tools =>

Issue
Diagnostic

- **PROTOCOLS**
  - KWP 2000 on the Vehicle CAN Bus
  - J1939 and proprietary protocol on the powertrain CAN Bus

- **INTERFACES**
  - Sontheim CAN-USB interface
  - NSI serial interface

- **METADIAG© 2007**
  - The new AXION needs the new version METADIAG© 2007: the easy-to-use version for diagnostic with new feature
Protocols

- For the "vehicle CAN Bus" (or Claas CAN Bus):
  - Use of the standard of the Claas group
    - KWP 2000 is used
    - The diagnostic component of the ECU is created automatically thanks to the description of the requirement in Candela (Vector tool chain)
    - Changes and implementation of the diagnostic of new software versions in METADIAG© is fast and easy.

- For the "powertrain CAN Bus" (or "J1939" CAN Bus)
  - Use of the flexibility of the METADIAG© tool to support different protocols:
    - J1939 with RP1210A standard for the engine
    - KWP 2000 on suspended front axle
    - Proprietary GIMA protocol for transmission

- For the non-CAN components:
  - Use of the ISO 9141 standard
Interfaces

- For CAN communication, existing Claas CAN-USB interface is used:

- For ISO connection the new ISO-USB interface was developed:
Axion N3 architecture
Axion N2 architecture

- Vehicle CAN Bus
- J1939 CAN Bus
- Z+ CAN Bus
- GPS CAN Bus
- Hydraulic CAN Bus

Components:
- MFA
- Maxima
- 6PS
- WLp
- Preh
- TdB5
- TR1
- TR2
- TR3
- SFA
- REH
- ENG
- HPCR14
- Z+
- CL
- Danfoss/PVED
- Danfoss/Steering Column Sensor
- Trimble/GPS Receiver
- ASG/Gyro-Inclinometer
- IAV/Cebis mobil
- ISO 11783 CAN Bus

Brands:
- Selco
- Auto5
- TR2 SFA REH
- DPS/HPCR14
- EV5
- TR3
- Selco/Armrest
Multi-Bus architecture

- **Multi-Bus**
  - Share data flow
  - Split functions
  - Decrease bus load
  - Avoid congestion
  - Decrease risks

- **CAN-Bus**
  - Robust technology
  - Well known technology
  - Low cost
  - Universal
Multi-Bus architecture

- Multi-bus functions
  - Claas Sequence Management
    - Master – Slave architecture
    - All functions can be remotely controlled
  - GPS
    - Drive alone w/o driver help