REPAIR ECU DIESEL MODULES

Repair in Central DIESEL

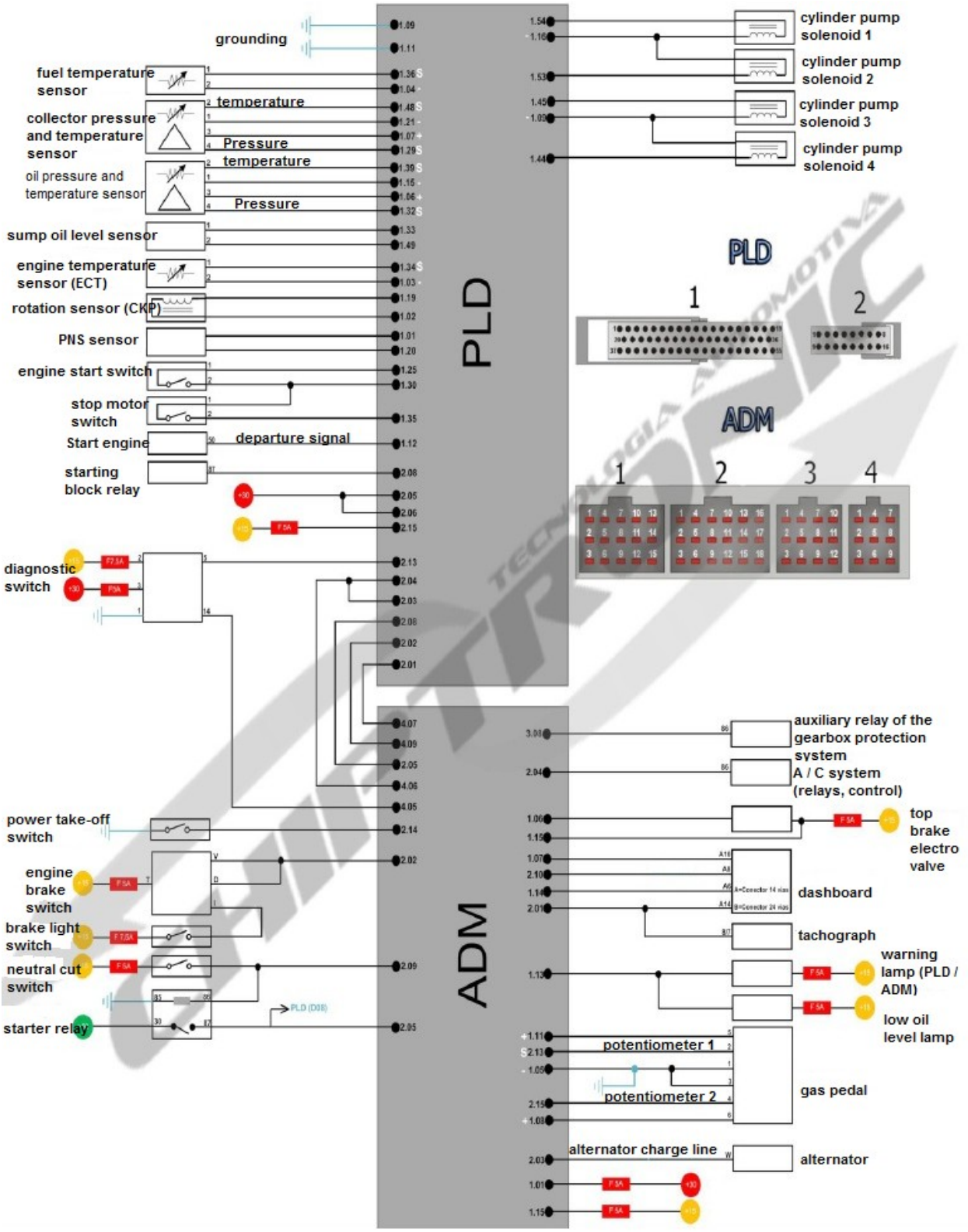
Content:

Mercedes Benz

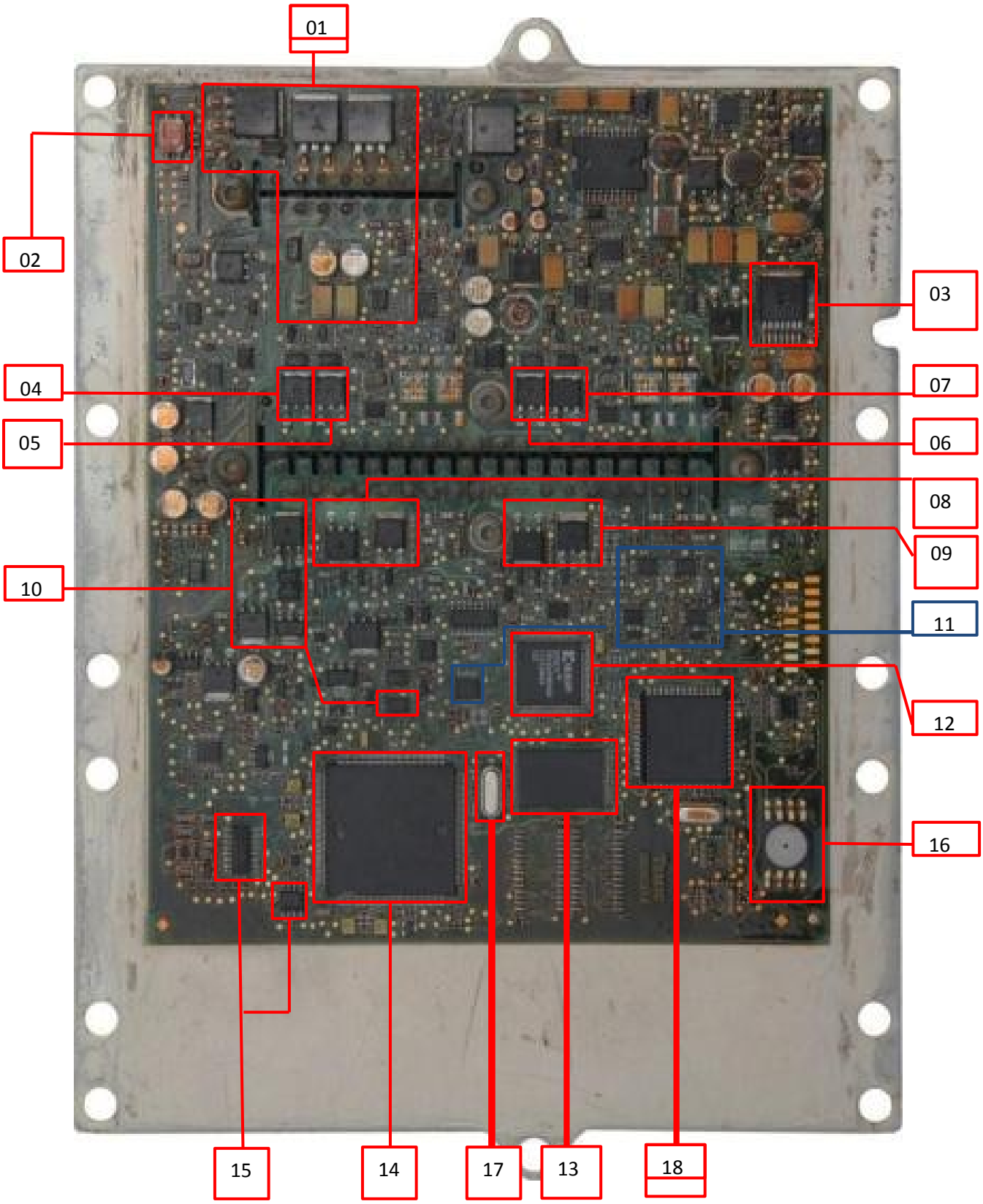
OM904

System PLD

Scheme Electric OM 904 OVER THERE



Eyesight General From Components (OM904)



Description and Occupation From Components

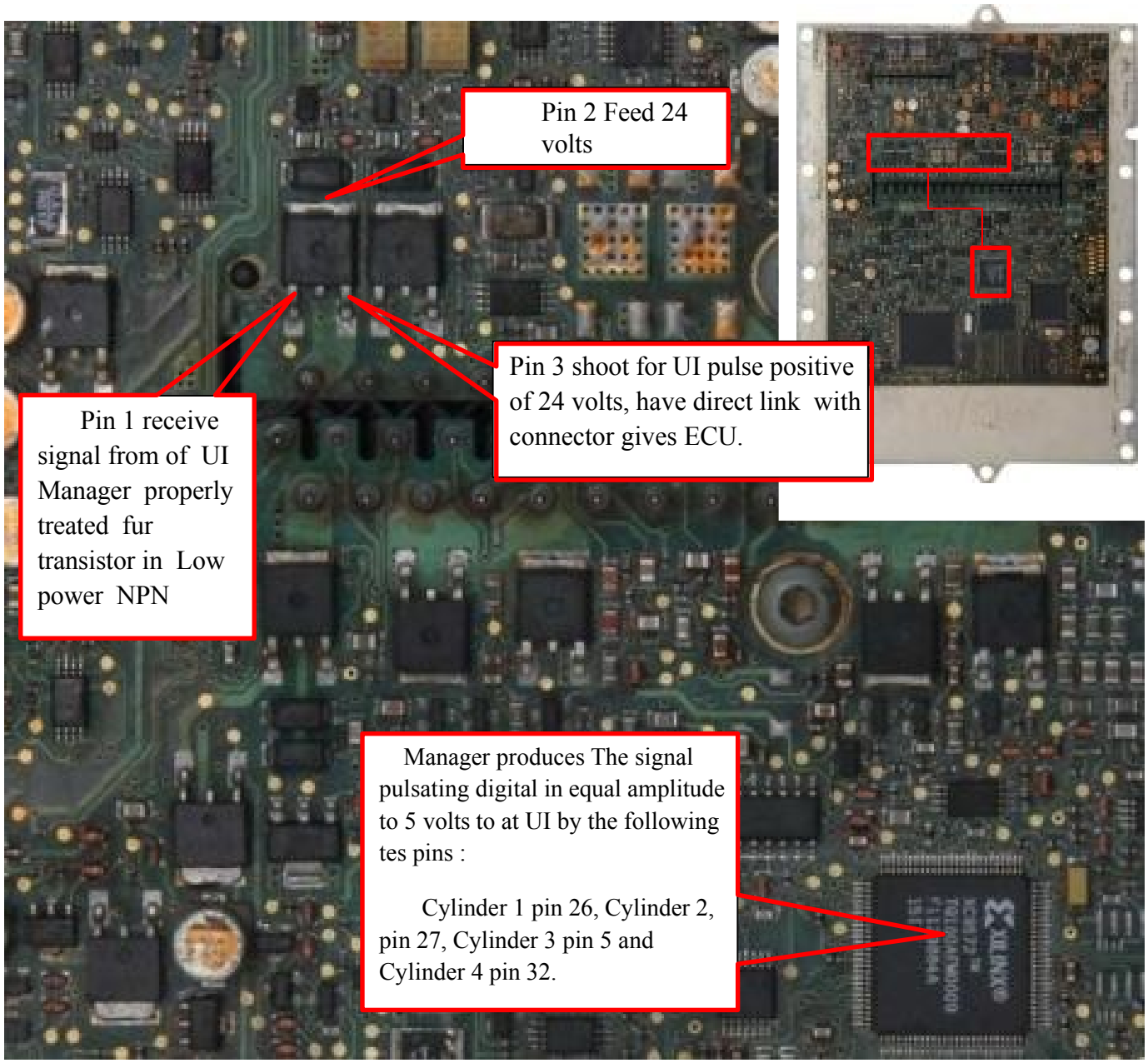
Component	Occupation of Component
01-Transistors and Capacitors	Circuit in Protection
02-Filter At the. B82790	Filter in line gives Network Can
03-Transitor 7 terminals At the. 42712G	Regulator in Voltage of 8v for 5v.
04-Transistor At the. 25N06 (PNP)	Individual Unit Injector Cylinder 1.
05-Transistor At the. 25N06 (PNP)	Individual Unit Injector Cylinder two.
06-Transistor At the. 25N06 (PNP)	Individual Unit Injector Cylinder 3
07-Transistor At the. 25N06 (PNP)	Individual Unit Injector Cylinder 4
08-Transistor Main At the. 46N06 (NPN)	Circuit Common of Units Cylinders 1 and two
09-Transistor Main At the. 46N06 (NPN)	Circuit Common of Units Cylinders 3 and 4
10-Transistor Main At the. N439AC	Circuit Relay in Match
11-Integrated Circuit At the. 29030	To convert A / D and Reverse in Signal From sensors in rotation and phase of the engine
12-Integrated Circuit At the. XC9572	Main Manager gives Units Injection Molding, commands the action in each unity of system PLD
13-TSOP At the. AM29F400BB	Memory contains every information and maps in operation of system in injection PLD
14-Processor At the. SAK-C167CR-LM	Responsible per commend all system functions, well at run calculations and operation fundamental
15-SOIC Integrated Circuit 16 At the. B10011S	Decoder protocol Can have the occupation in send and receive packages in Dice for Network Can
16-Component At the. MPXA4115A	Sensor in pressure Atmospheric
17-XTAL - Crystal Oscillator	Crystal Oscillator or piezoelectric, keeps O processor active and operational

Description Detailed From Circuits

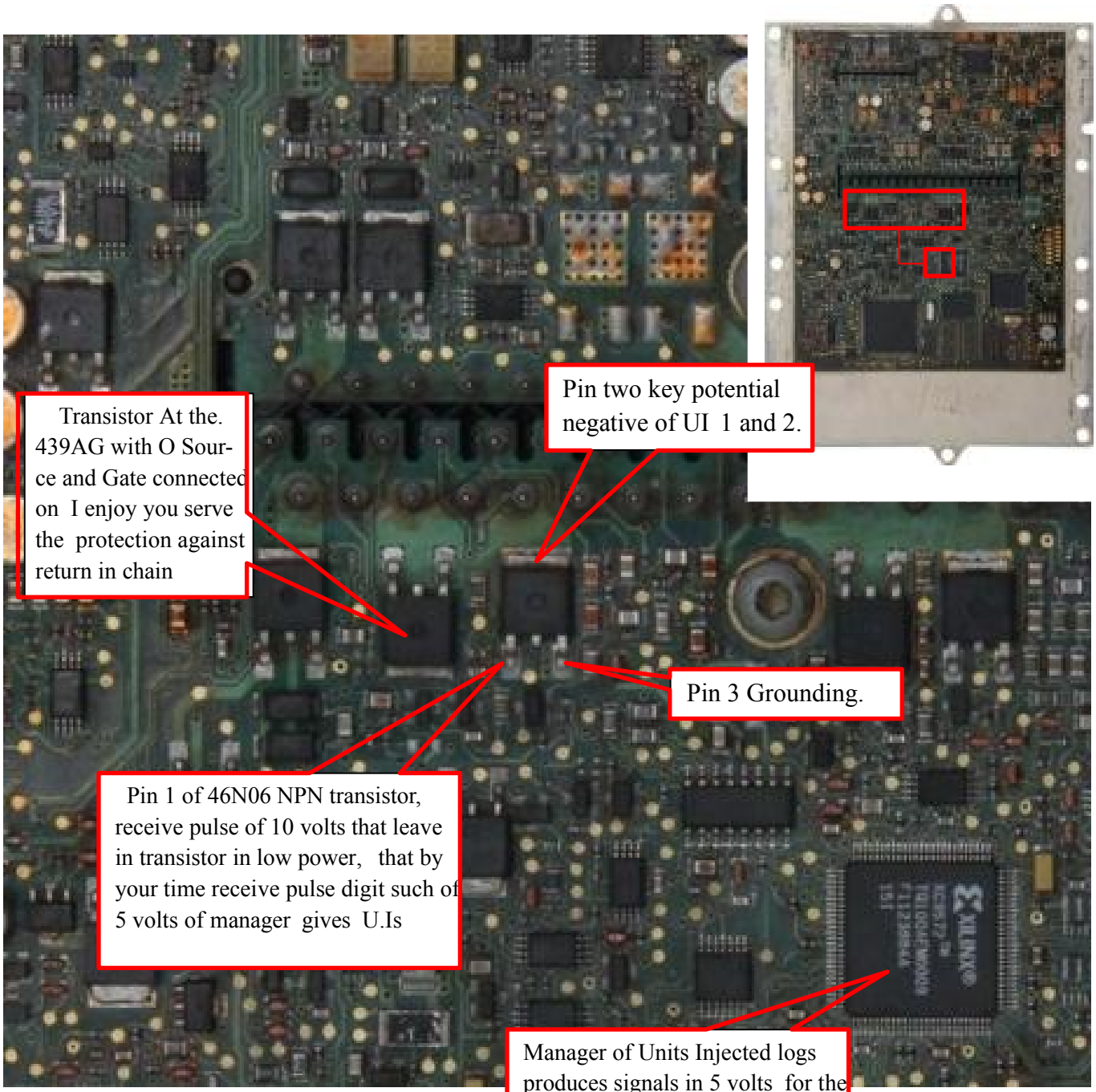
Circuit of Units Injection molding machines (UI)

In this system in injection there is a very important feature referent at injection units (UI). The operation electric of units if from the with The ECU doing the negative switching through of transistor Junction 46N06 NPN, although something interesting is that that same transistor key more in one UI, in that case at of cylinder 1 and 2 and another transistor It is responsible for the cylinders 3 and 4, to that we give O Name in Bank 1 and subsequently Bank two. Another important factor is that ECU too if blame per send the signal pulsating Positive 24v through of the transistors 25N06 PNP, to which we give O Name in circuit individual of UI He follows below Details of that circuit.

Circuit Individual of U.Is (Everyone is equals)

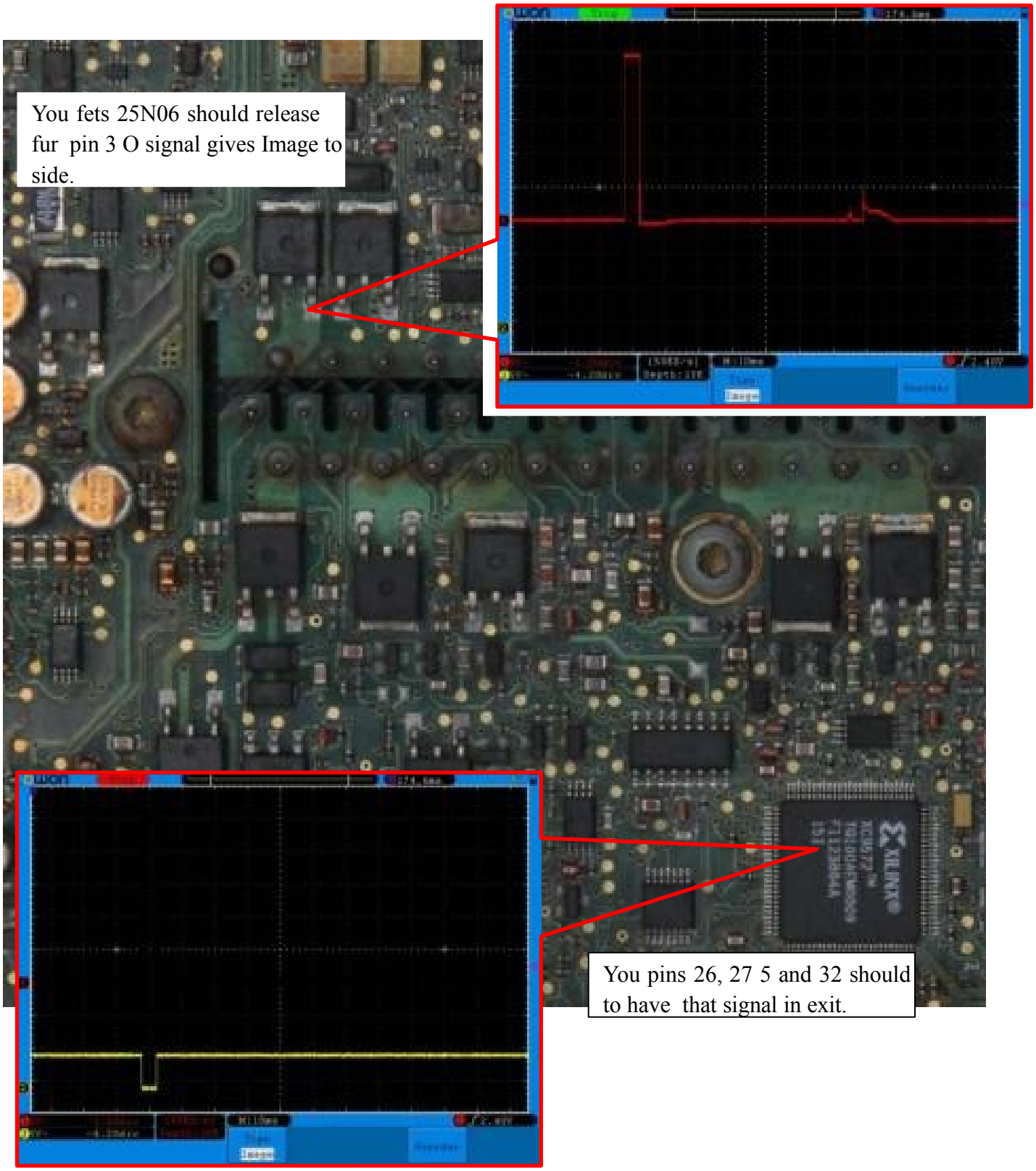


Circuit Common of U.Is (OM904)



Signals Electrical Individual of UI (OM 904)

With at information of pages previous on The description From pins From components watch with O oscilloscope at next shapes in waves below:



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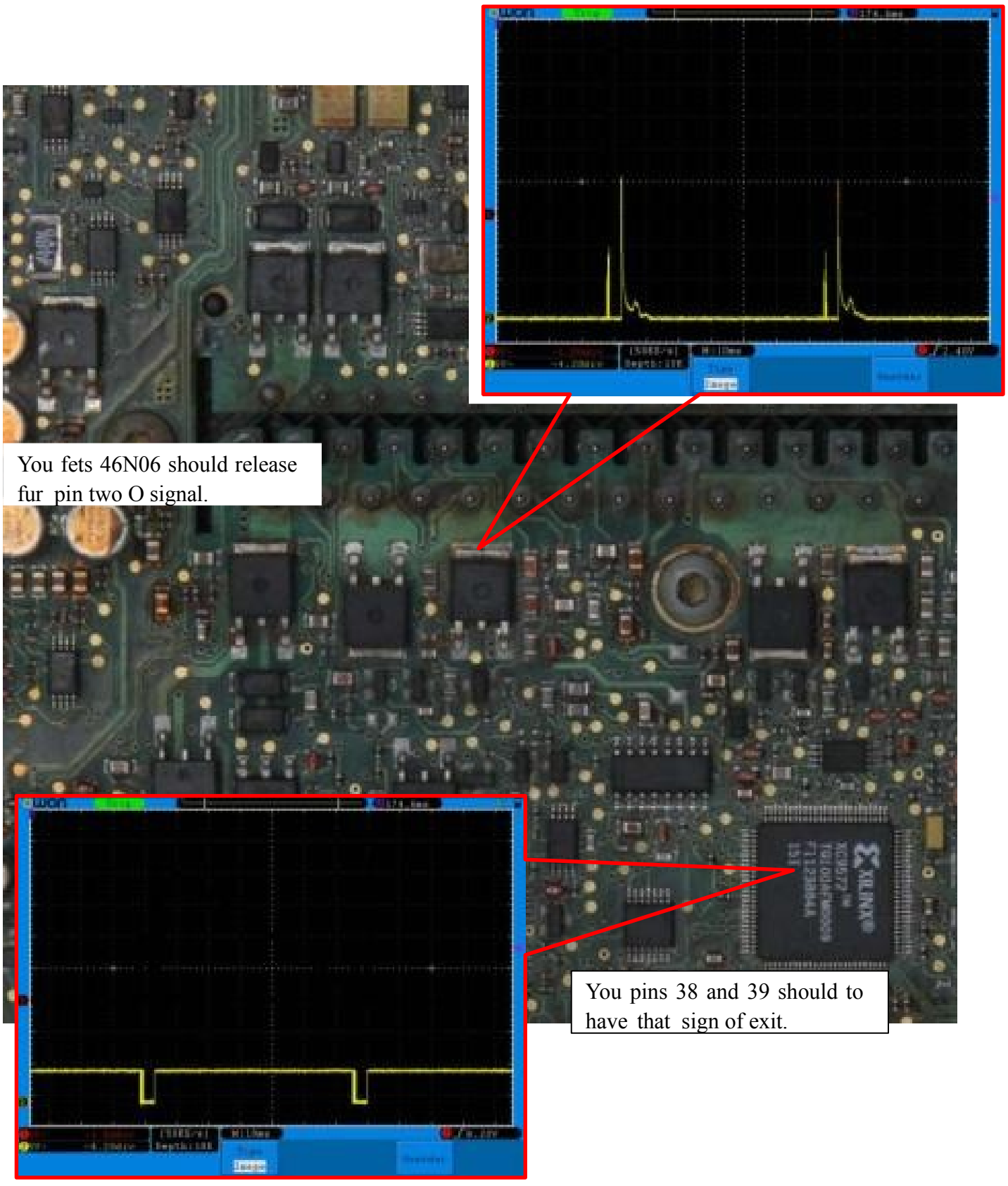
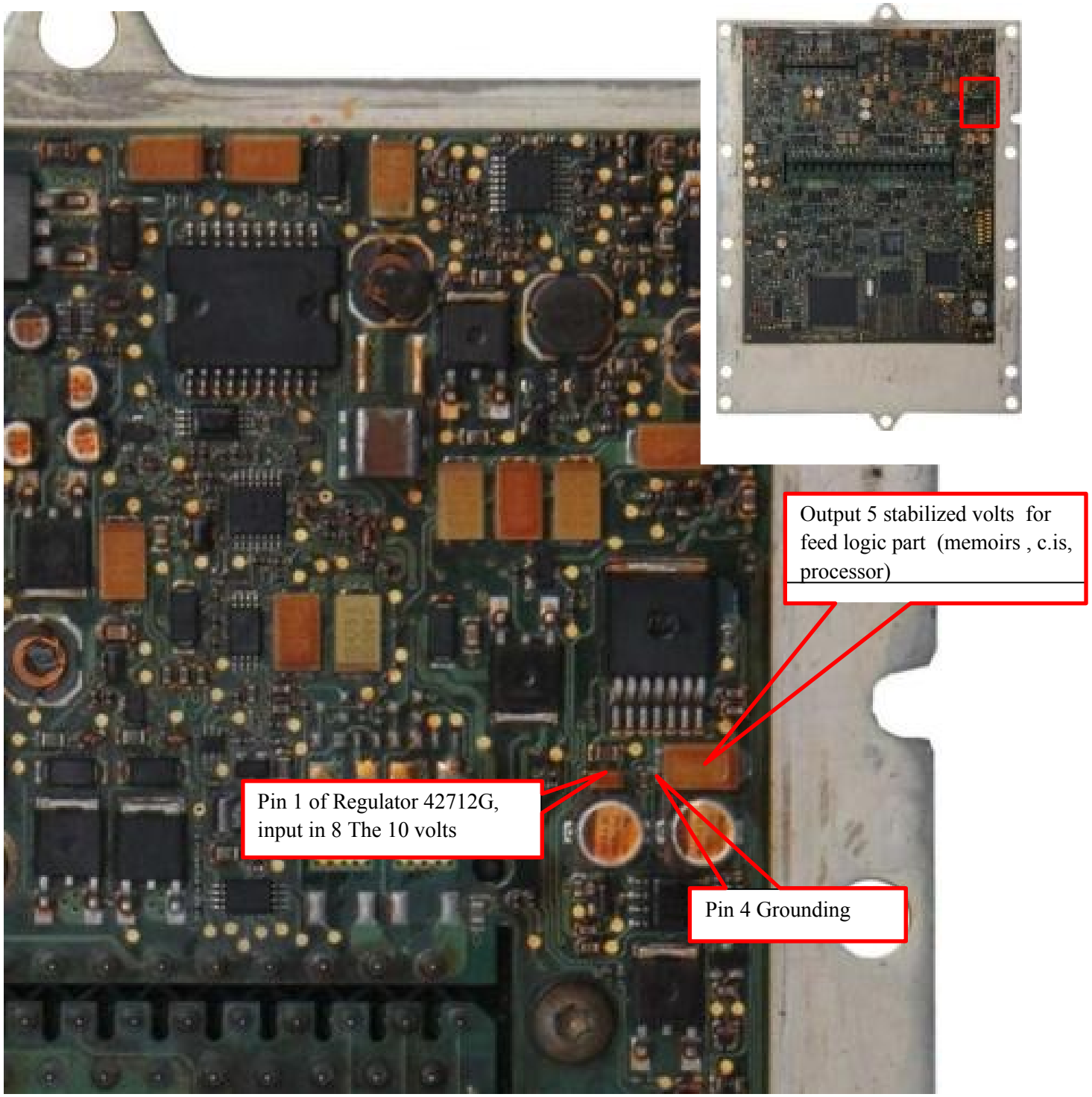


You fets 46N06 should release fur pin two O signal.

You pins 38 and 39 should to have that sign of exit.

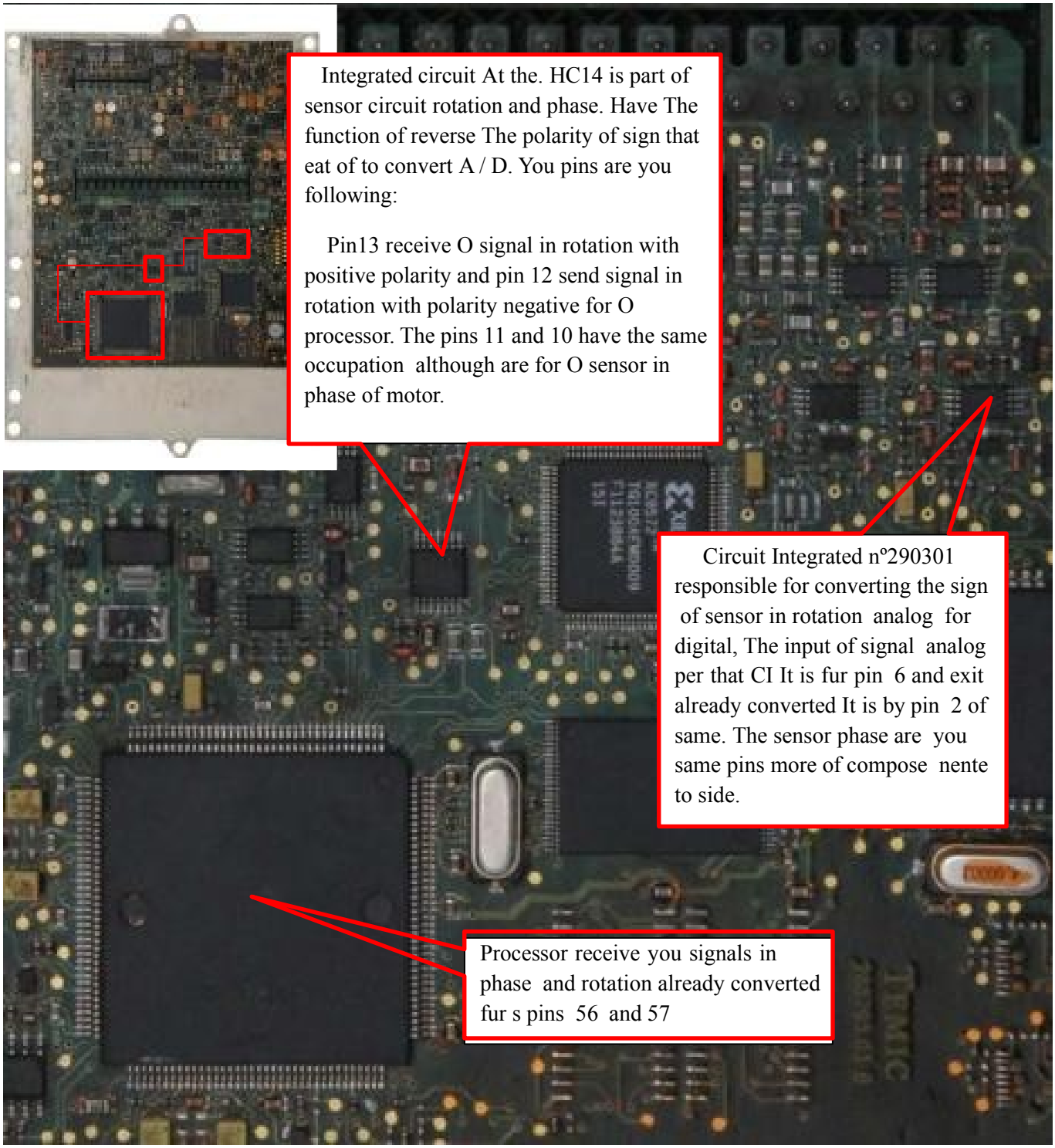
Regulator in Voltage (PLD OM904)

Component fundamental of printed circuit because It is he what feed The part logic of system. In case in short circuit this component is susceptible The burn, for run O diagnosis feed The plate using scheme electric and certify US next pins at feeds.



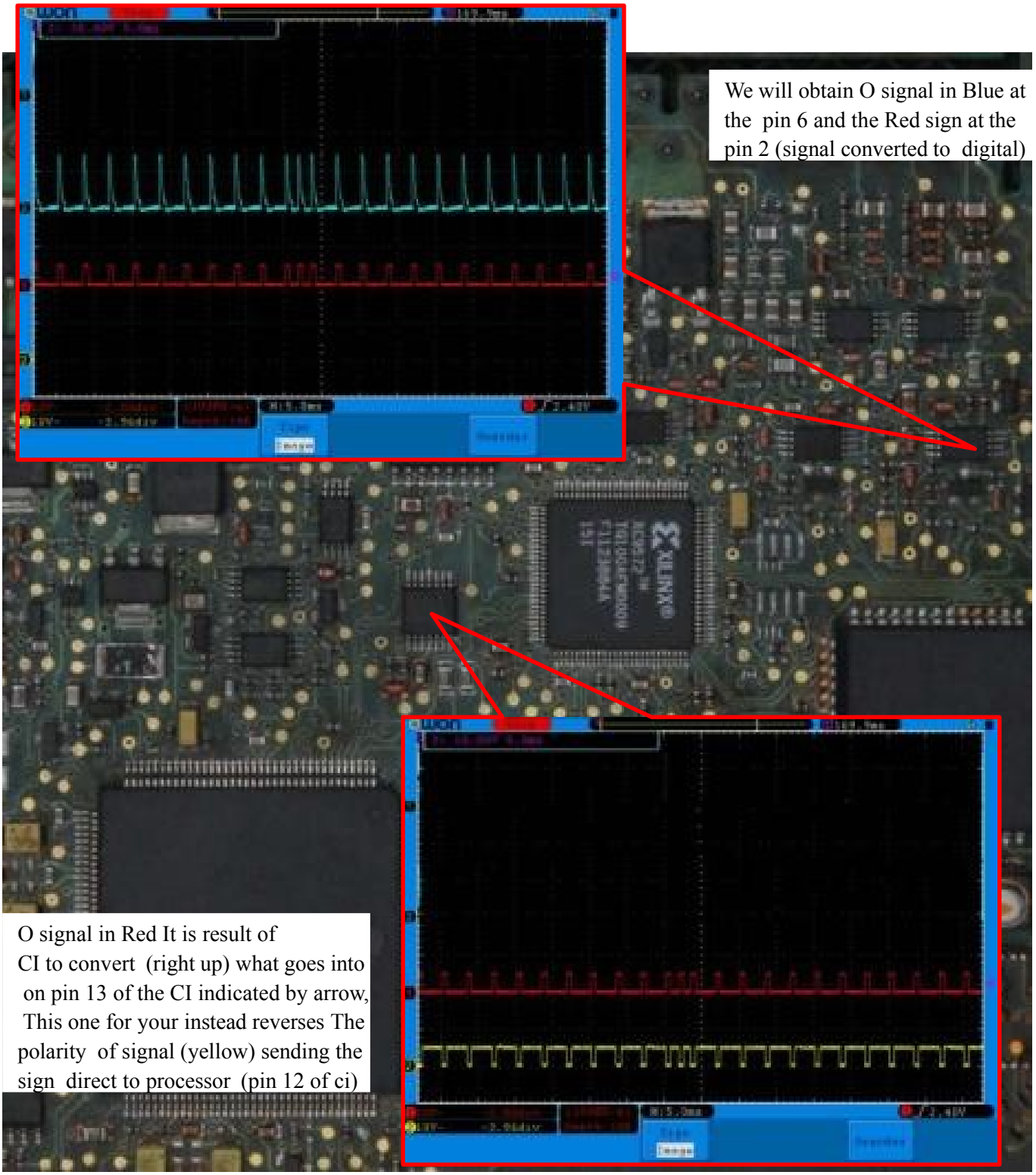
Circuit of Sensor in Rotation and Phase of Motor

Very important circuit for system, because if not there is the occurrence of signal in rotation arriving at processor not there is operation. Possible defectsin that circuit can to be diagnosed with the use of oscilloscope. Below Follow O circuit of these sensors.



Signals Electrical Circuit Rotation and Phase

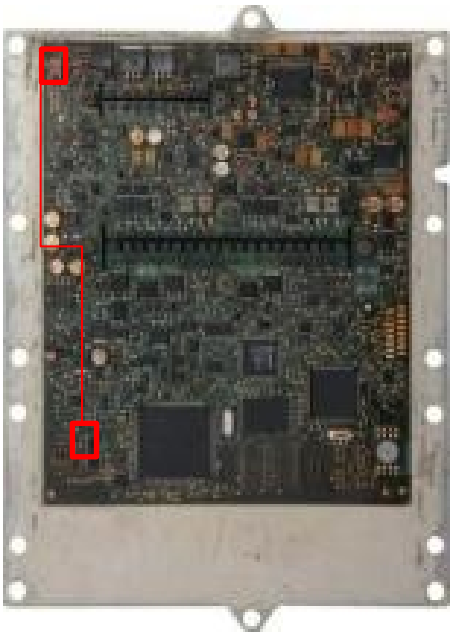
One particularity of this circuit and the presence in rectifier diodes making A paper important at the treatment of that sign as well with oa presence of c.is with functions in converters A / D. See the pins Where you signals electrical if locate:



NOTE: Sensor in phase Follow at same coordinates

Circuit of Decoder in Network CAN

Circuit responsible fur protocol in Communication CAN, Where It consists in to do with there communications in between different modules sending and receiving information important.



Filter gives Line in Network Can in High and Low.

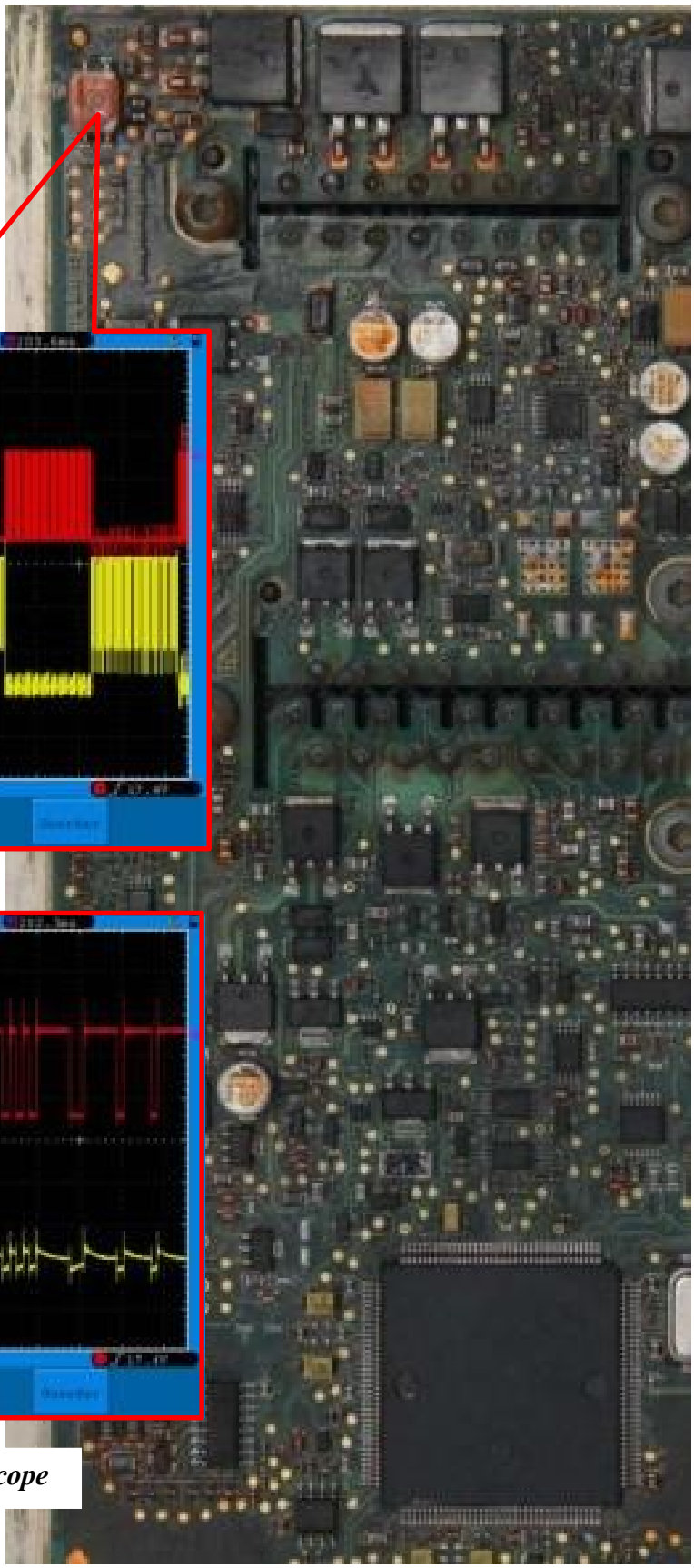
Circuit Integrated At the. B10011S responsible by decoding of Can signal.

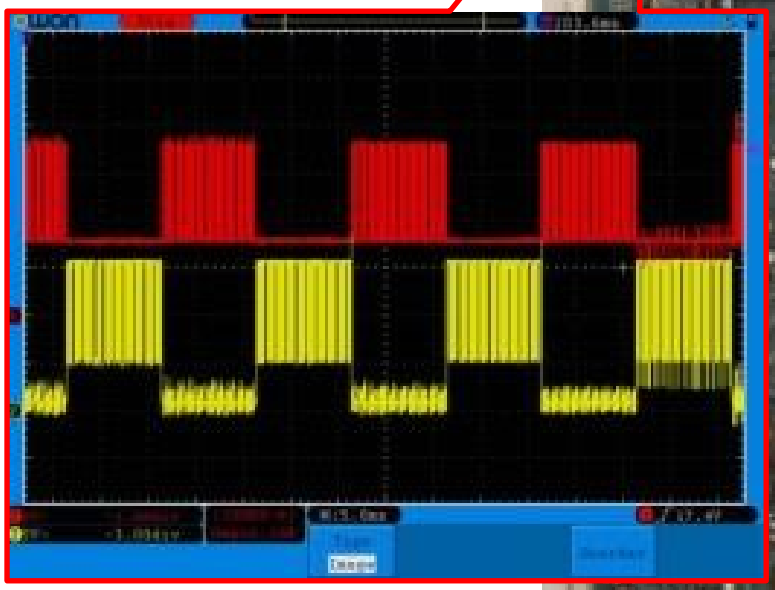
At Appetizer in exits From Dice are you next pins:

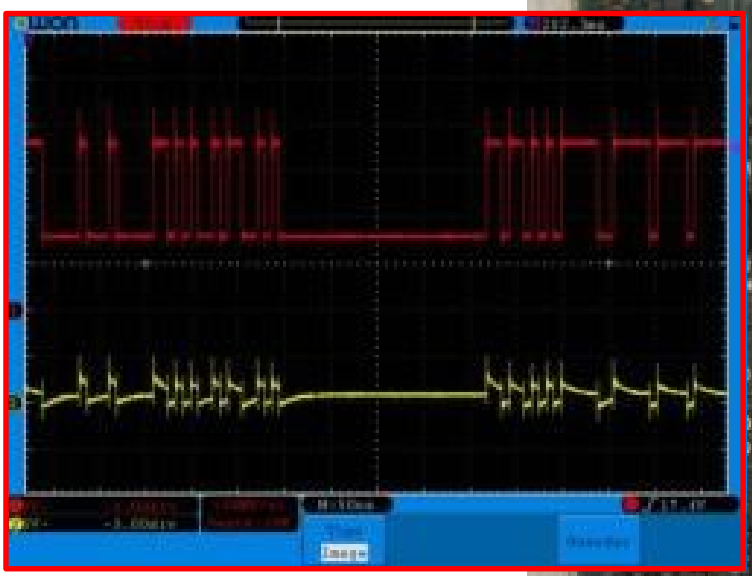
Pins 12 and 11 are the respective doors in Communication

Signals Electrical of Decoder Network Can

Electrical signals gives Can network are characterized by digital waves, being able to or not to be mirrored. THE perfect visualization of signal well at your interpretation It is something difficult but It is possible examine The existence of that us sign pins 1 and 2 of the connector in 16 ways or at the filter in line. Look now you Signals characteristic what we get.



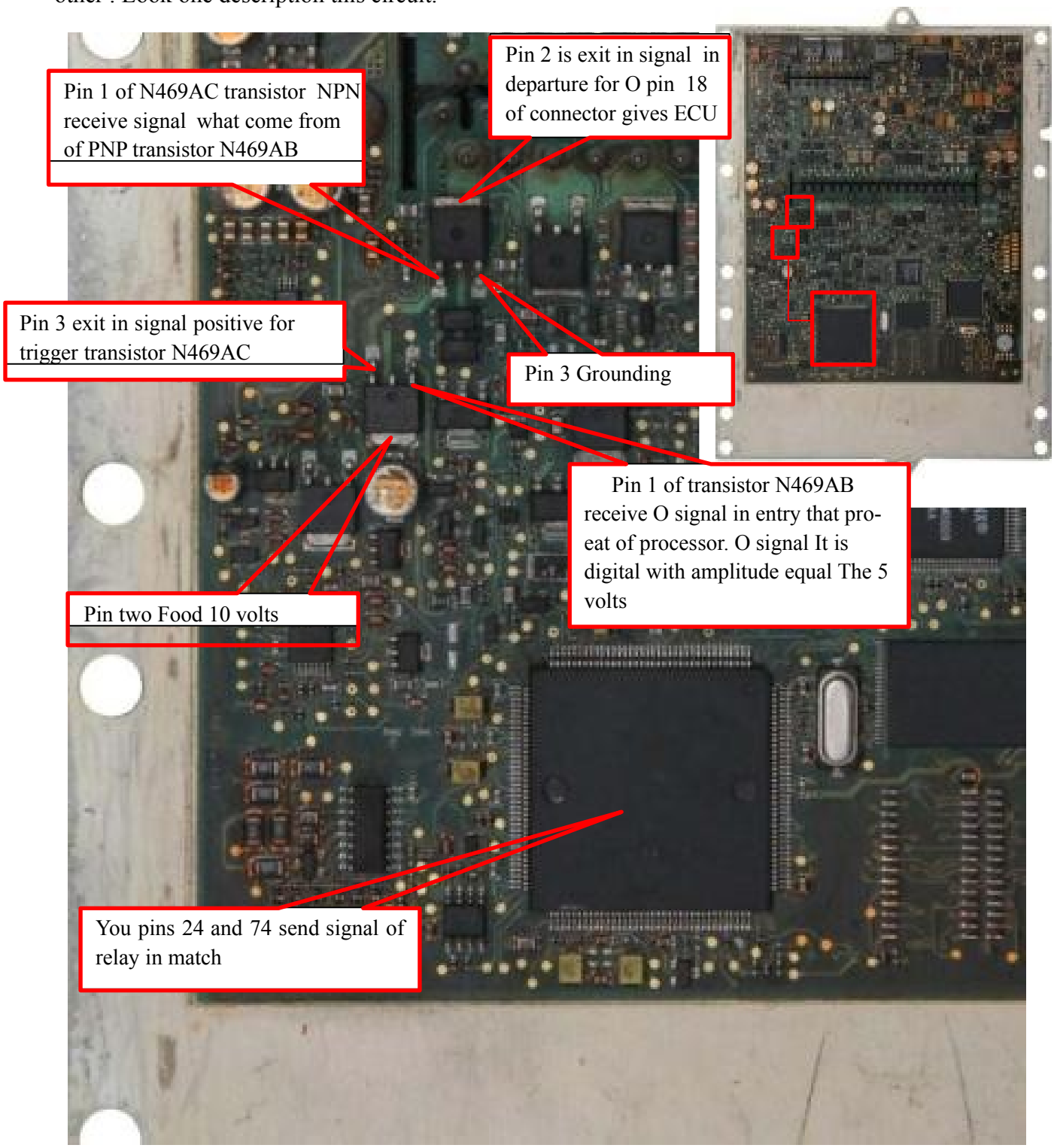




Signal gives Can Network magnified at the oscilloscope

Circuit in Relay in Match

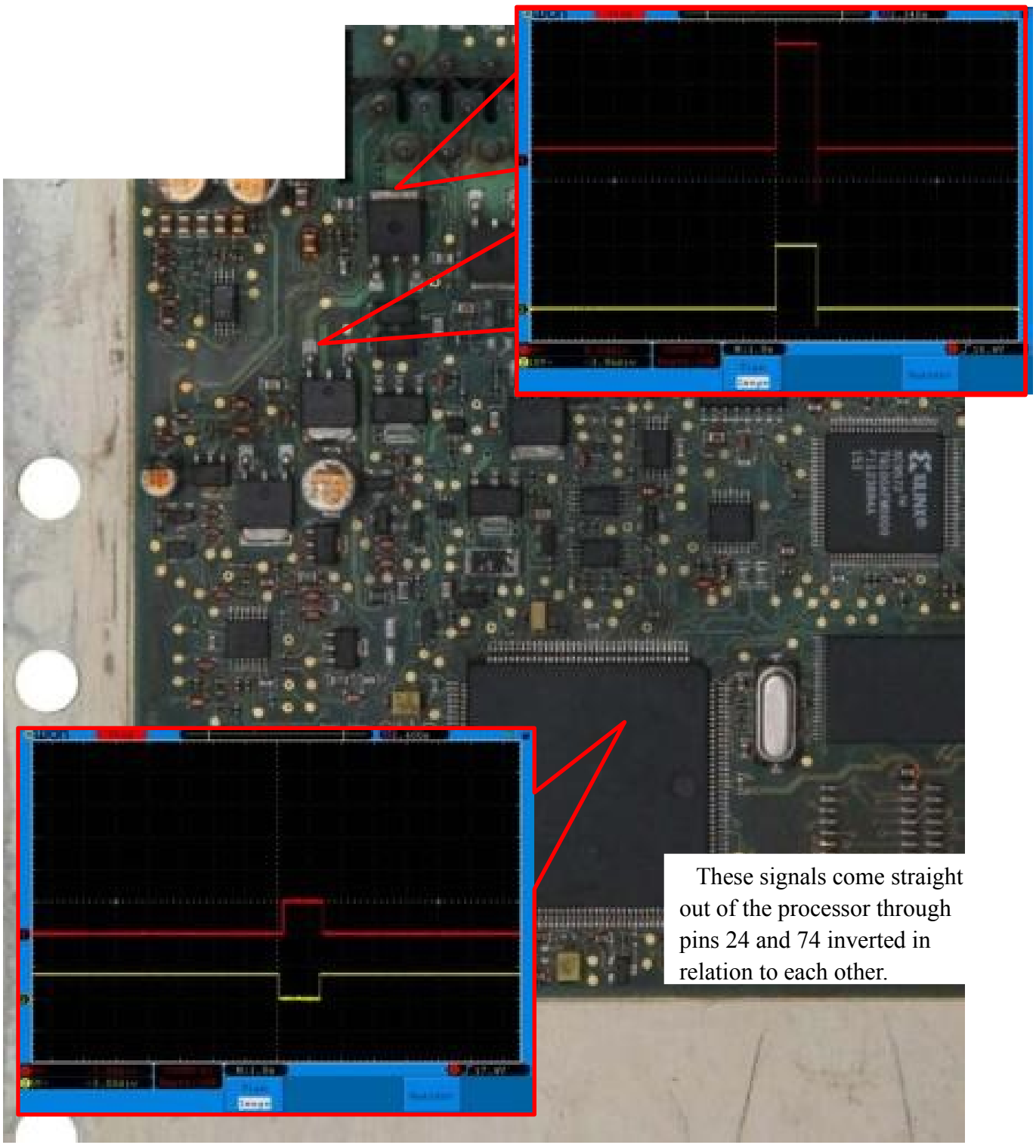
Responsible circuit per activate O system in relay in Match sending a signal negative of, in the tests carried out is possible to observe with the oscilloscope occurrence of that signal what is one wave continues at 10 volts and When release signal in match that signal falls for negative, and remains in that signal per The time course what hard 3 to 5 seconds. That sign goes out of processor for two pins, the 24 and 74 and both have the amplitude out of 5 volts although are mirrored The to other . Look one description this circuit.



Signals Electrical of Circuit Relay in Match

Signals electrical of this circuit are brief durations in 2 to 3 seconds, but are critical to The release in starting from that system in injection. Watchthe base in team of the signs with the oscilloscope and check if you same they are plausible.

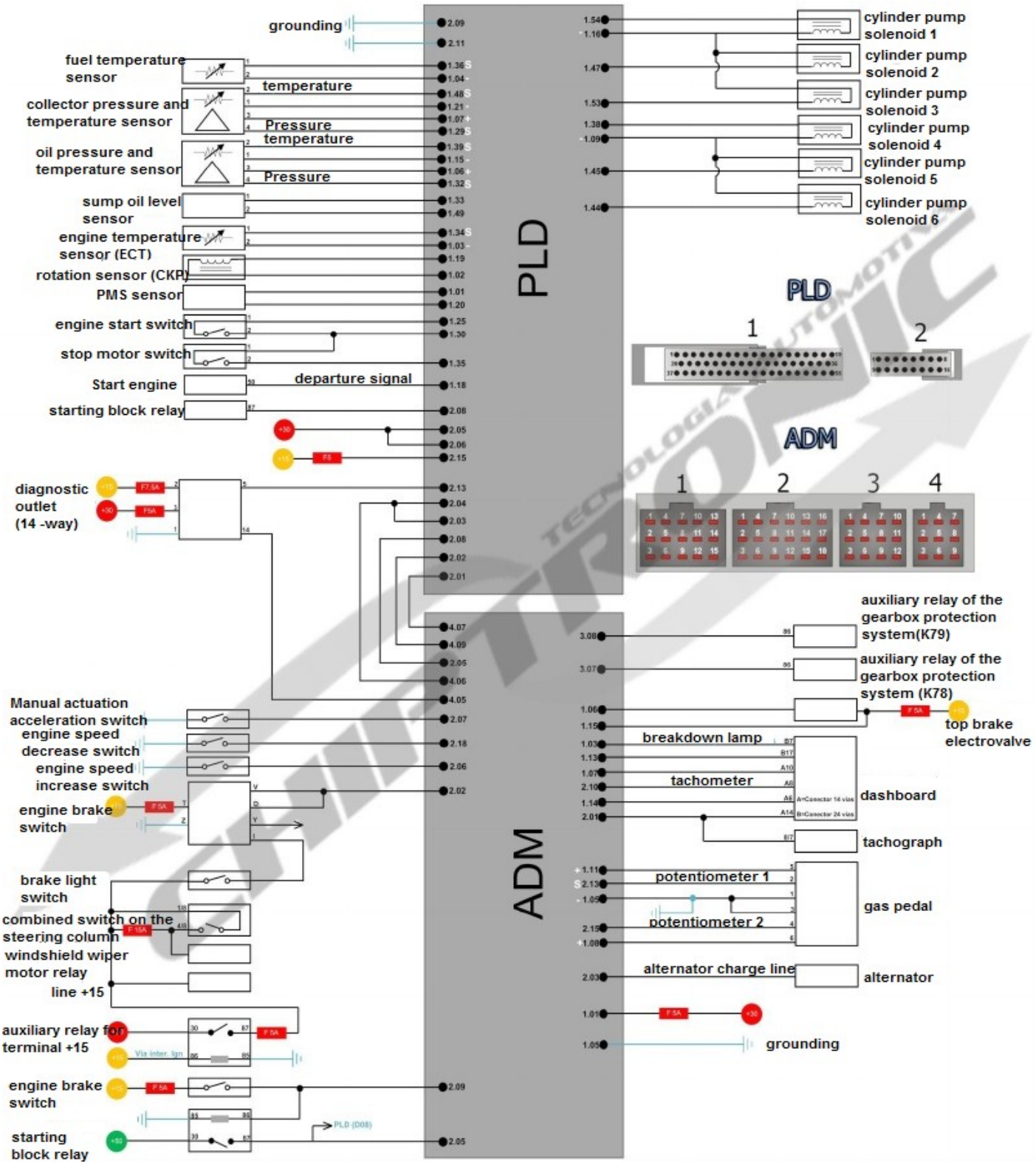
US Transistors in Featured we found you signals who are from system in relay in match, in that case around in 1.5 Mon. in lasts dog



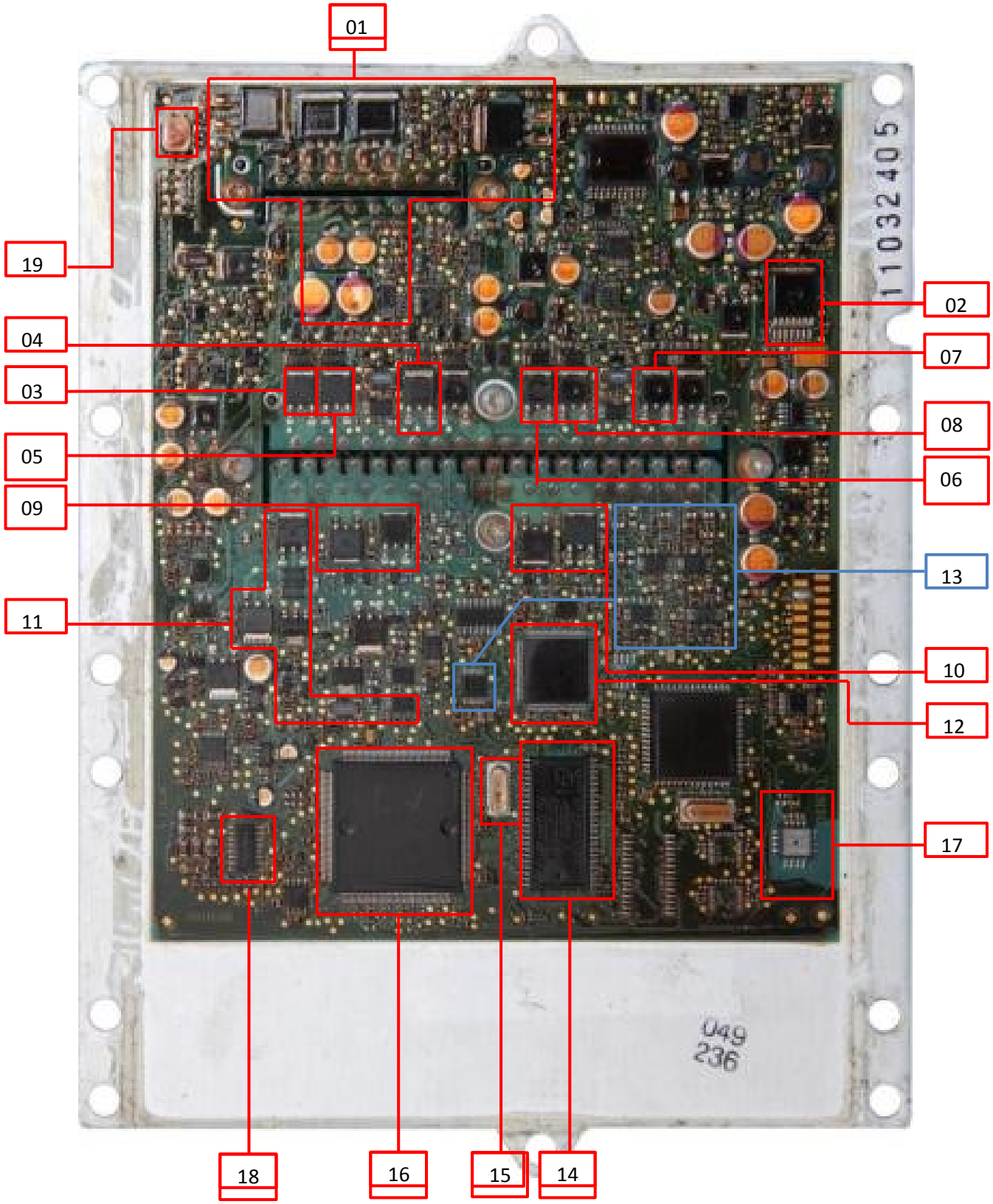
These signals come straight out of the processor through pins 24 and 74 inverted in relation to each other.

Mercedes Benz OM906 / 457 PLD System

Scheme Electric PLD OM906 / 926/457



Components Overview (OM906 / 457)



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18- SOIC Integrated Circuit 16 At the. B10011S	Decoder protocol Can have the occupation in send and receive packages in Dice for Network Can
19- Filter At the. B82790	Filter in line gives Network Can

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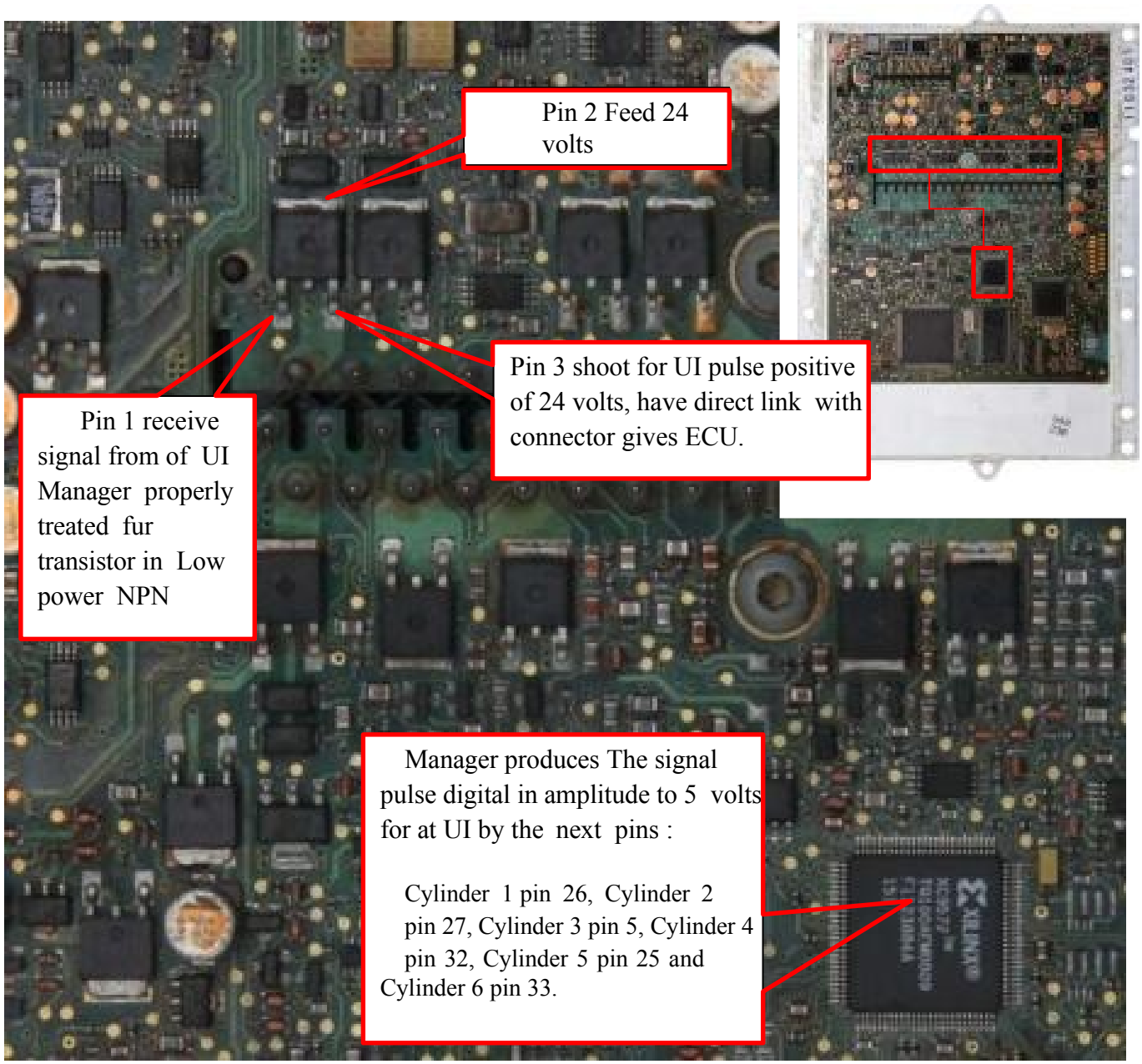
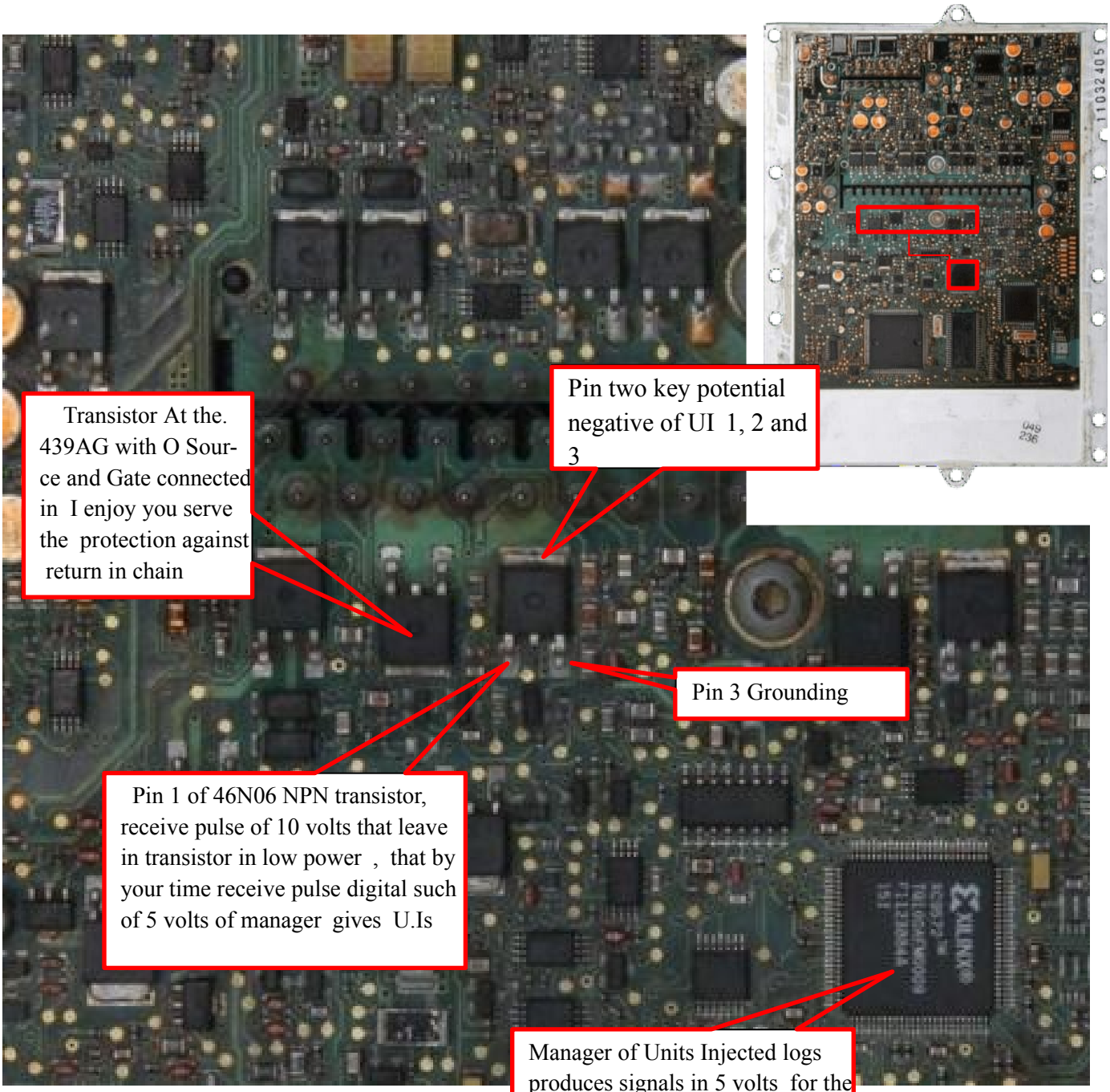
In this system in injection there is a particularity very important referent injection units (UI). The operation electric of units if from the with The ECU doing the negative switching through of transistor Junction 46N06 NPN, although something interesting is that that same transistor switches more in one UI, in that case at of cylinder 1, 2 and 3 and another transistor It is responsible for the cylinders 4, 5 and 6, To this we give O Name Bank 1 and posteriorly Bank 2. Another important factor is that ECU too if blame per submit O Positive pulsating signal in 24v through the transistors 25N06 PNP, to which we give O Name in circuit individual of UI He follows below Details of that circuit.

Circuit Individual of U.Is (Everyone is equals)

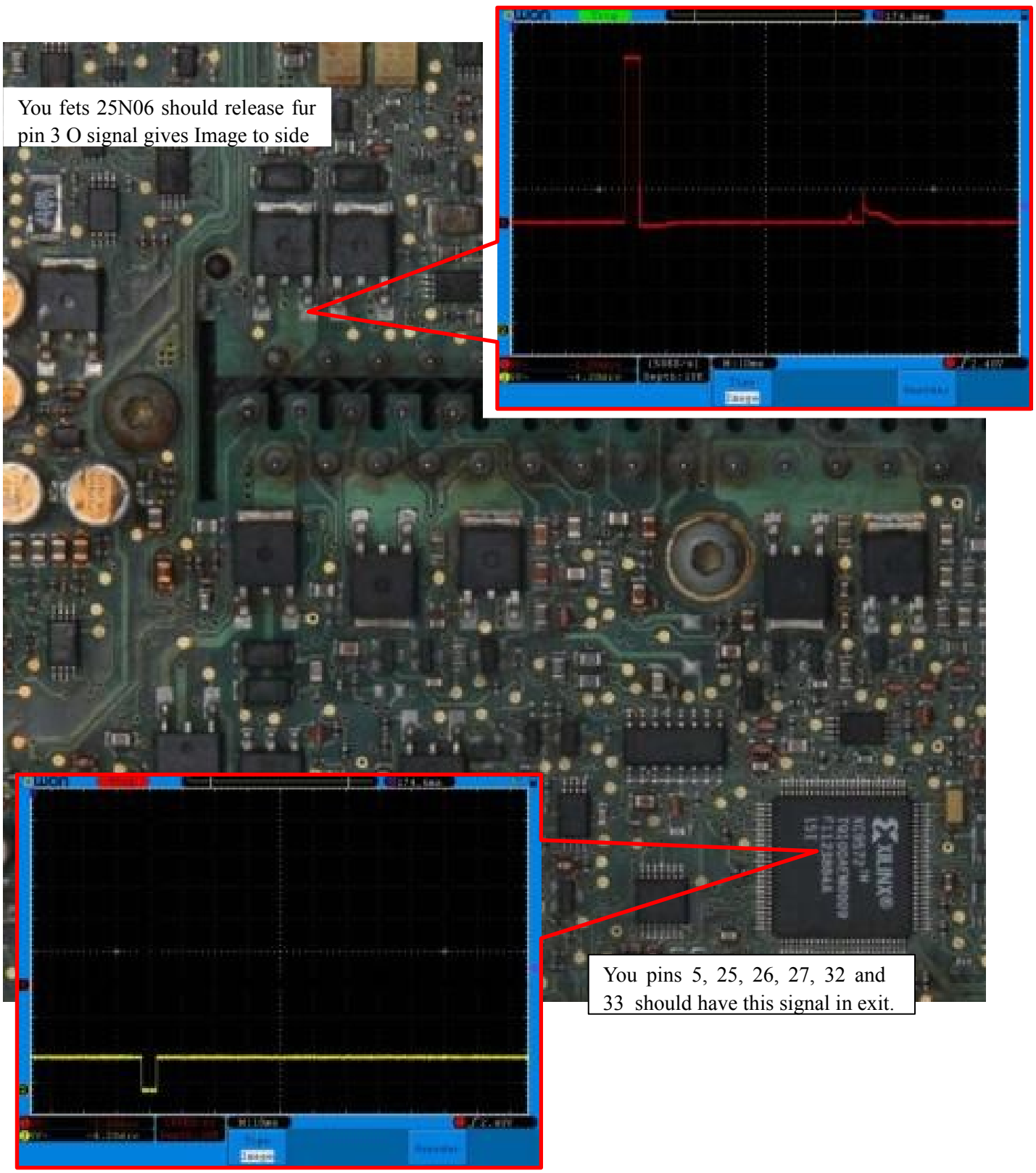


Circuit Common of U.Is (OM906)



Signals Electrical Individual of UI (OM 906/457)

With at information of pages previous on The description From pins From components watch with O oscilloscope at next shapes in waves below:



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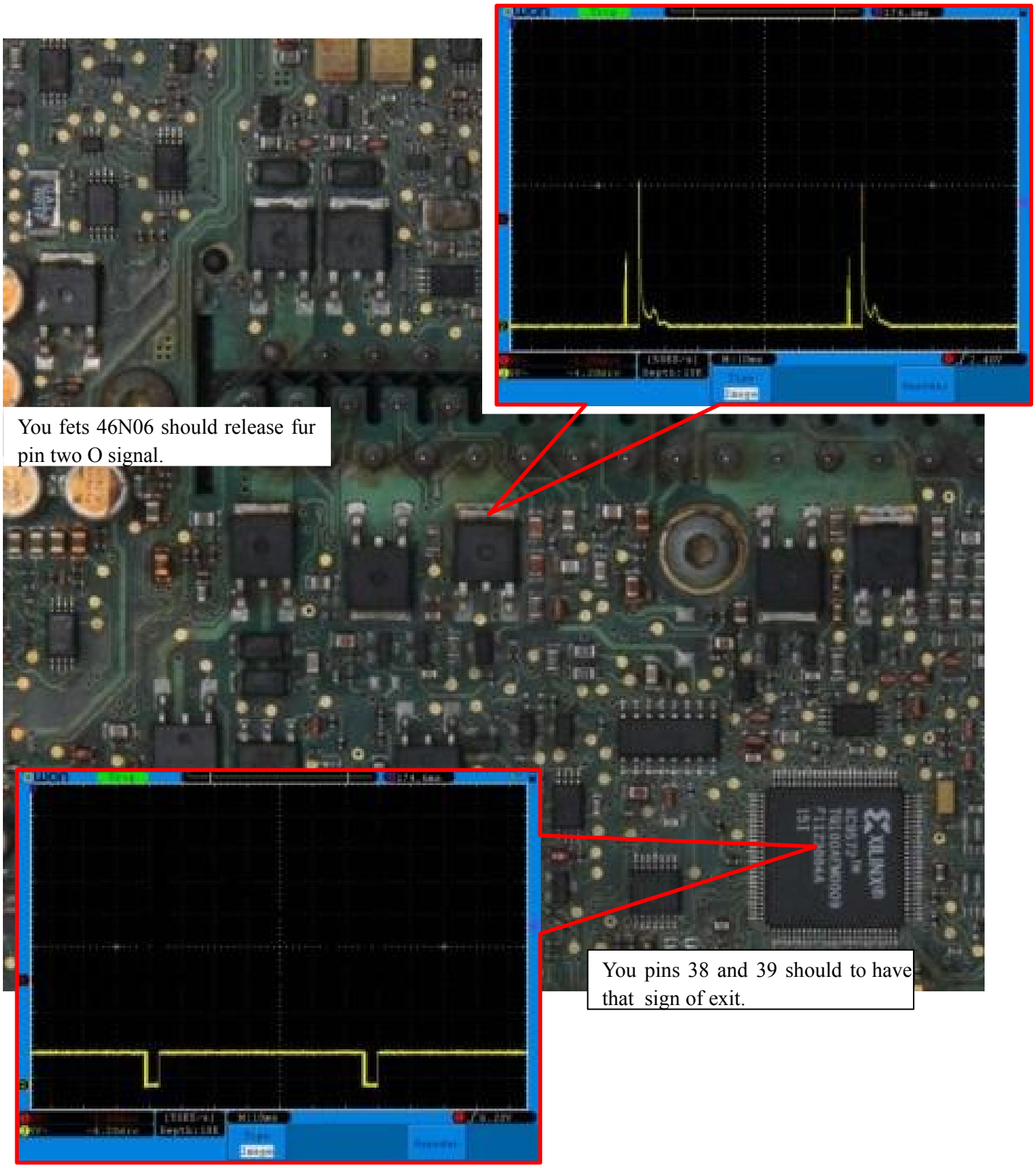
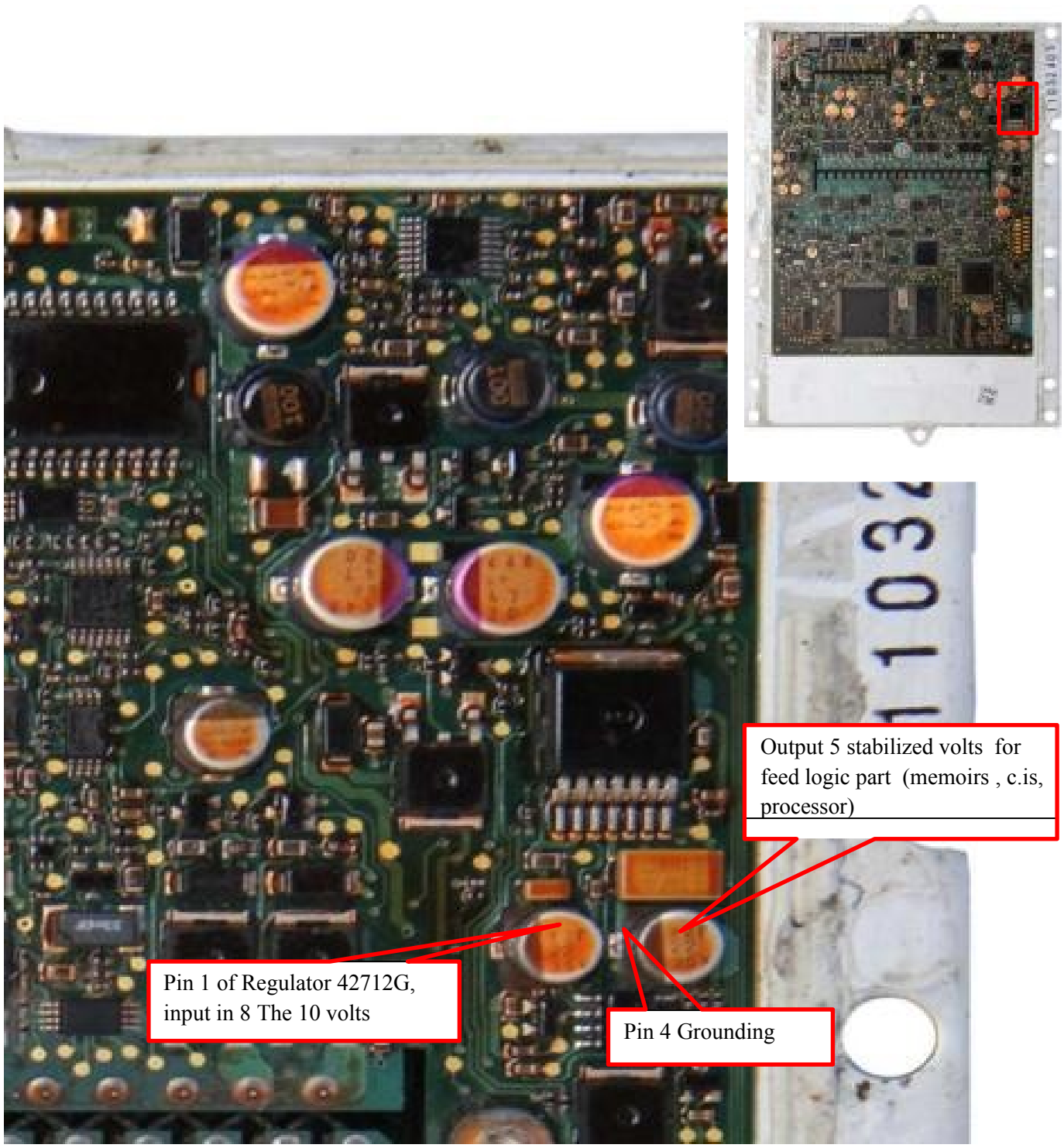


You fets 46N06 should release fur pin two O signal.

You pins 38 and 39 should to have that sign of exit.

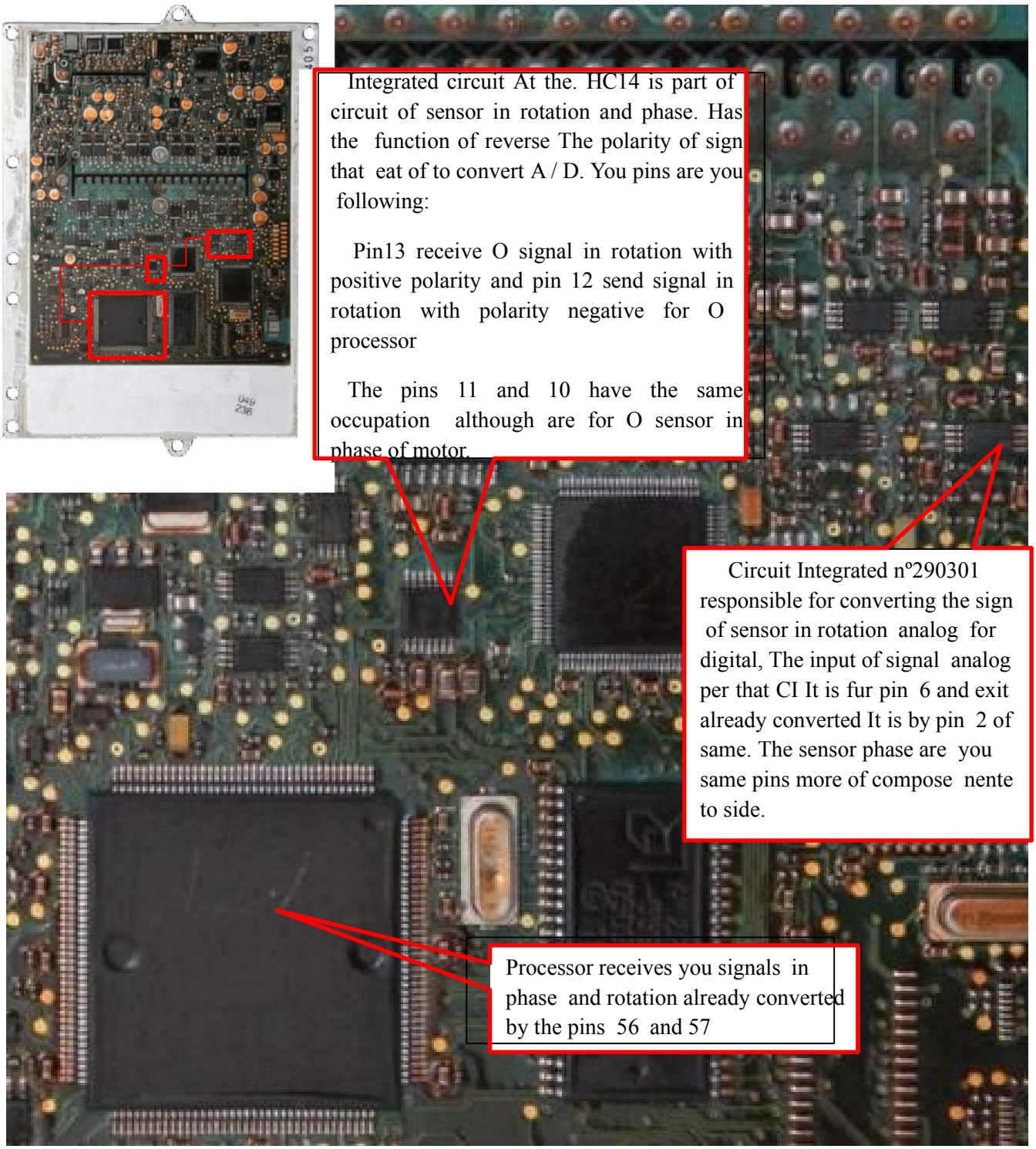
Regulator in Voltage (PLD OM906 / 457)

Component fundamental of printed circuit because It is he what feed The logical part of system. In case in short circuit this component it is susceptible The burn, for run O diagnosis feed The plate using scheme electric and certify US following pins at feeds.



Circuit of Sensor in Rotation and Phase of Motor

Very important circuit for system, because if not there is the occurrence of signal in rotation arriving at processor not there is operation. Possible defectsin that circuit can to be diagnosed with the use of oscilloscope. Below Follow O circuit of these sensors.



Integrated circuit At the. HC14 is part of circuit of sensor in rotation and phase. Has the function of reverse The polarity of sign that eat of to convert A / D. You pins are you following:

Pin13 receive O signal in rotation with positive polarity and pin 12 send signal in rotation with polarity negative for O processor

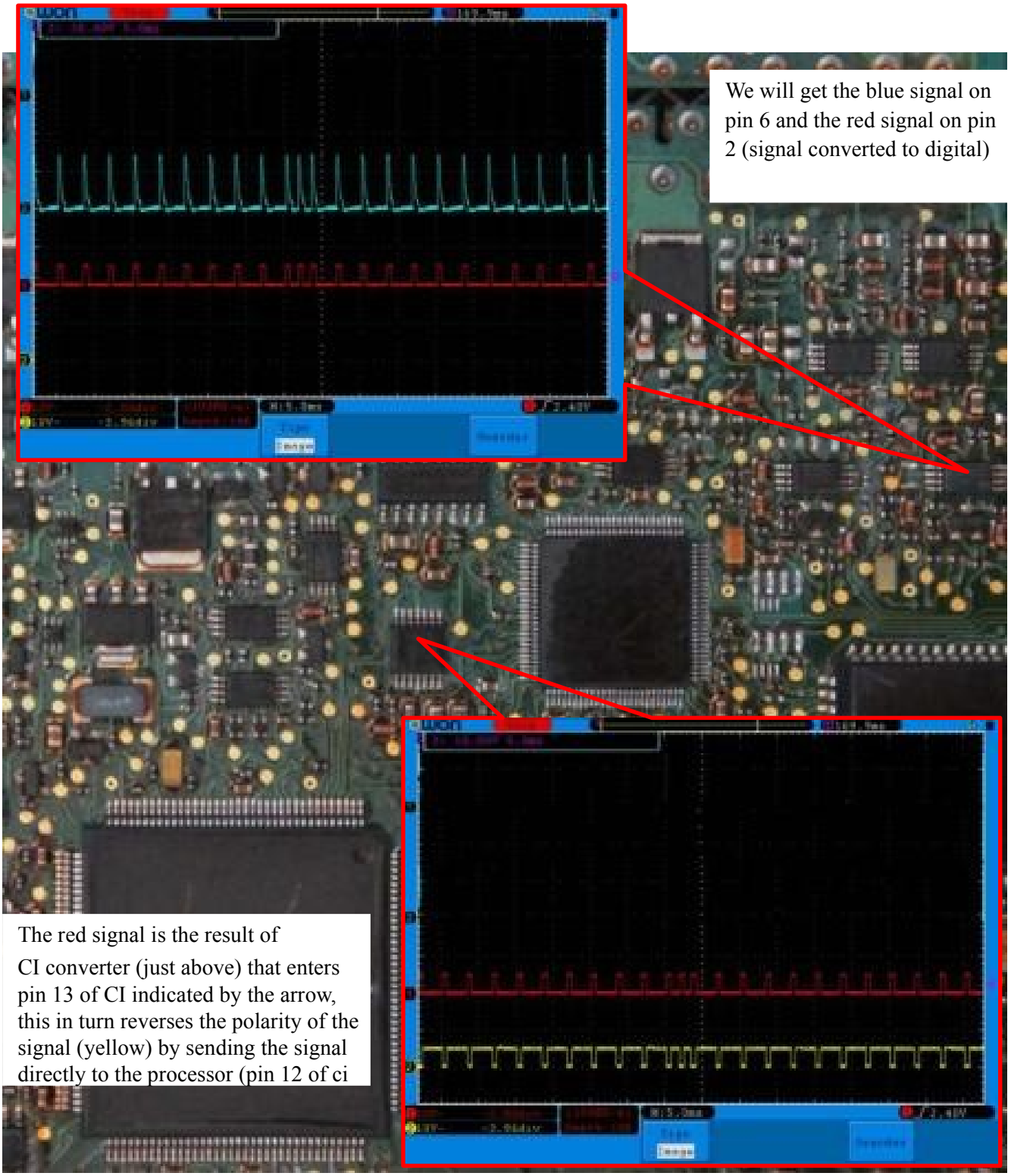
The pins 11 and 10 have the same occupation although are for O sensor in phase of motor.

Circuit Integrated nº290301 responsible for converting the sign of sensor in rotation analog for digital, The input of signal analog per that CI It is fur pin 6 and exit already converted It is by pin 2 of same. The sensor phase are you same pins more of compose nente to side.

Processor receives you signals in phase and rotation already converted by the pins 56 and 57

Electrical Signals Circuit Rotation and Phase

A particularity of this circuit is the presence of rectifier diodes playing an important role in the treatment of this signal, as well as the presence of c.is with functions of A / D converters. See the pins where the electrical signals are located:



NOTE: Phase sensor follows the same coordinates

CAN Network Decoder Circuit

Circuit responsible for the CAN communication protocol, which consists of making communications between different modules sending and receiving important information.

High and Low Can Line Filter

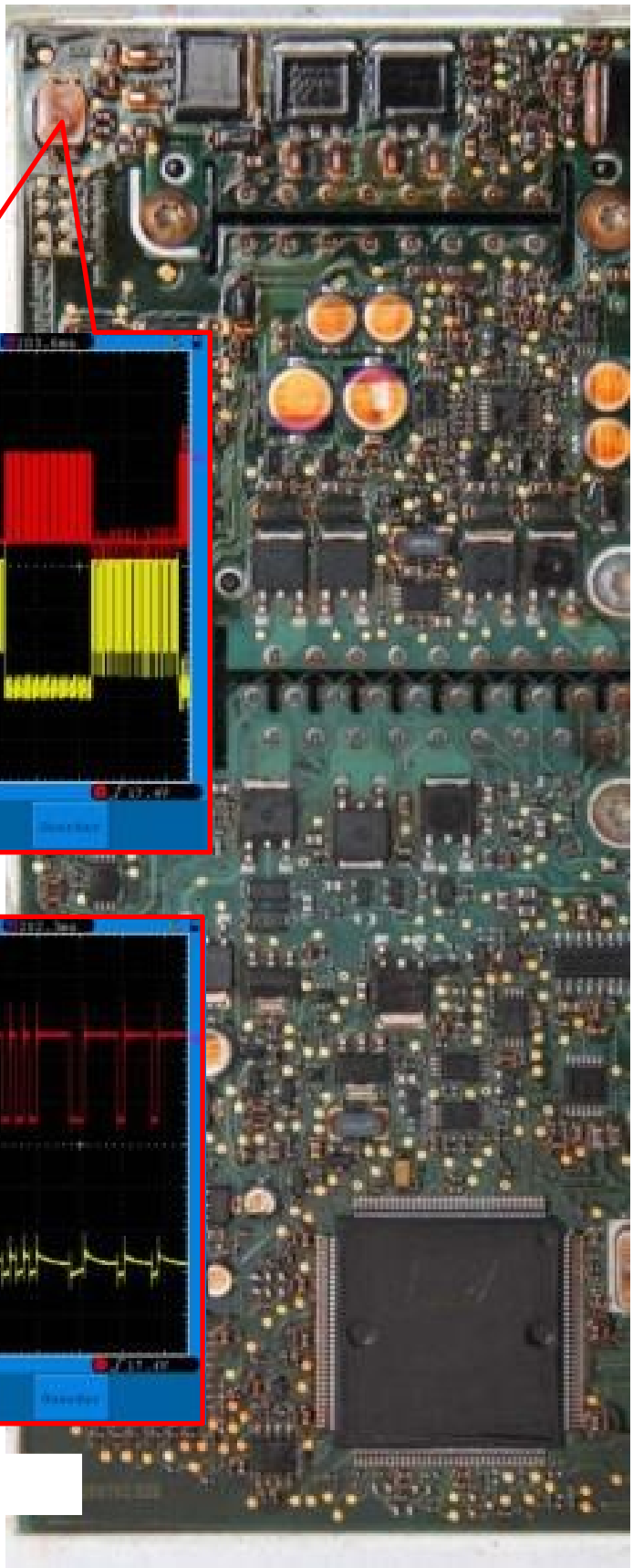
Circuit Integrated At the. B10011S responsible for decoding of Can signal.

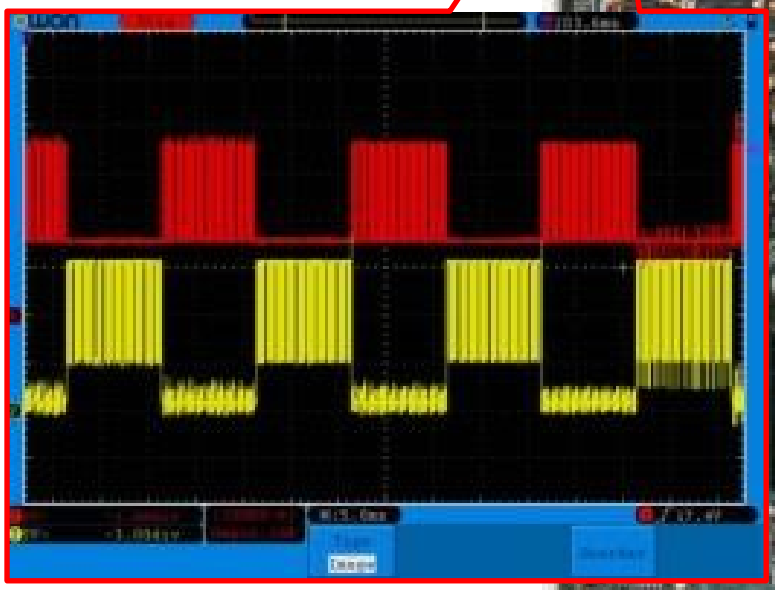
At Appetizer in exits From Dice are you next pins:

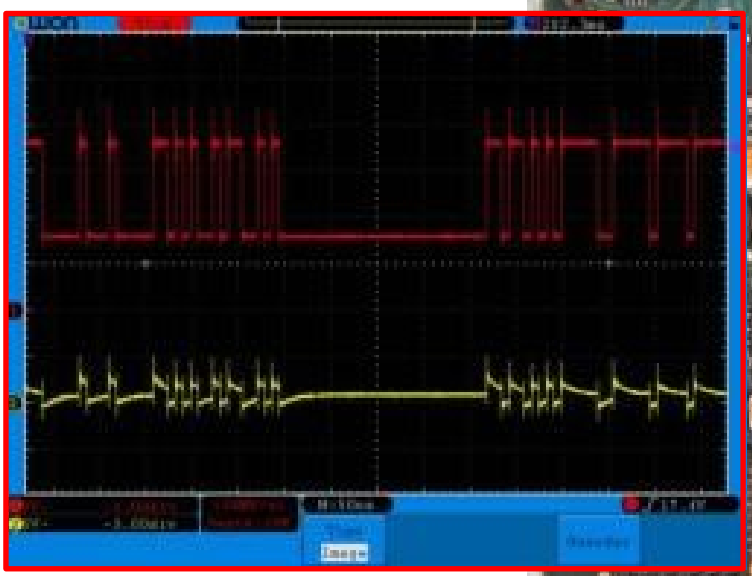
Pins 12 and 11 are the respective doors in Communication

Electrical Signals of the Can Network Decoder

The electrical signals of the Can Network are characterized by digital waves, which may or may not be mirrored. The perfect visualization of the signal as well as its interpretation is difficult, but it is possible to examine the existence of this signal on pins 1 and 2 of the 16-way connector or on the power strip. See now the characteristic Signs we obtain.



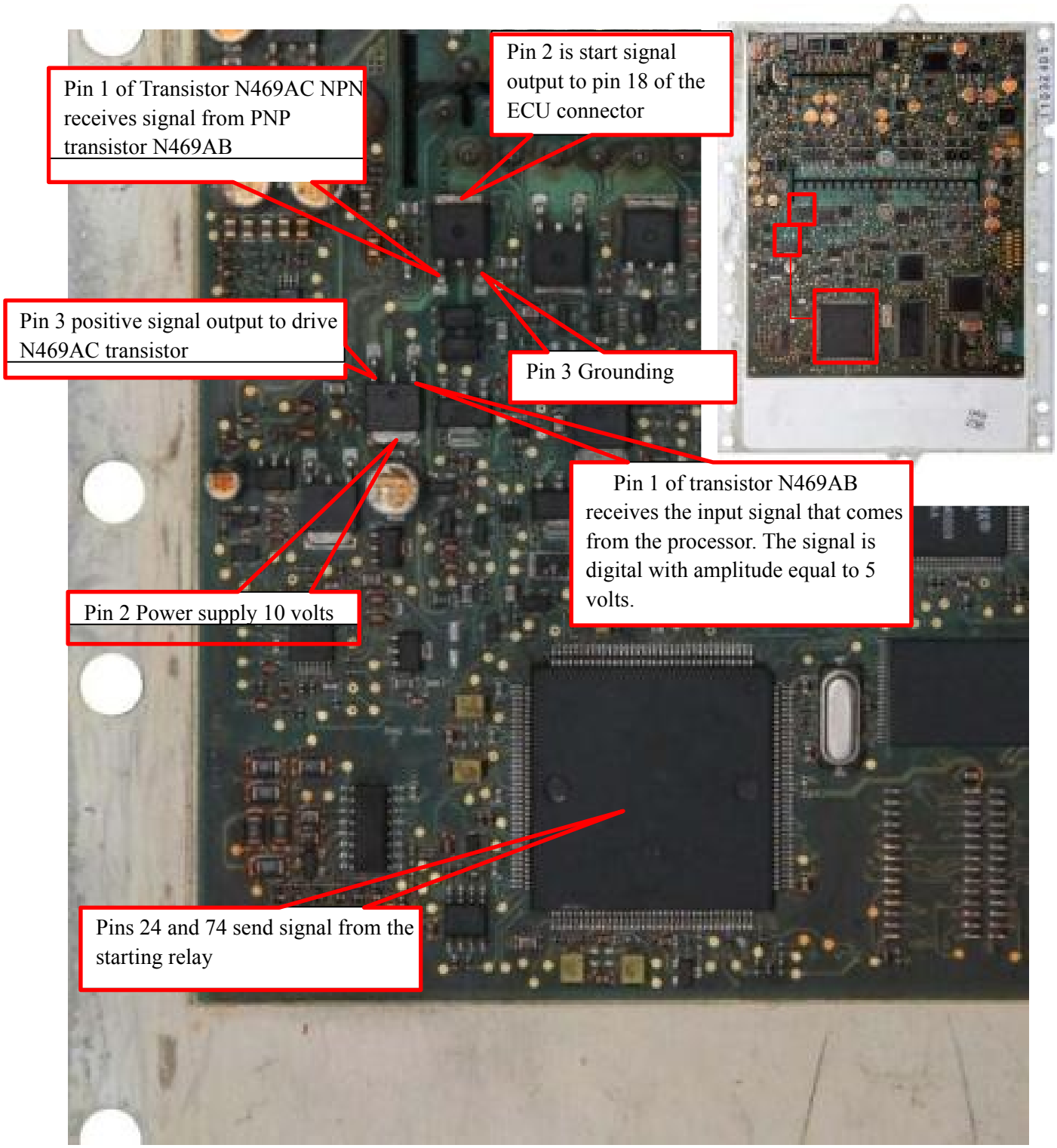




Can Network signal amplified on the oscilloscope

Start Relay Circuit

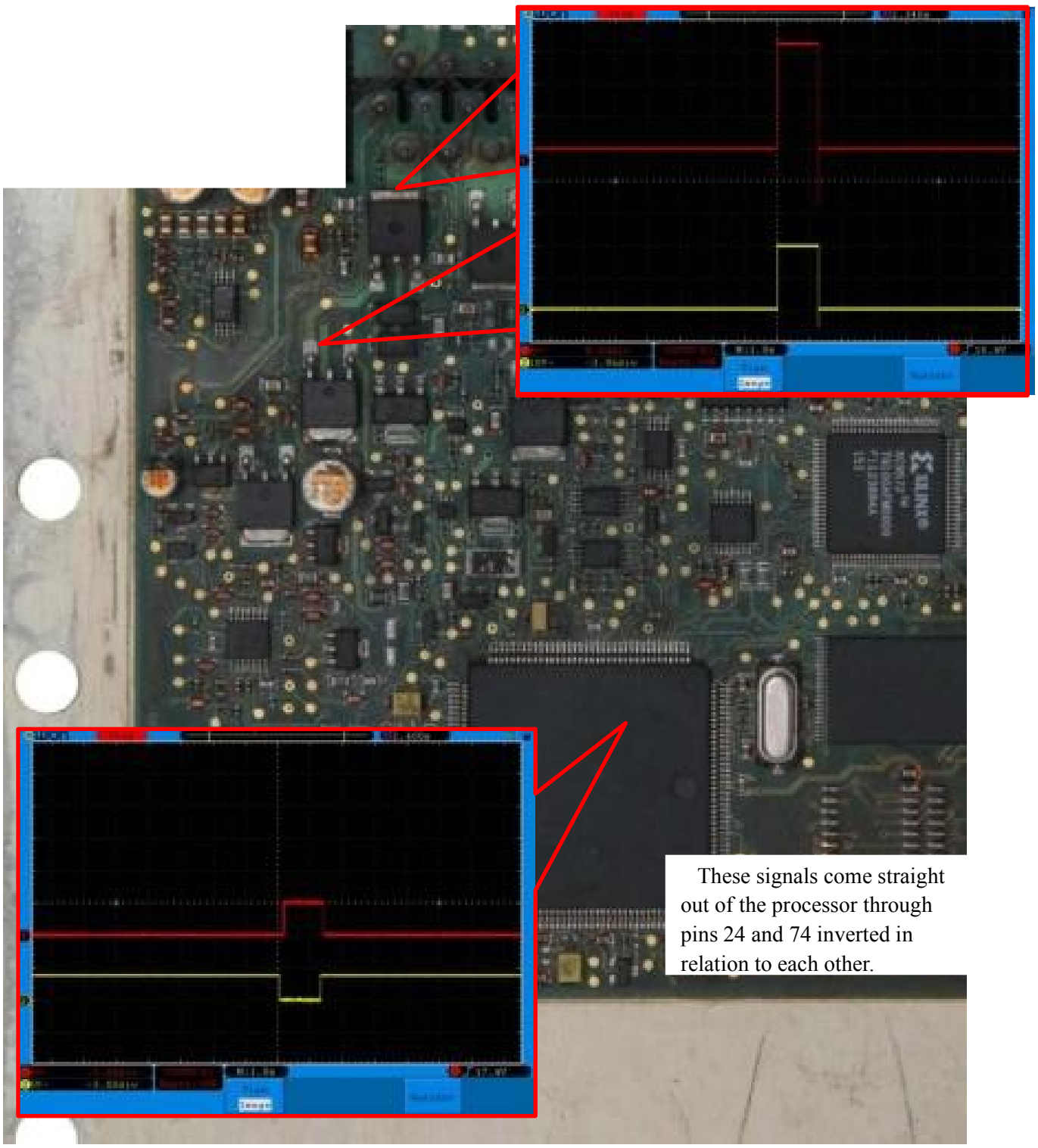
Circuit responsible for activating the Start relay system by sending a negative signal, in the tests carried out it is possible to observe with the oscilloscope the occurrence of this signal, which is a continuous wave at 10 volts and when the starting signal is released, this value drops to negative (0v), and remains on that signal for a period that lasts 3 to 5 seconds. This signal comes out of the processor by two pins, the 24 and 74 and both have an amplitude of 5 volts but are mirrored to each other. See a description of this circuit.



Start Relay Circuit Electrical Signals

Electric signals from this circuit are brief durations of 2 to 3 seconds, but they are fundamental for the starting release of this injection system. Observe the time base of the signals with the oscilloscope and check if they are plausible.

In the Transistors highlighted, we find the signals that are from the starter relay system, in this case around 1.5 sec. of duration



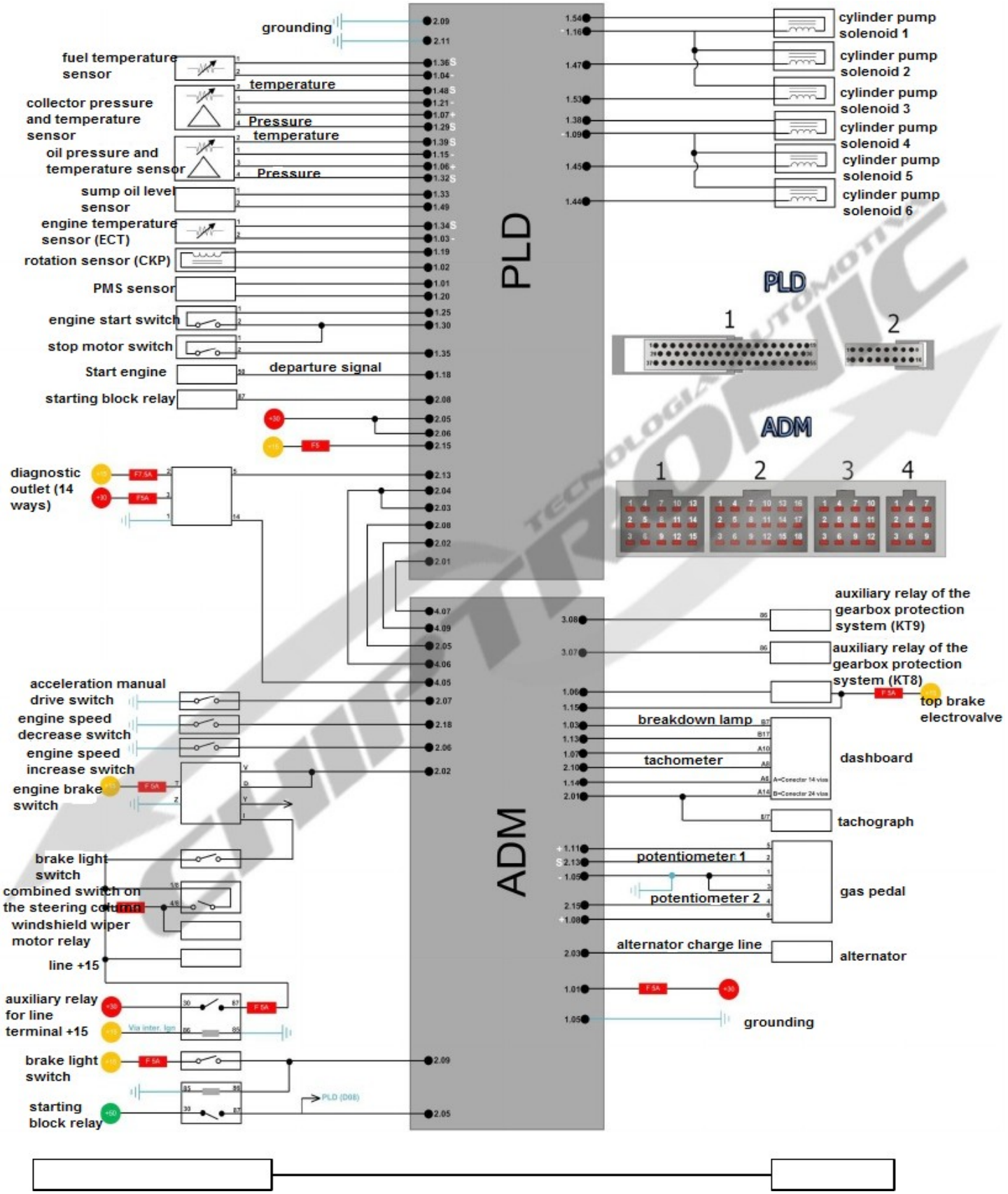
These signals come straight out of the processor through pins 24 and 74 inverted in relation to each other.

Mercedes Benz

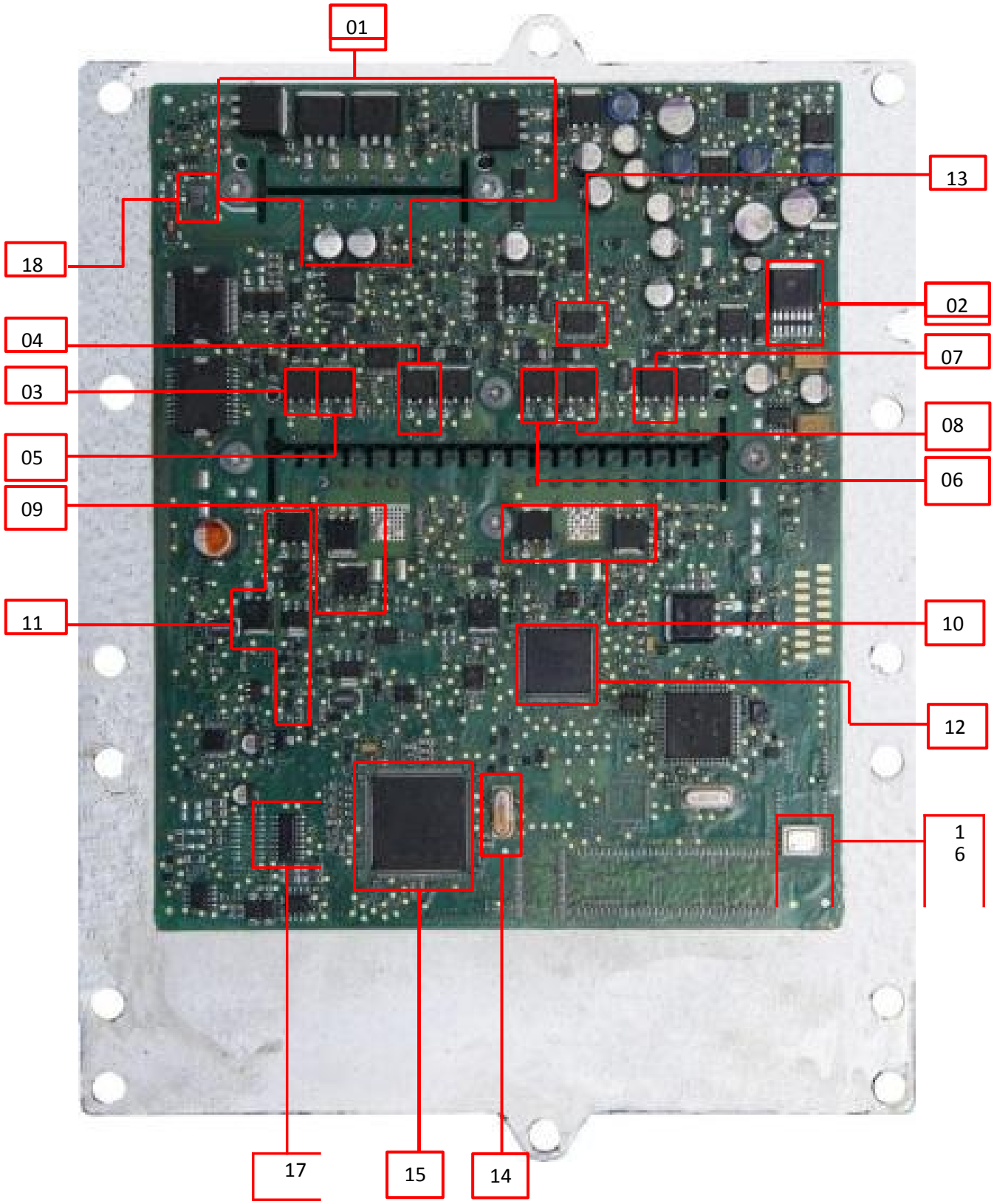
OM 457

System MR

Scheme Electric MR OM 475



Description General of Components



Component Description and Function

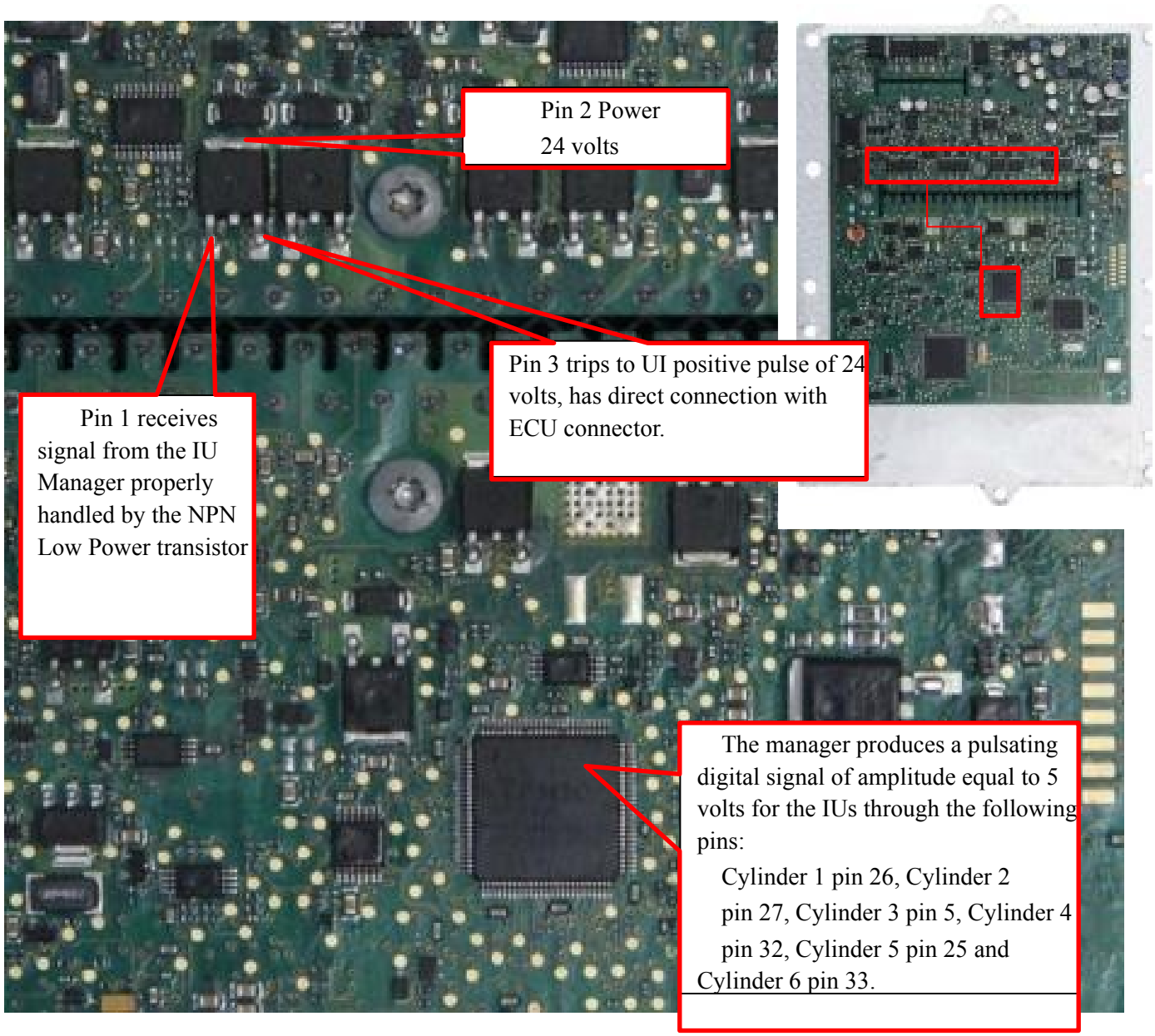
Component	Component function
01-Transistors and Capacitors	Protection Circuit
02-Transistor 7 terminals 42712G	Voltage Regulator from 8v to 5v.
03-Transistor At the. 25N06 (PNP)	Individual Cylinder Injection Unit 1.
04-Transistor At the. 25N06 (PNP)	Individual Cylinder Injection Unit 2.
05-Transistor At the. 25N06 (PNP)	Individual Cylinder Injection Unit 3
06-Transistor At the. 25N06 (PNP)	Individual Cylinder Injection Unit 4
07-Transistor At the. 25N06 (PNP)	Individual Cylinder Injection Unit 5
08-Transistor At the. 25N06 (PNP)	Individual Cylinder Injection Unit 6
09-Main Transistor nº 46N06 (NPN)	Common Circuit of Cylinder Units 1, 2 and 3
10-Main Transistor nº 46N06 (NPN)	Common Circuit of Cylinder Units 3, 4 and 5
11-Main Transistor nº 620TG	Start Relay Circuit
12-Integrated Circuit nº 1120 AMV	Main Manager of Injection Units, commands the action of each unit of the PLD system
13-Integrated Circuit nº 1160D	A / D Converter and Signal Inverter for motor speed and phase sensors
14-XTAL - Crystal Oscillator	Crystal Oscillator or piezoelectric, keeps the processor active and operational
15-Processor No. SAK-XC2080	Responsible for managing all system functions, as well as performing fundamental calculations and operation
16-Component No. MPXA4115A	Atmospheric pressure sensor
17- SOIC Integrated Circuit 16 nº B10011S	Can protocol decoder has the function of sending and receiving data packets to Can Network
18- Filter No. B82790	Can Network line filter

Detailed Description of the Circuits

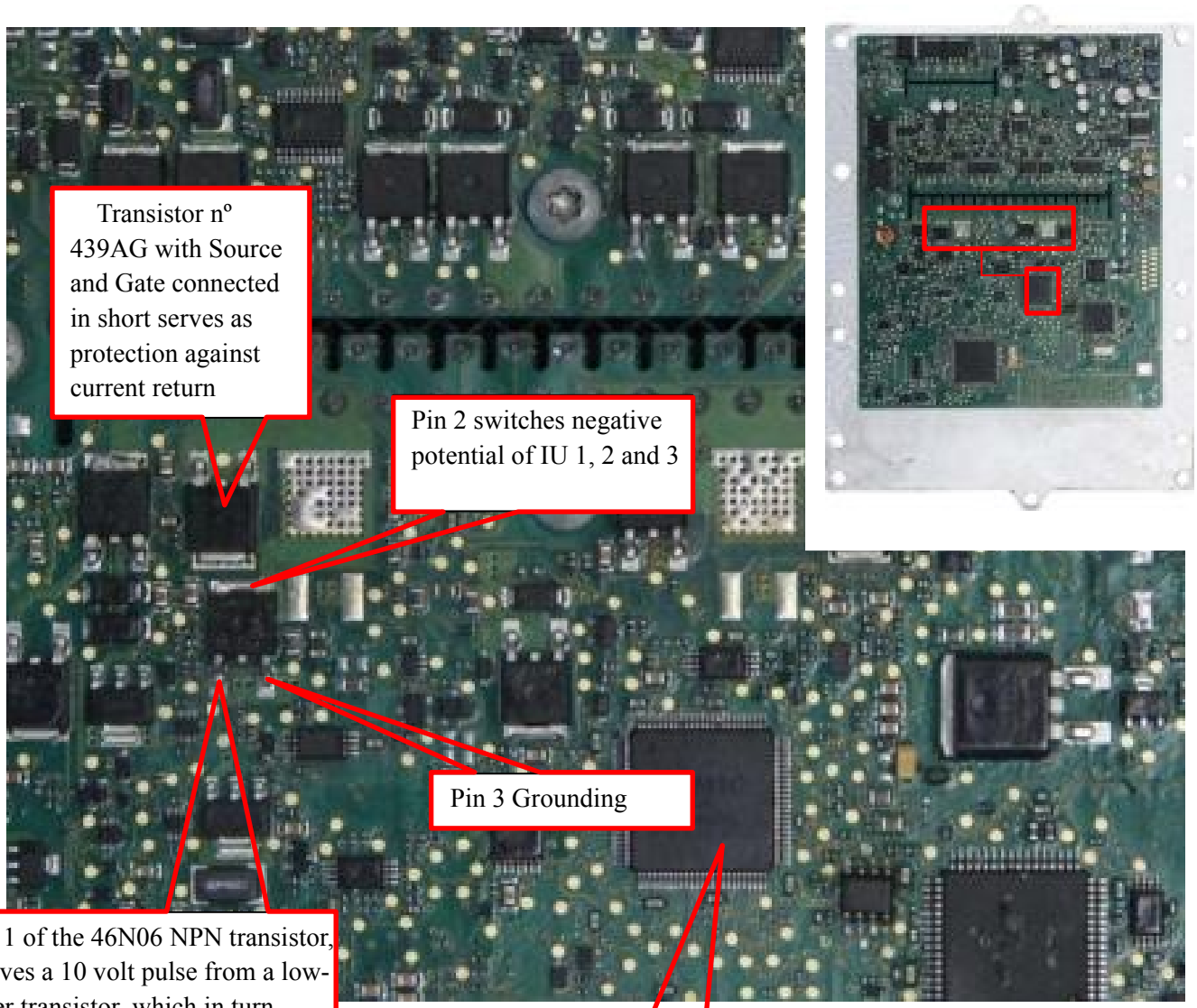
Injection Unit Circuit (UI)

In this injection system, there is a very important feature regarding the injection units (IU). The electrical functioning of the units takes place with the ECU doing the negative switching through transistor 46N06 of NPN junction, however something interesting is that this same transistor switches more than one UI, in this case those of cylinder 1, 2 and 3 and another transistor is responsible for cylinders 4, 5 and 6, this is called Bank 1 and later Bank 2. Another important factor is that the ECU is also responsible for sending the 24v Positive pulse signal through the 25N06 PNP transistors, to which we give the individual UI circuit name Details of this circuit are shown below.

Individual Circuit of the IUs (all are the same)



Common Circuit of UIs (MR 457)



Transistor nº 439AG with Source and Gate connected in short serves as protection against current return

Pin 2 switches negative potential of IU 1, 2 and 3

Pin 3 Grounding

Pin 1 of the 46N06 NPN transistor, receives a 10 volt pulse from a low-power transistor, which in turn receives a 5 volt digital pulse from the IU manager.

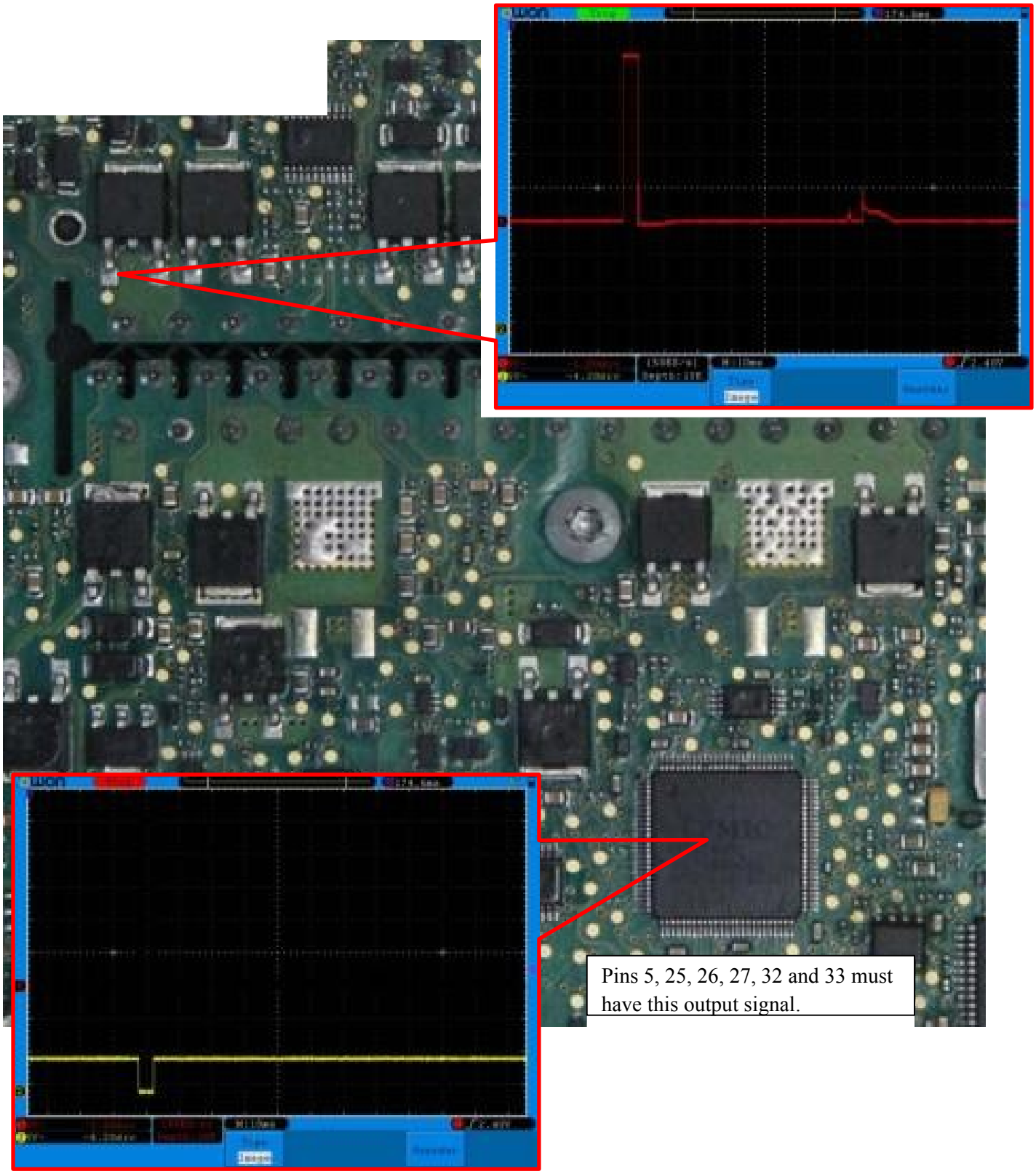
Injector Unit Manager produces 5 volt signals for the common circuit of units 1, 2 and 3, 4, 5 and 6, see pins:

Cylinder 1, 2 and 3 pin 38 and Cylinder 4, 5 and 6 pins 39

Individual Electrical Signals of the IU (OM 906/457)

With the information on the previous pages on the description of the component pins, note with the oscilloscope the following waveforms below:

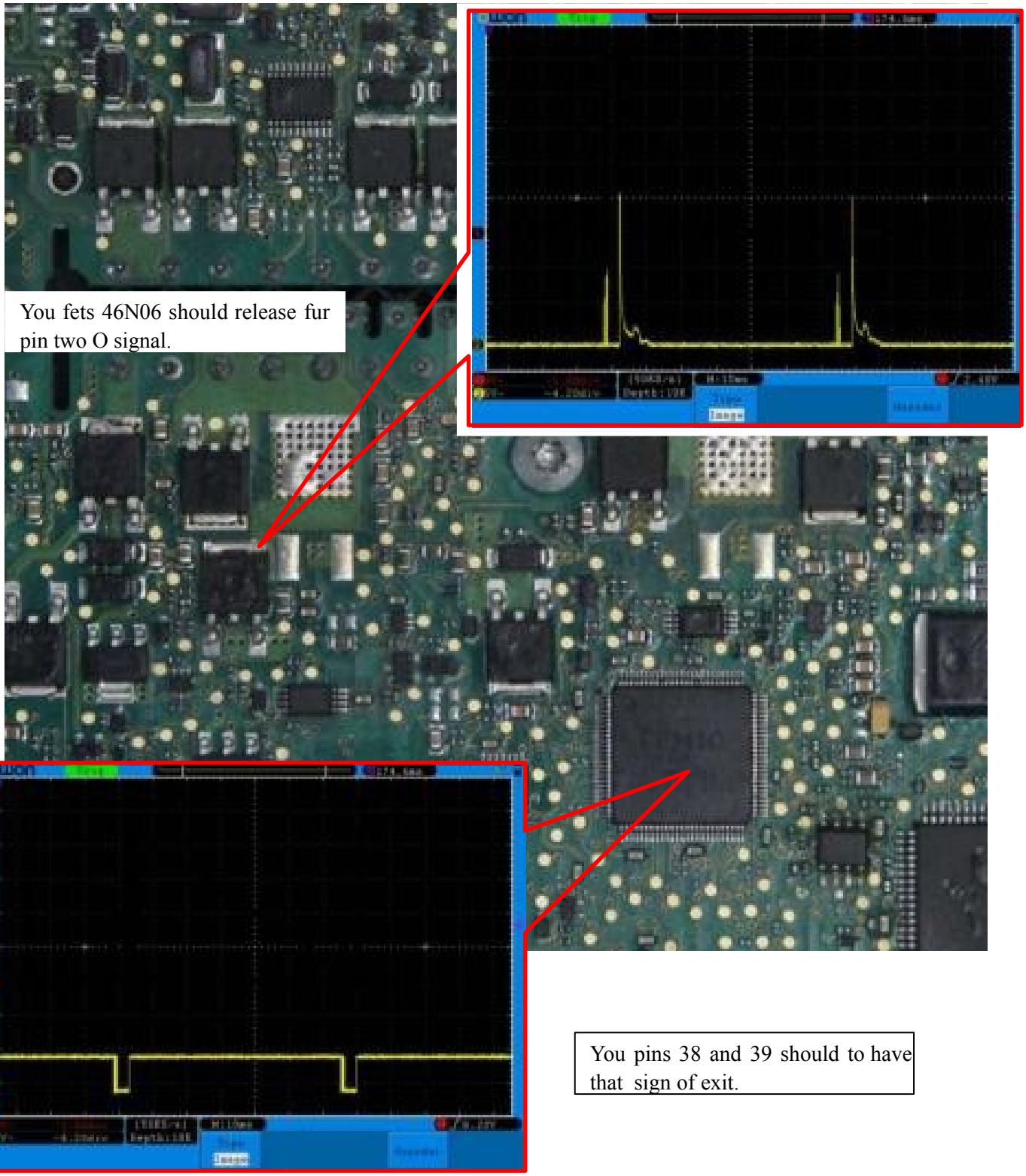
The 25N06 fets must release the signal from the image on the side by pin 3



Pins 5, 25, 26, 27, 32 and 33 must have this output signal.

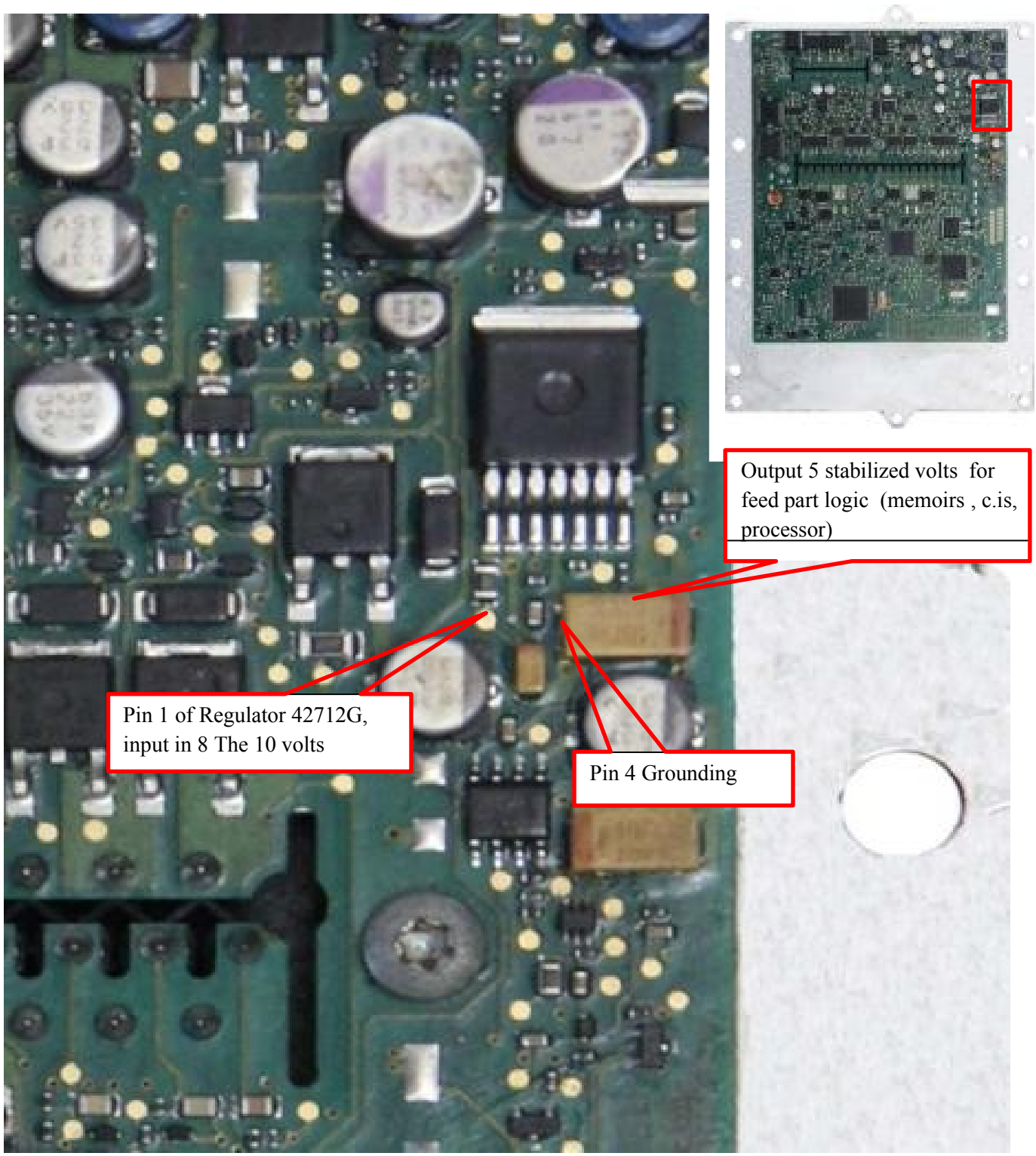
Signals Electrical Common of UI (OM 906/457)

With at information of pages previous on The description From pins From components watch with O oscilloscope at next shapes in waves below:



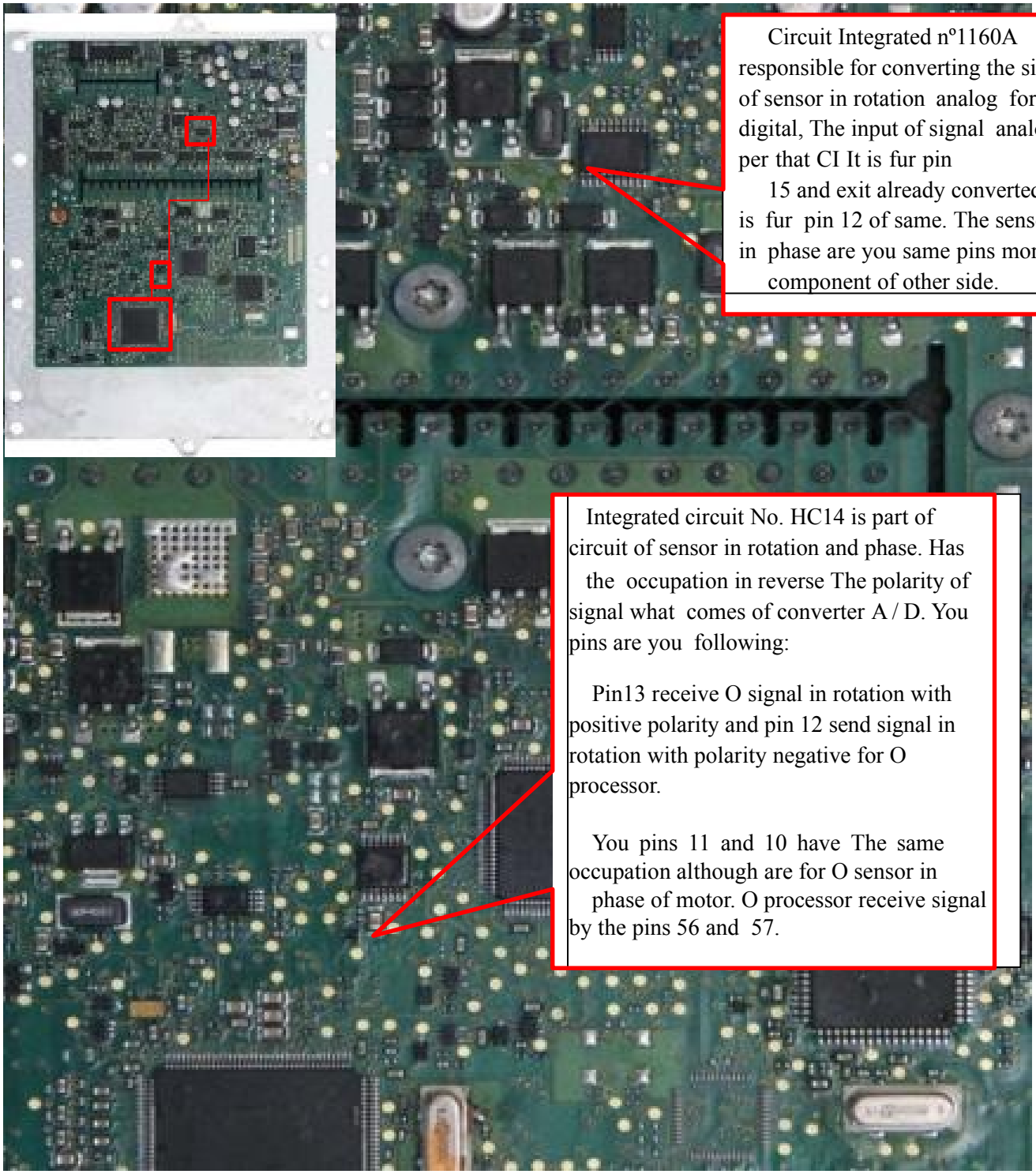
Regulator in Voltage (MR 906/457)

Component fundamental of circuit printed because It is he what feed The logical part of system. In case in short circuit this component it is susceptible The burn, for run O diagnosis feed The plate using scheme electric and certify US following pins at feeds.



Circuit of Sensor in Rotation and Phase of Motor

Very important circuit for system, because if not there is the occurrence of signal in rotation arriving at processor not there is operation. Possible defectsin that circuit can be diagnosed with the use of oscilloscope. Below Follow O circuit of these sensors.



Circuit Integrated nº1160A responsible for converting the sign of sensor in rotation analog for digital, The input of signal analog per that CI It is fur pin 15 and exit already converted It is fur pin 12 of same. The sensor in phase are you same pins more of component of other side.

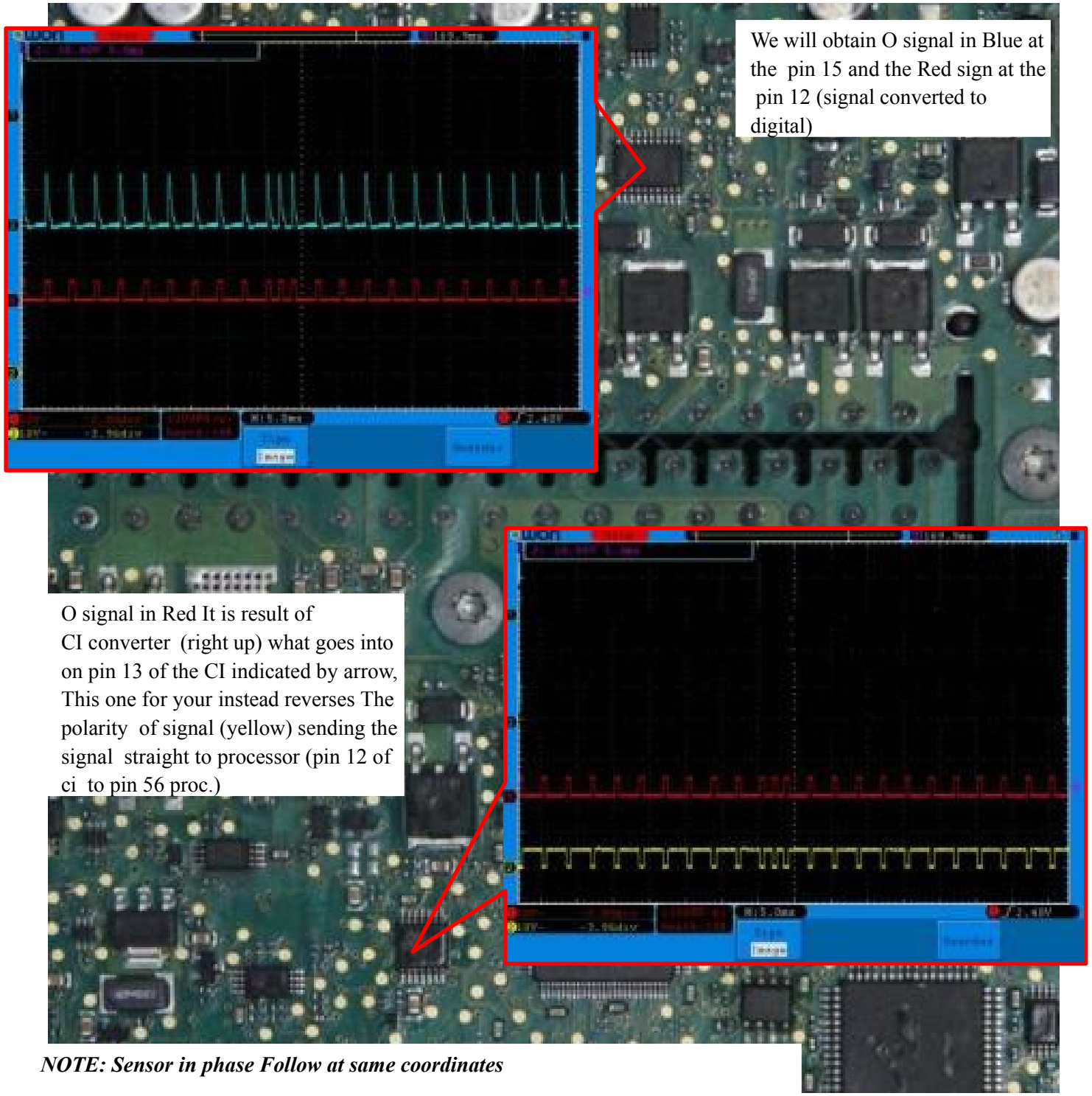
Integrated circuit No. HC14 is part of circuit of sensor in rotation and phase. Has the occupation in reverse The polarity of signal what comes of converter A / D. You pins are you following:

Pin13 receive O signal in rotation with positive polarity and pin 12 send signal in rotation with polarity negative for O processor.

You pins 11 and 10 have The same occupation although are for O sensor in phase of motor. O processor receive signal by the pins 56 and 57.

Signals Electrical Circuit Rotation and Phase

One particularity of this circuit and the presence in rectifier diodes making A paper important at the treatment of that sign as well with oa presence of c.is with functions in converters A / D. See the pins Where you signals electrical if locate:



NOTE: Sensor in phase Follow at same coordinates

Circuit of Decoder in Network CAN

Circuit responsible fur protocol in Communication CAN, Where It consists in to do with there communications in between different modules sending and receiving information important.

Filter gives Line in Network Can in High and Low

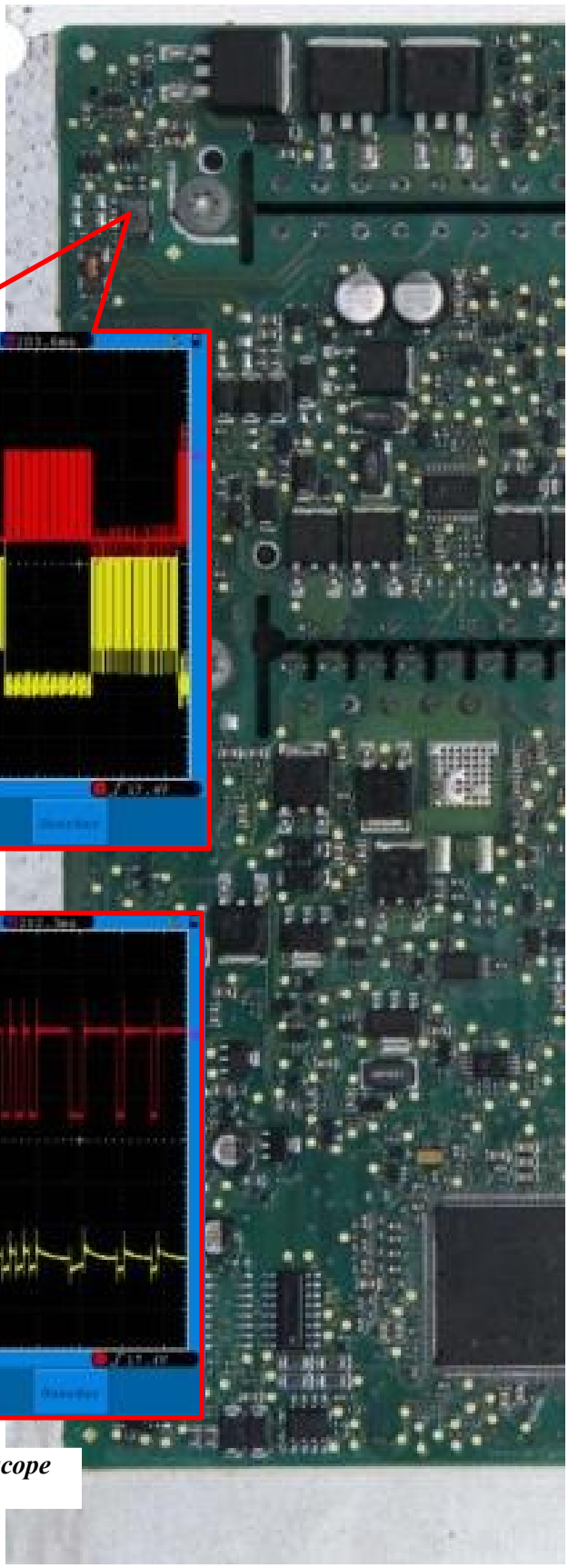
Circuit Integrated No. B10011S responsible for decoding of Can signal.

At Appetizer in exits From Dice are you next pins:

Pins 12 and 11 are the respective doors in Communication

Signals Electrical of Decoder Network Can

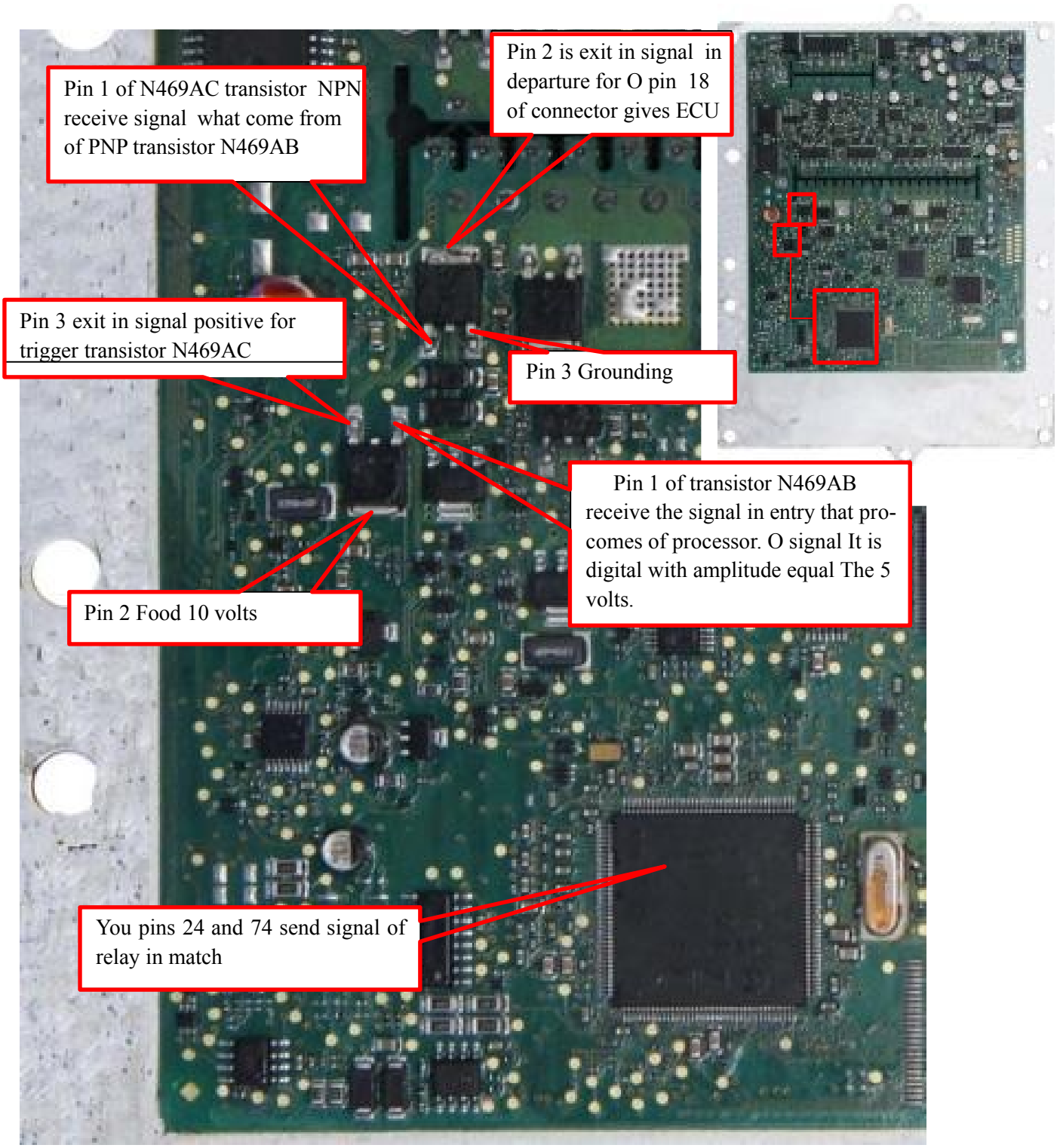
Electrical signals gives Can Network are characterized by digital waves, being able to or not to be mirrored. THE perfect visualization of signal well as your interpretation It is something difficult but It is possible examine The existence of that us sign pins 1 and 2 of the connector in 16 ways or at the filter in line. Look now you Signals characteristic what we get



Signal gives Can Network magnified at the oscilloscope

Circuit in Relay in Match

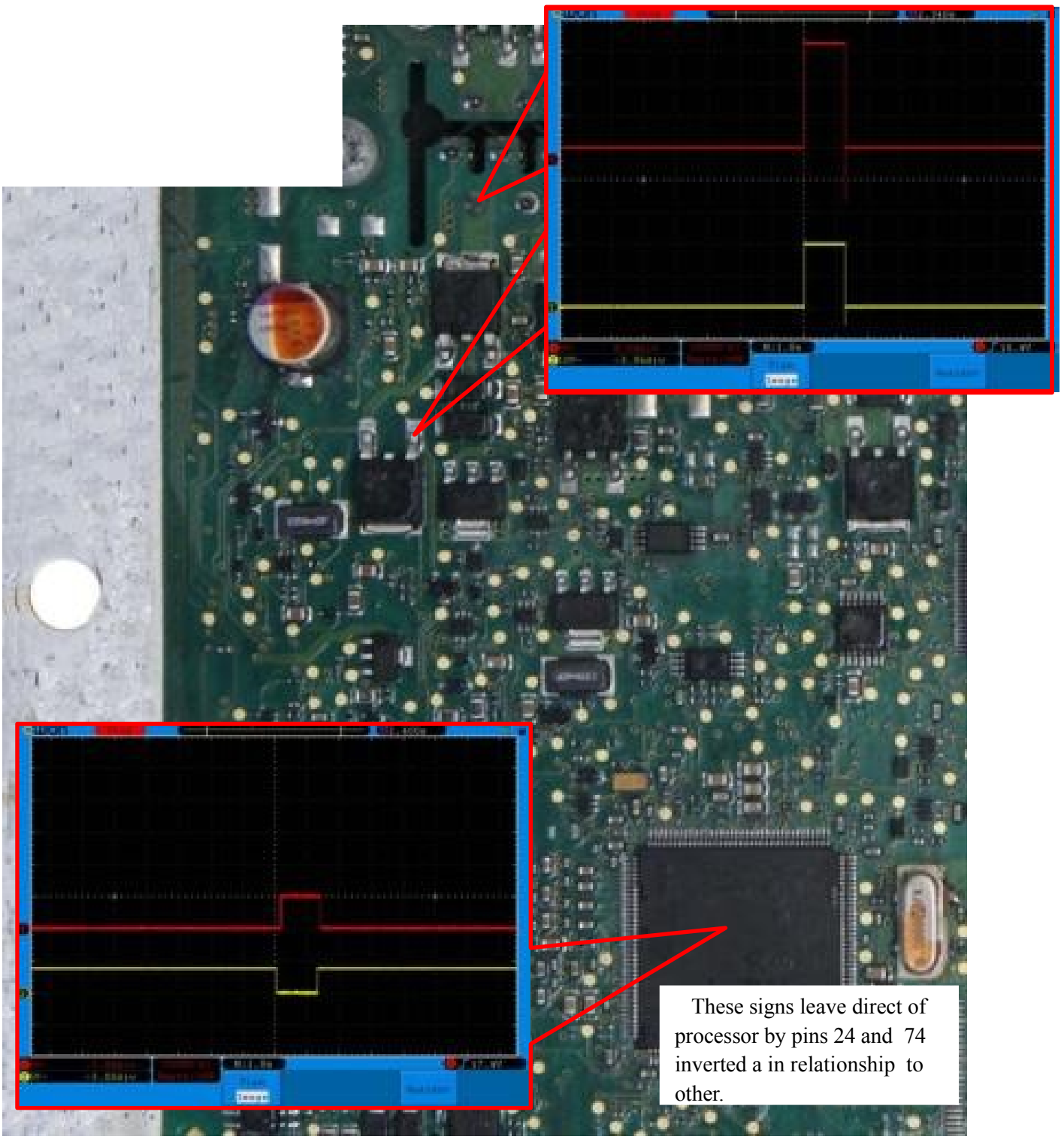
Responsible circuit per activate O system in relay in Match sending a signal negative, US tests carried out is possible to observe with the oscilloscope occurrence of that signal what is one wave continues at 10 volts and when release signal in match that value falls for negative (0v), and remains in that sign per a time course that lasts 3 to 5 seconds. That signal goes out of two-pin processor, O 24 and 74 and both have the amplitude in 5 volts although are mirrored a to the other . Look one description this circuit.



Signals Electrical of Circuit Relay in Match

Signals electrical of this circuit are brief durations in 2 to 3 seconds, but they are fundamental for The release in starting from that system in injection. Watchthe base in time of the signs with the oscilloscope and check if the same they are plausible.

US Transistors in Featured we found you signals who are from system in relay in match, in that case around in 1.5 Mon. of duration.

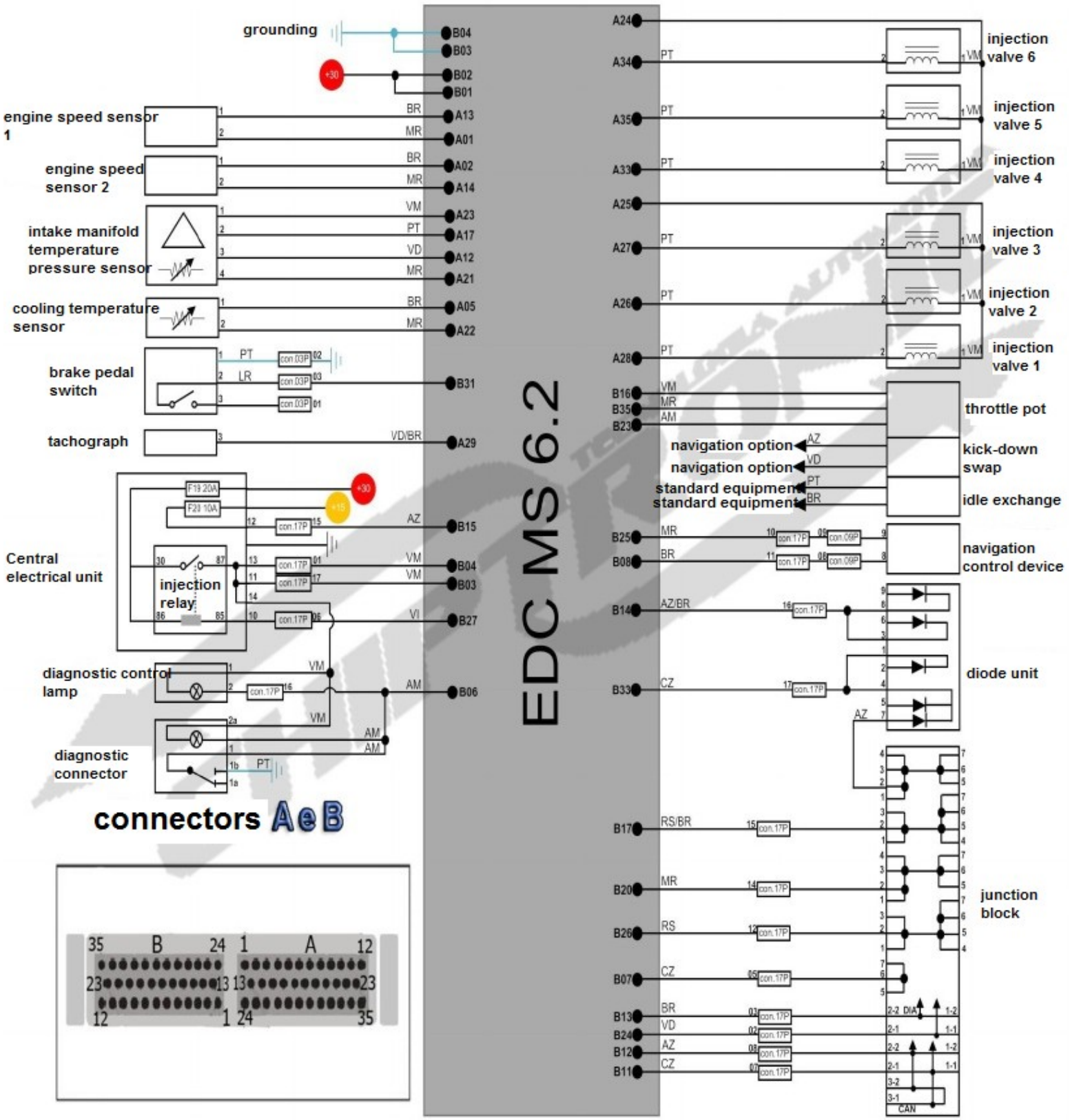


These signs leave direct of processor by pins 24 and 74 inverted a in relationship to other.

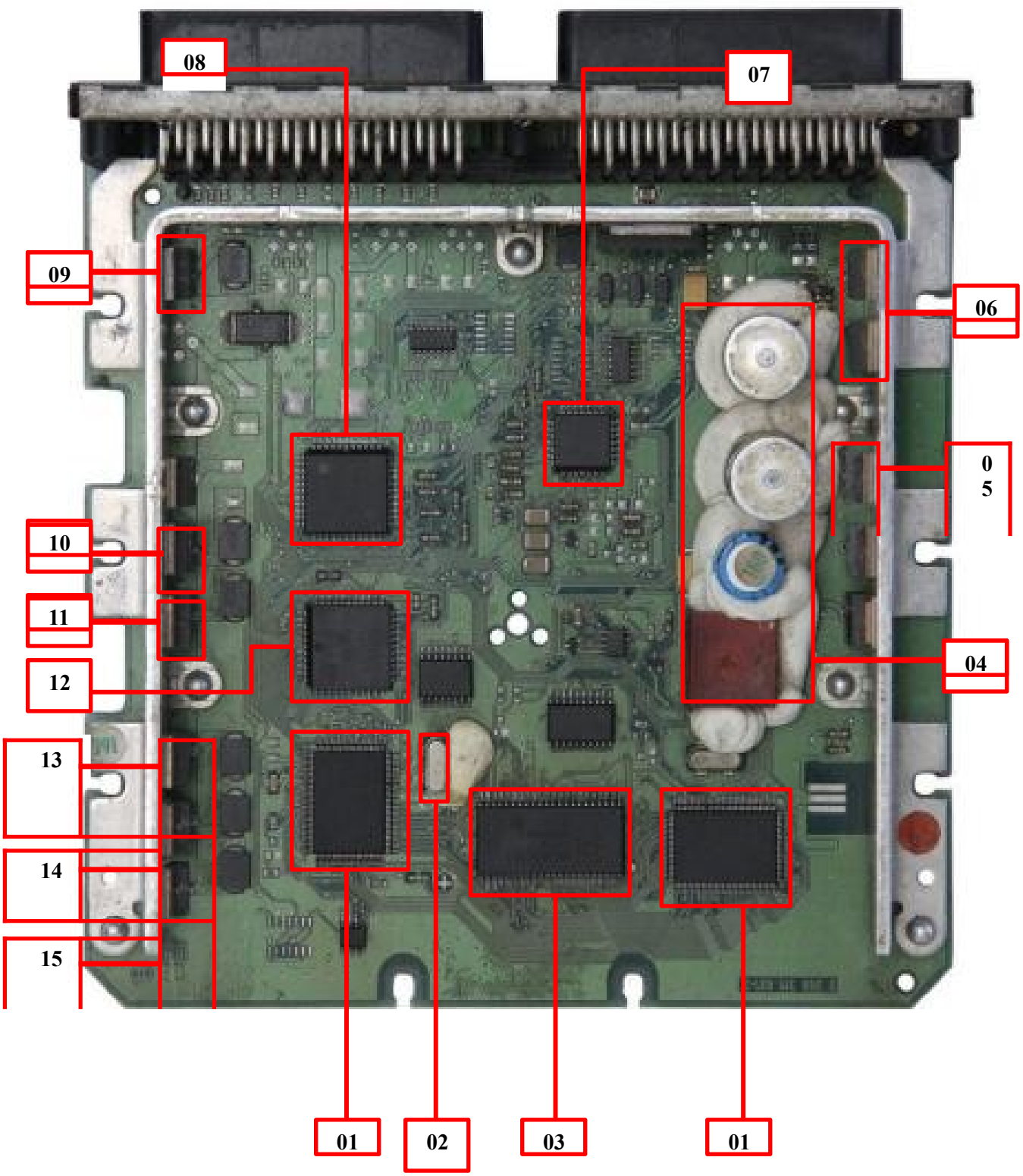
Scania

MS 6.2

Scheme Electric MS 6.2



Overview From Components (MS 6.2 Scania)



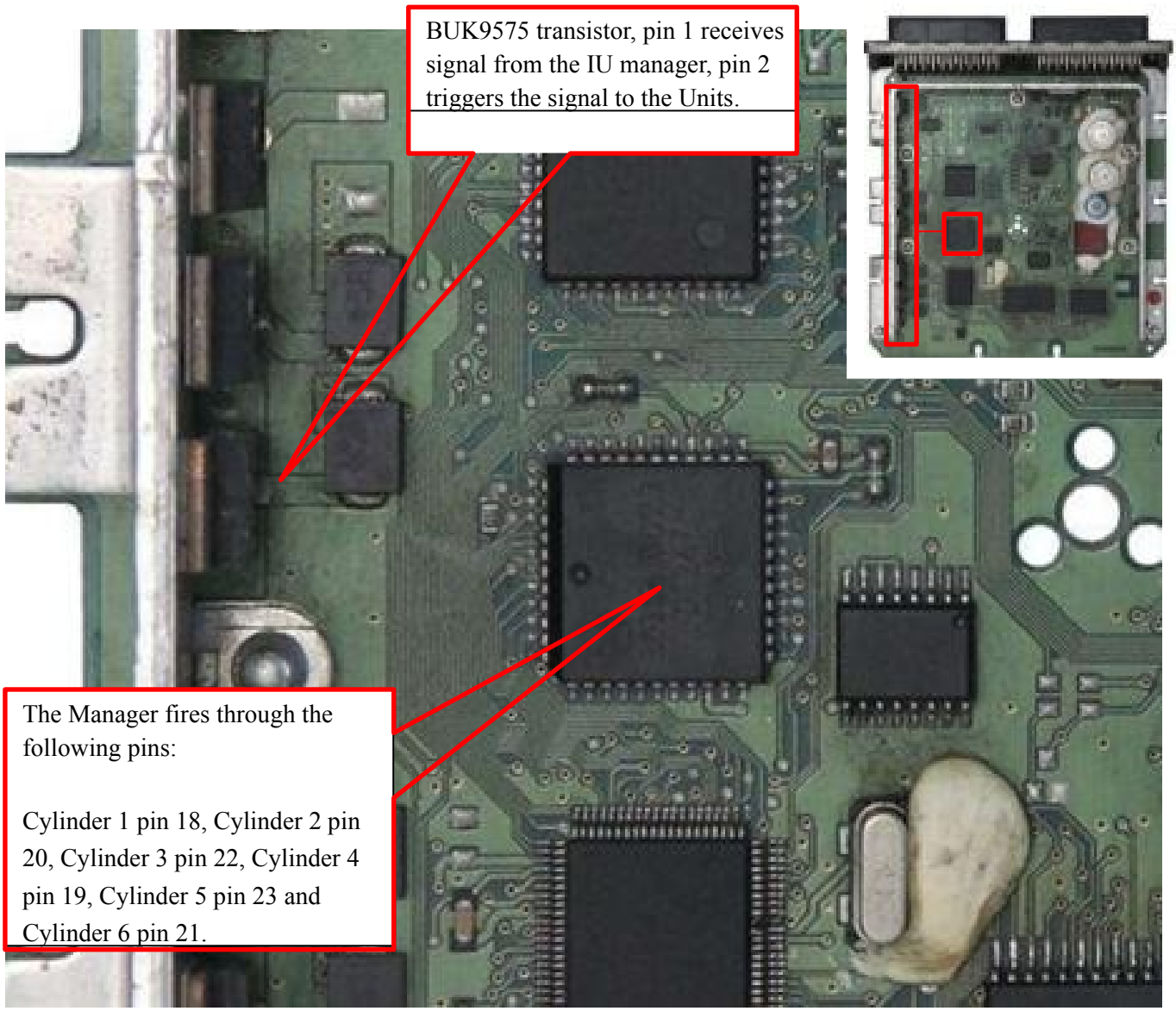
Description of Components (MS 6.2 Scania)

Component	Occupation of Component
1-Processor No. B58748	Command all at functions in management of motor Working in set with The memory .
2-Piezoelectric Crystal	Send a signal (clock) for what O processor start The operate, and it suits as a counter of processor for determined occupation
3-Memory PSOP No. AM29F400BT	Contains all at information in management of motor and all strategies in operation.
4-Circuit in Protection	Protects all O system against possible spikes in voltage.
5-Component No. 30114	Regulator in Voltage 24 volt for 5 volts
6-Transistor No. BYW29E	
7-Integrated Circuit No. 30296	Interface of sensor in rotation, sensor in pressure and temperature of air and pressure of turbo
8-Integrated Circuit No. 30377	Pedal of accelerator, light switch gives clutch
9-Transistor No. BUK 7595	Individual gives Unit Inejtora 4
10-Transistor No. BUK 7595	Individual gives Unit Inejtora 1
11-Components No. BUK 7595	Individual gives Unit Inejtora two
12-Circuit Integrated No.	Manager of Units Injection molding machines
13-Transistor No. BUK 7595	Individual gives Unit Inejtora 3
14-Transistor nº BUK 7595	Individual of the Inejtora Unit 6
15-Transistor nº BUK 7595	Individual of the Inejtora Unit 5
16-Integrated Circuit nº 3043322	CAN protocol decoder, located on the back of the board

Detailed Description of the Circuits

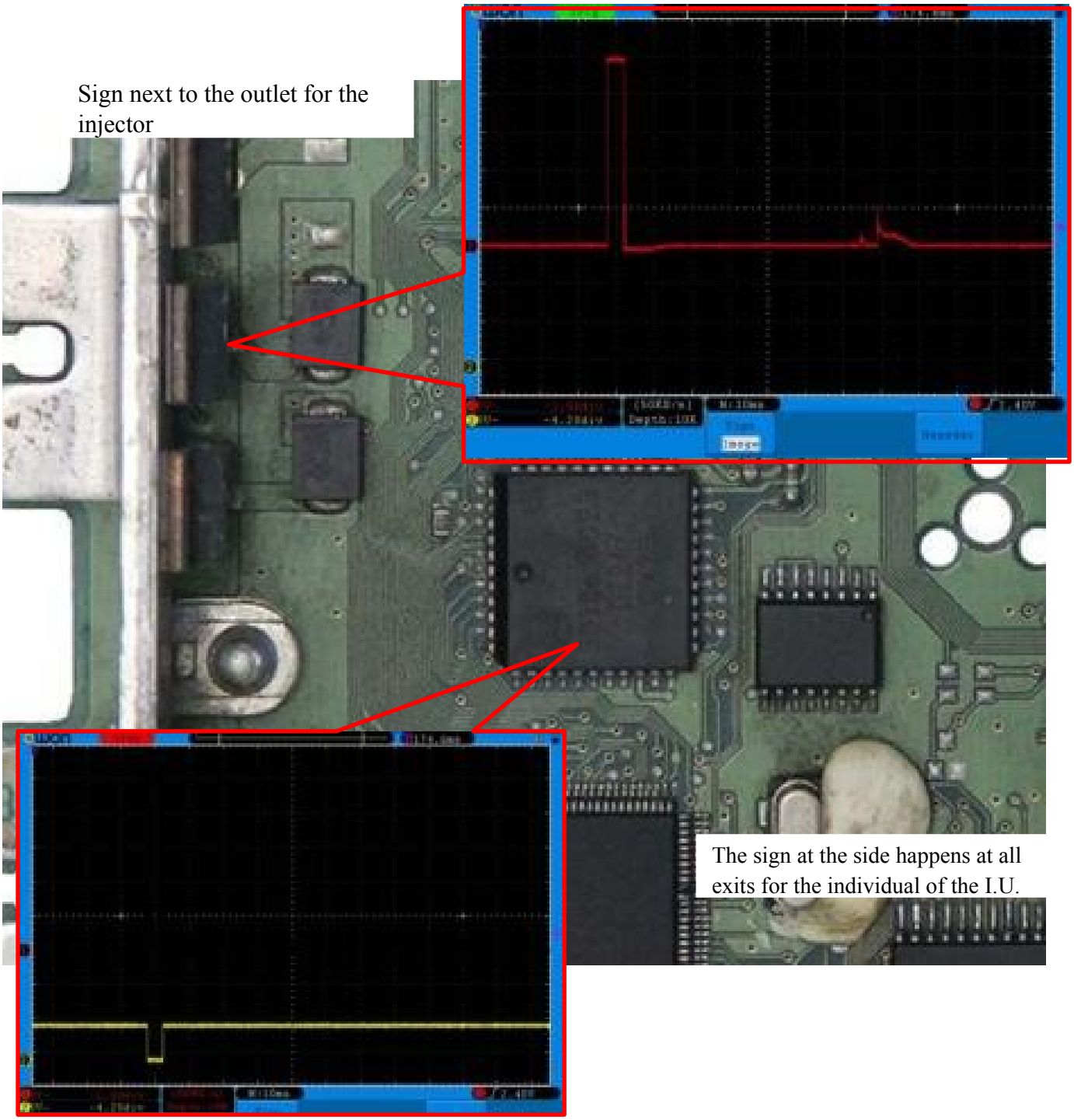
Injection Unit Circuit

They follow the same operating logic as the Mercedes, with the central unit being primarily responsible for the drive. The circuit of the injection units has an individual drive by cylinder, and a common switching for the six units of the system. Now see some particularities of the circuit.



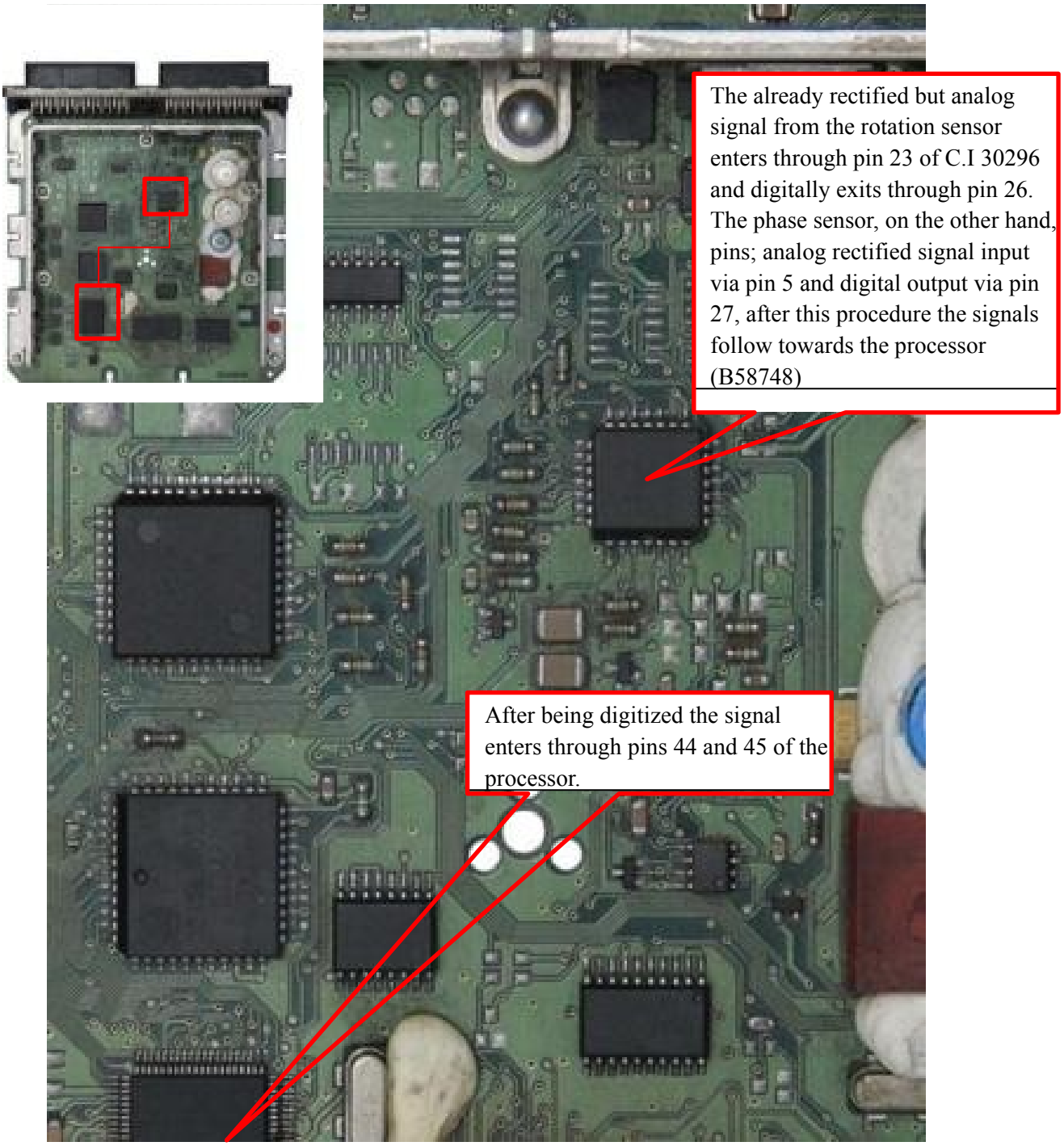
Electrical Signals of the Injector Units Circuit

The electrical signals the U.I are all the same as those shown below, so in the diagnosis to be made, stick to this model presented

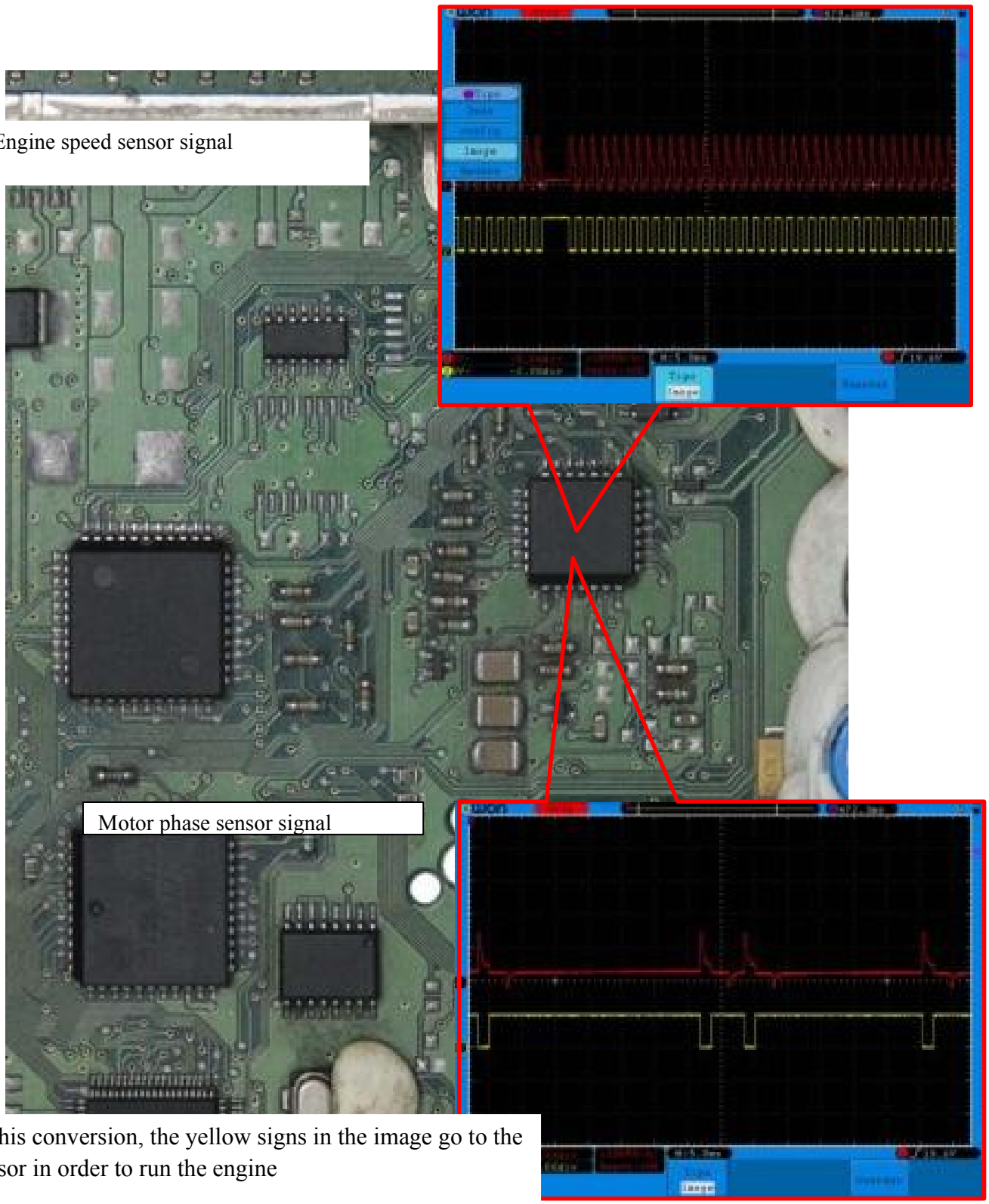


Rotation Sensor Circuit and Motor Phase

In this circuit we observe the presence of diodes, resistors and a C.I (30296) acting as an analog to digital signal converter, this circuit is fundamental for the operation of the motor, so be aware of some characteristics of this circuit for later diagnostics.



Rotation and Phase Sensor Electrical Signals



After this conversion, the yellow signs in the image go to the processor in order to run the engine

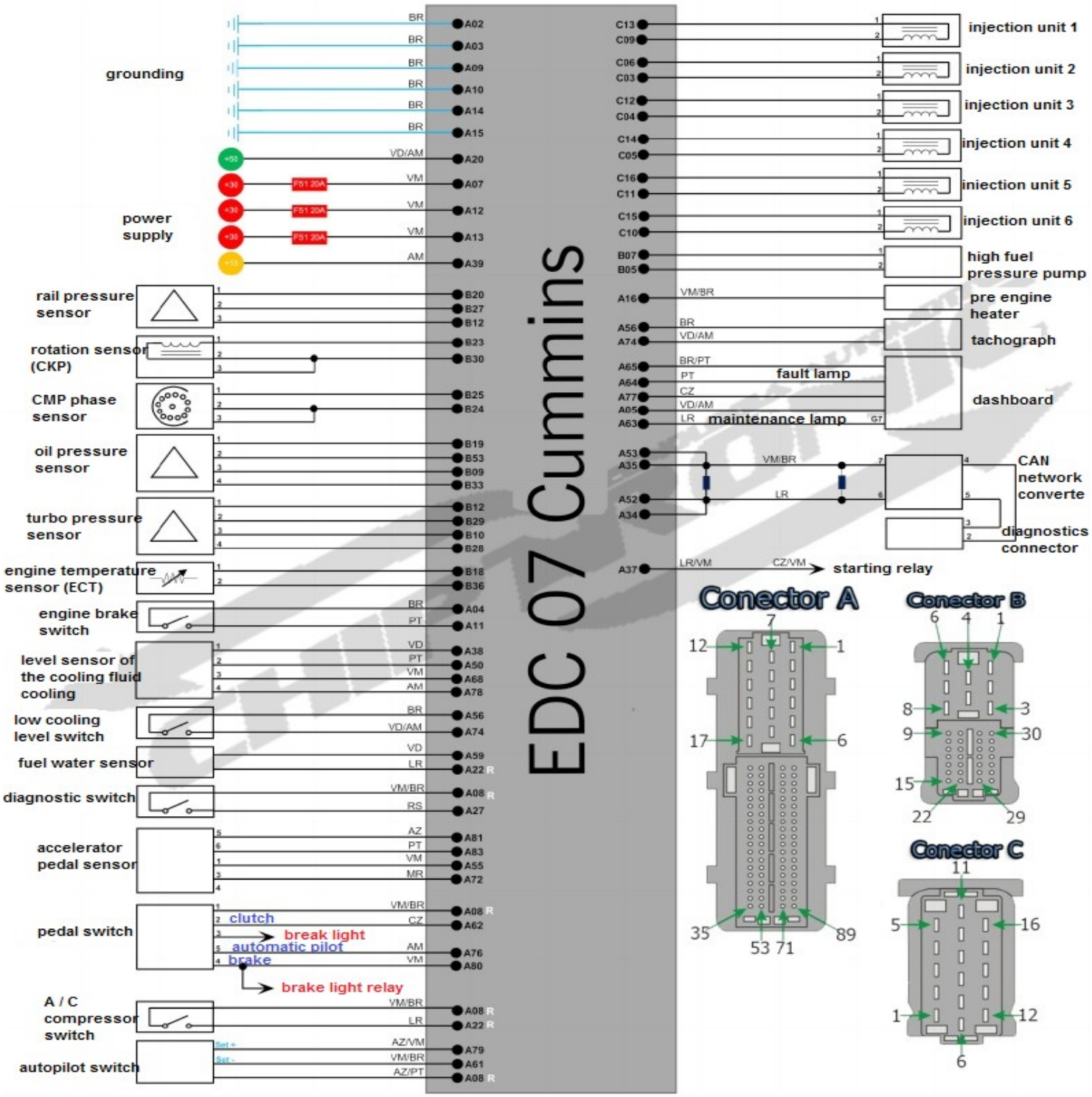
Ford EDC 07

Cummins 4 and 6

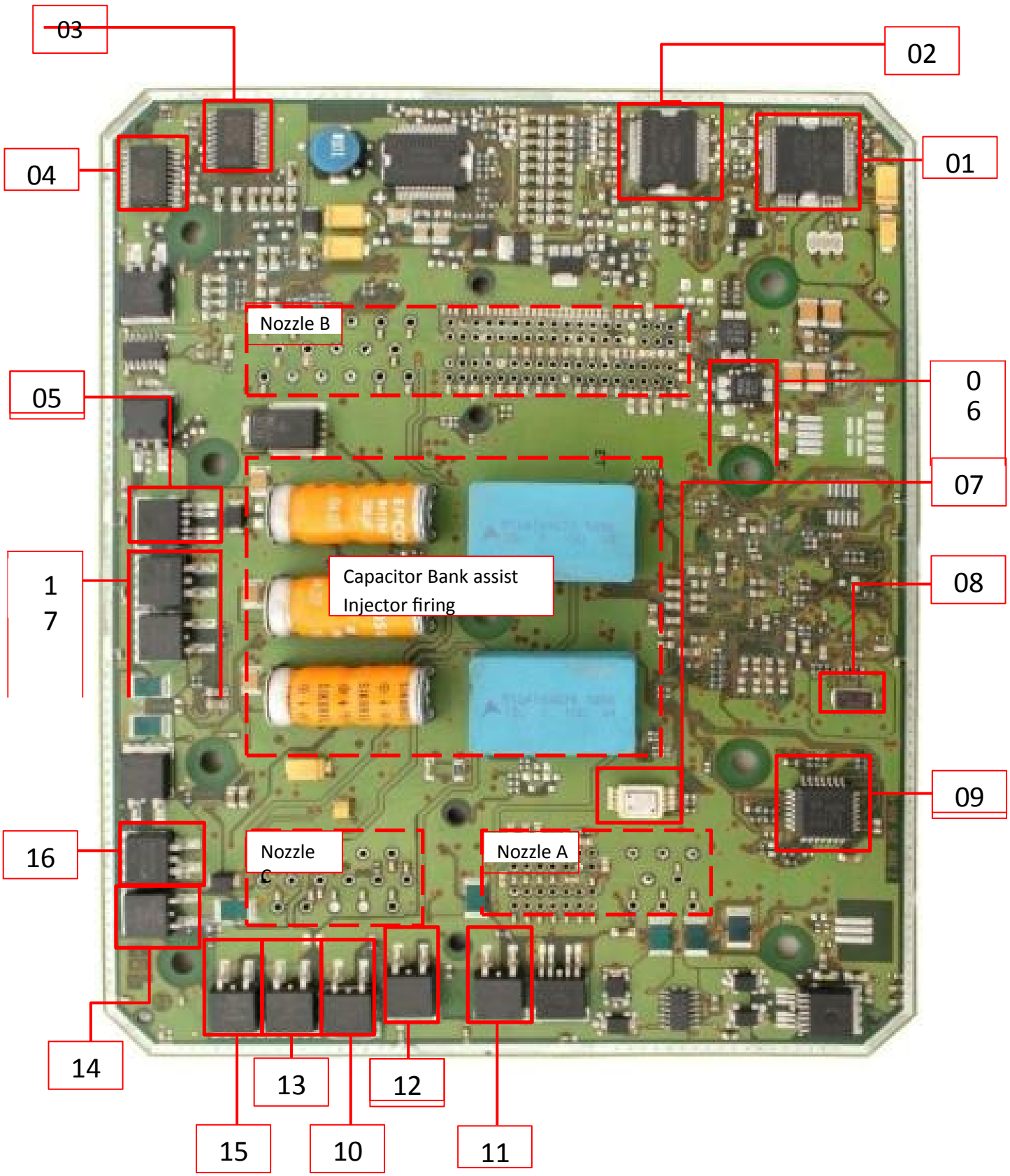
Cylinders

**** Obs. : The difference between modules 4 and 6 cylinders is only in the programming of the Micro controller Flash.***

Electrical diagram EDC 07 Cummins ISB 4 and 6 cyl.



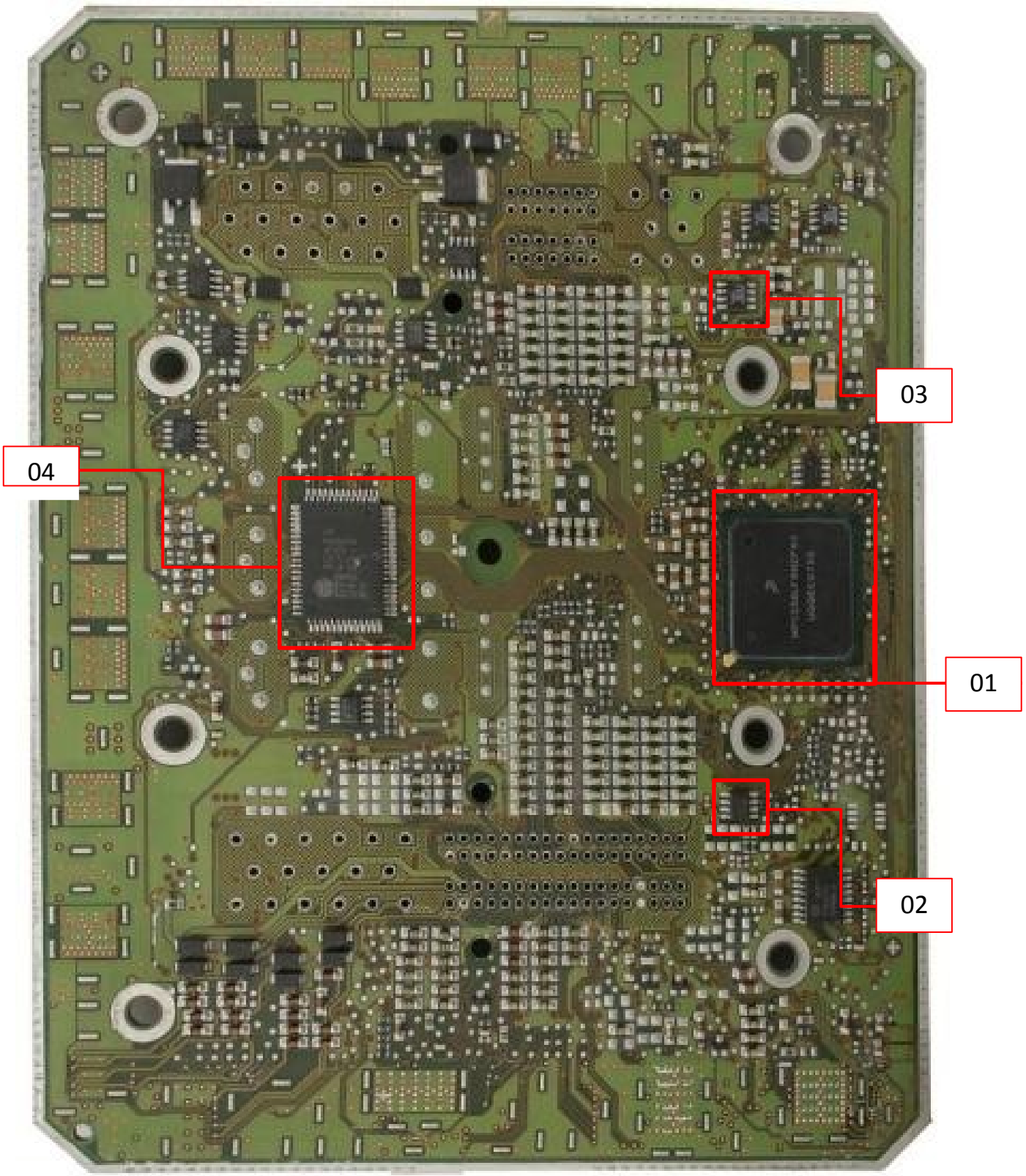
Overview of EDC Components 07 (front)



Description and Function of EDC 07 Components

Component	Component function
01-Integrated Circuit nº 30616	Voltage Regulator, stabilizes the voltage to 5 volts
02-Integrated Circuit nº 30439	Responsible for activating the maintenance lamp, warning, stop start lamp and start lock relay, according to the pins: **15-Warning lamp 16-Maintenance lamp 20-Stop lamp** **21 Starting lamp** **22 Start blocking relay**
03-Integrated Circuit No. BTS721L	Activates fuel heater and air inlet heater 1 by the following pins; **17-Air inlet heater 1 18-Fuel heater**
04-Integrated Circuit No. BTS721L	Activates air inlet heater 2 and motor brake by pins: **14-Air inlet heater 2** **18-Signal output for motor brake valve**
05-Transistor nº BTS432E	Engine fan electric clutch switch
06-Line filter nº 70504	J1939 data link communication protocol line filter
07-Sensor nº B0724	Atmospheric pressure sensor
08-Oscillator nº 716F	Keeps the processor active with an unchanging frequency signal (clock)
09-Circutio Integrado nº 30296	Analog / Digital converter of the speed sensor signal (for a detailed description of this circuit, see page 112)
10-Transistor nº BUK9640	Responsible for firing individual Cylinder Injector 1
11-Transistor nº BUK9640	Responsible for firing Individual Cylinder Injector 2
12-Transistor nº BUK9640	Responsible for firing Individual Cylinder Injector 3
13-Transistor nº BUK9640	Responsible for firing Individual Cylinder Injector 4
14-Transistor nº BUK9640	Responsible for firing Individual Cylinder Injector 5
15-Transistor nº BUK9640	Responsible for firing Individual Cylinder Injector 5
16-Transistor nº N713AP	Responsible for the Common Bank of Injectors 4, 5 and 6
17-Transistor nº N713AP	Responsible for the Common Bank of Injectors 1, 2 and 3

Overview of EDC Components 07 (back)



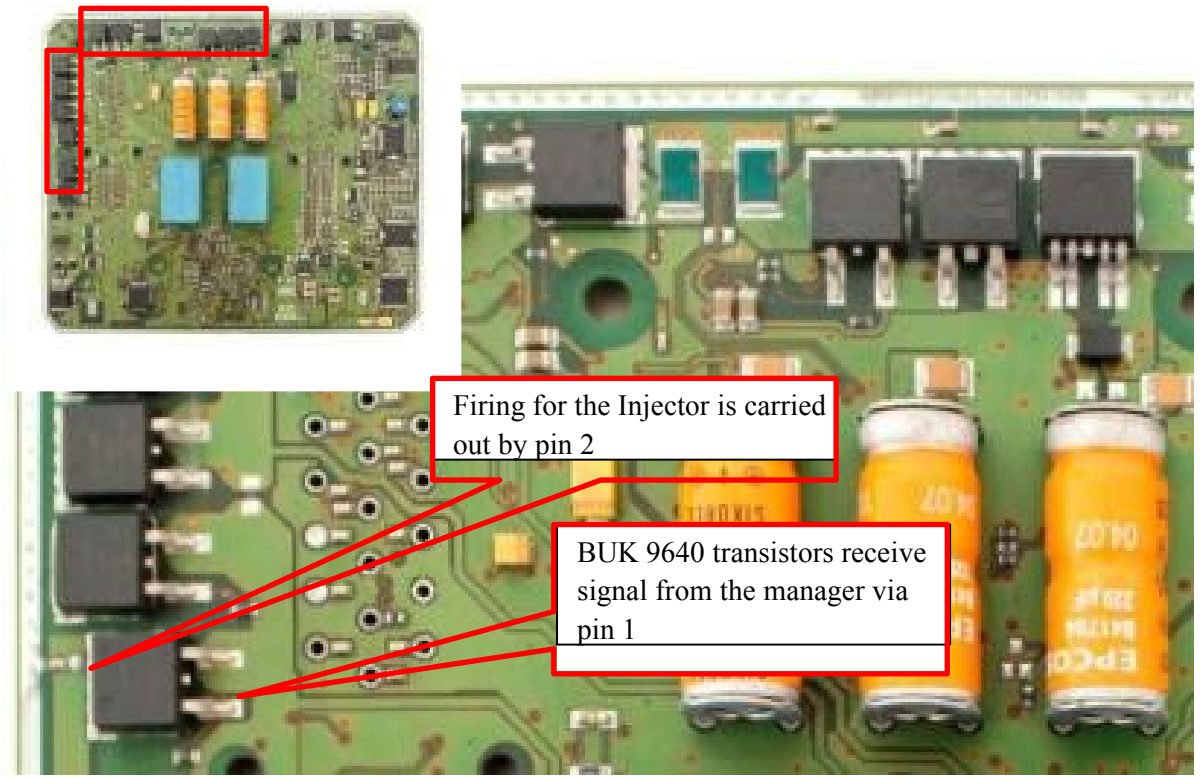
Component Description and Function

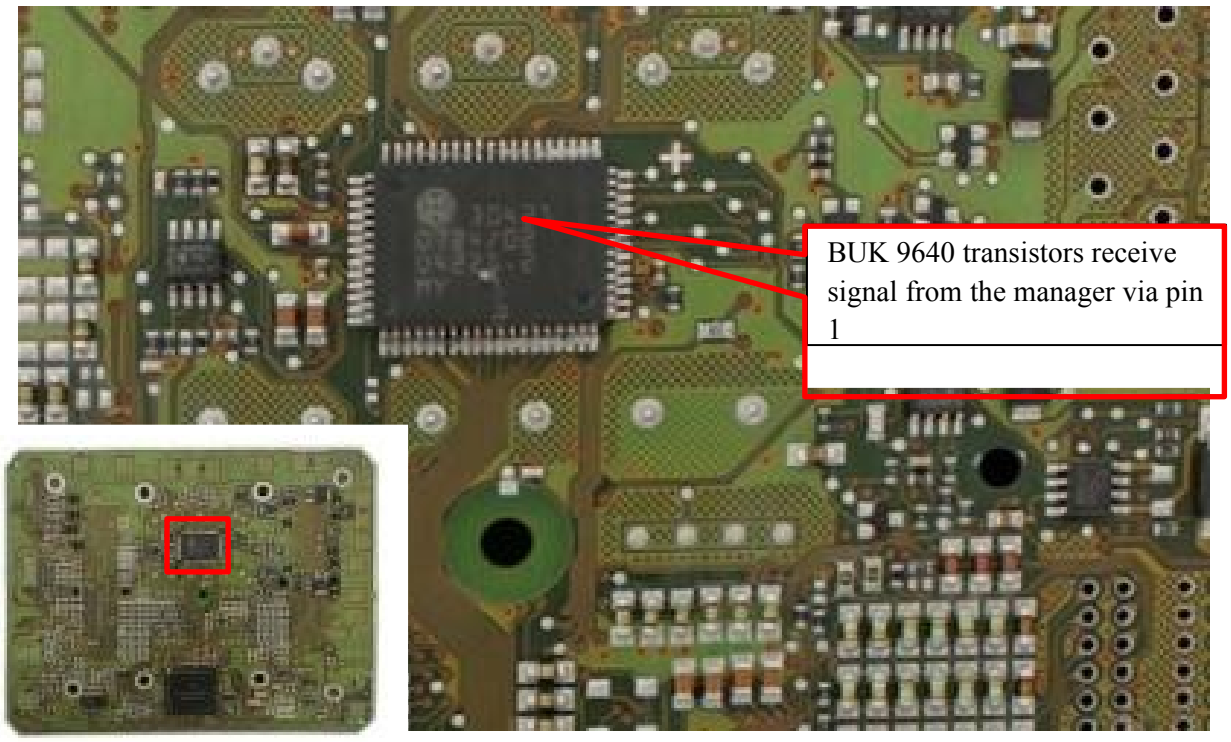
Component	Component function
01-Micro Controller	Processes information and performs all engine management functions, contains the flash added to the component
02-Integrated Circuit nº9327PD	Communication link protocol data link J1939
03-Integrated Circuit nº AD2097	Pressure regulating valve control (MPROP)
04-Integrated Circuit nº 30421	Discharge Injector Manager (CRIN), responsible for activating the injectors through the following pins: **Individual Injectors 24-Shot Injector 1** **25 Injector Trigger 3** **26 Injector Trigger 2** **28 Injector Trigger 5** **29 Injector Trigger 6** **30 Injector Trigger 4** **Common Injectors** **35-Shot of Common Injectors 1/2/3 37-Shot of Common Injectors 4/5/6**

Detailed Description of the Circuits

Injector Circuit

We see in this circuit similarities with the others already studied, remembering that for positive shots we have a transistor for each injector and in the case of negative switching there are only two, as this is responsible for three injectors. See the circuits:

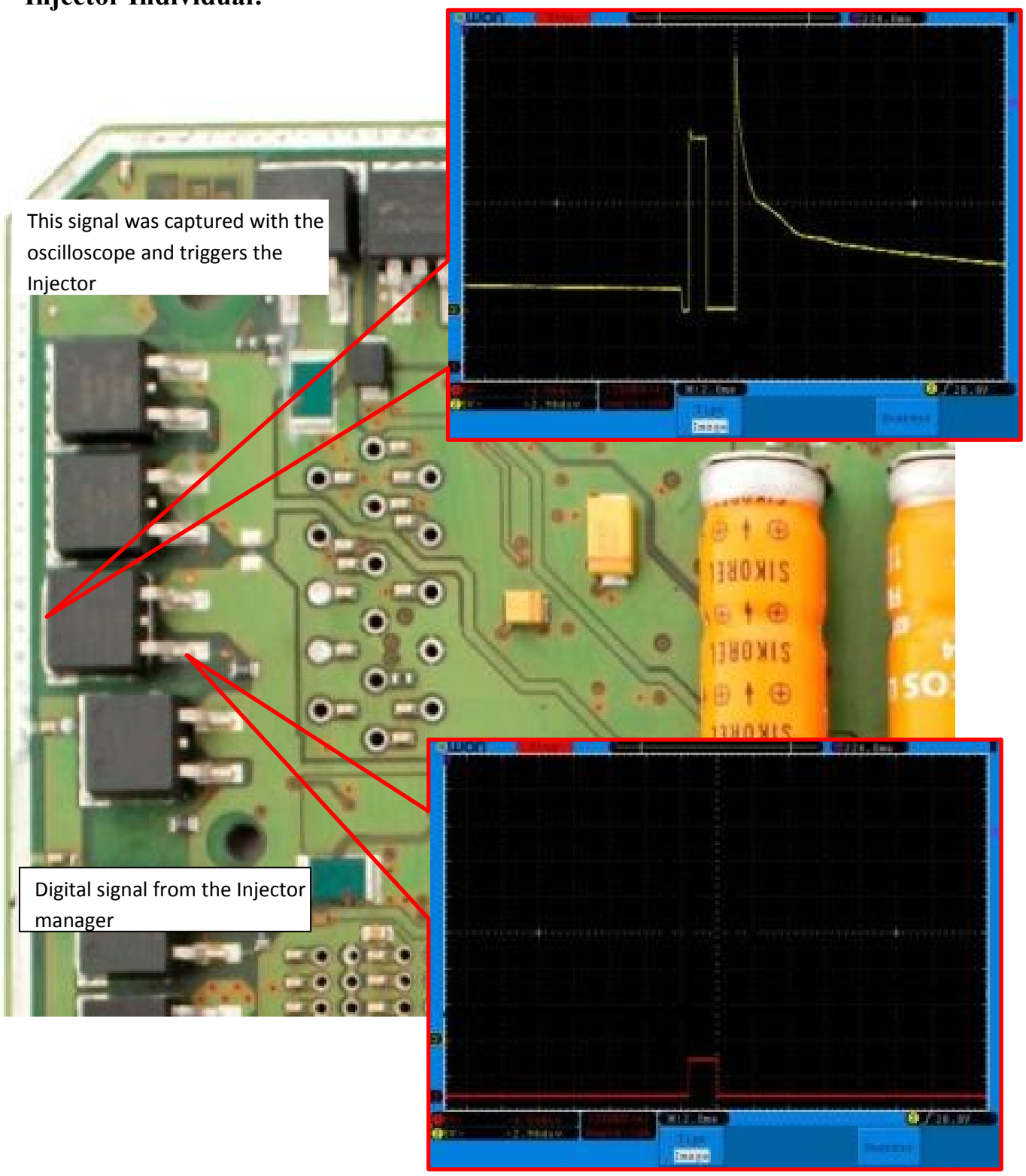




Injector Electrical Signals (CRIN)

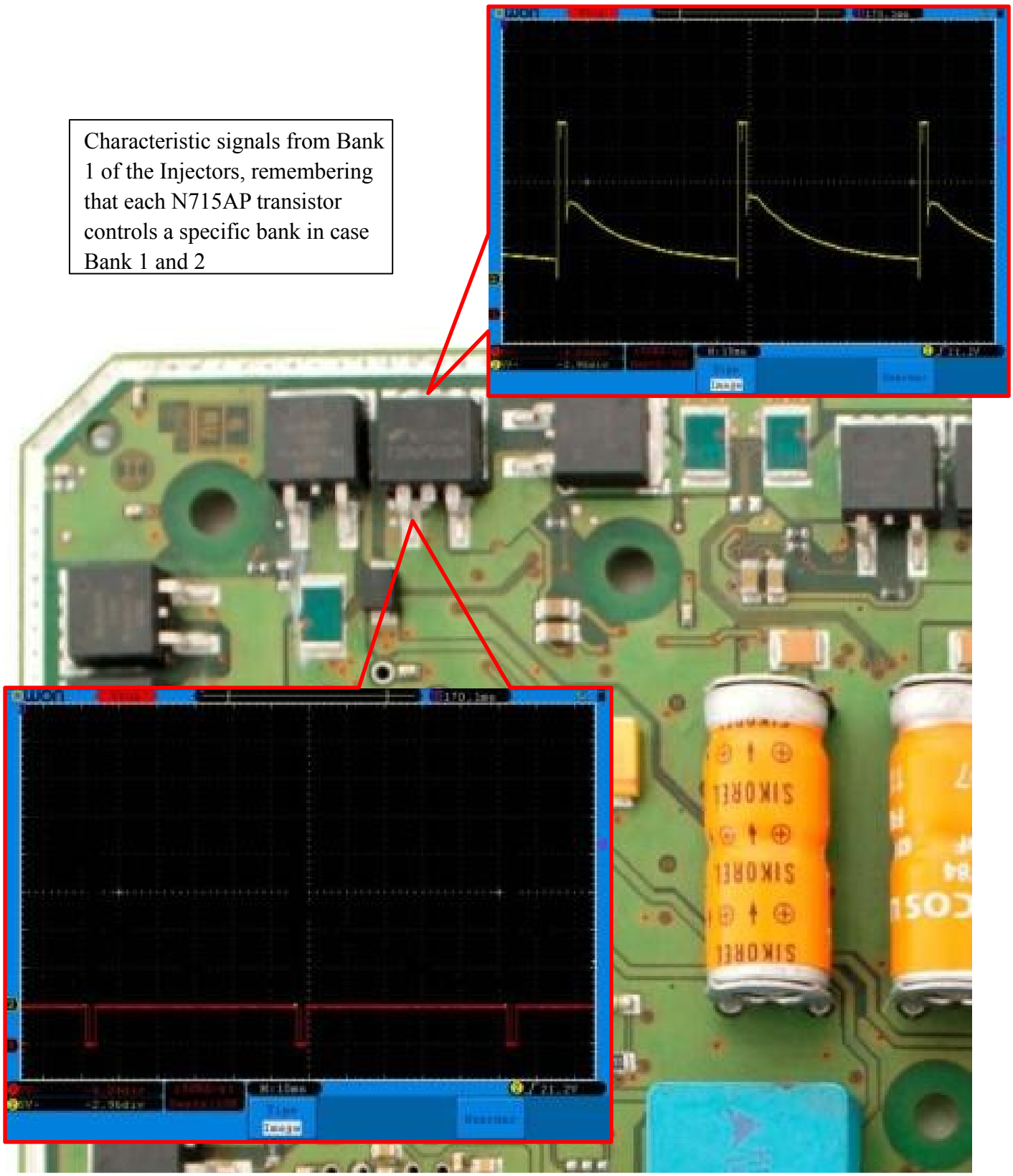
Observe the electrical signals from the related circuit:

Injector Individual:



Electric Signals of Common Injectors

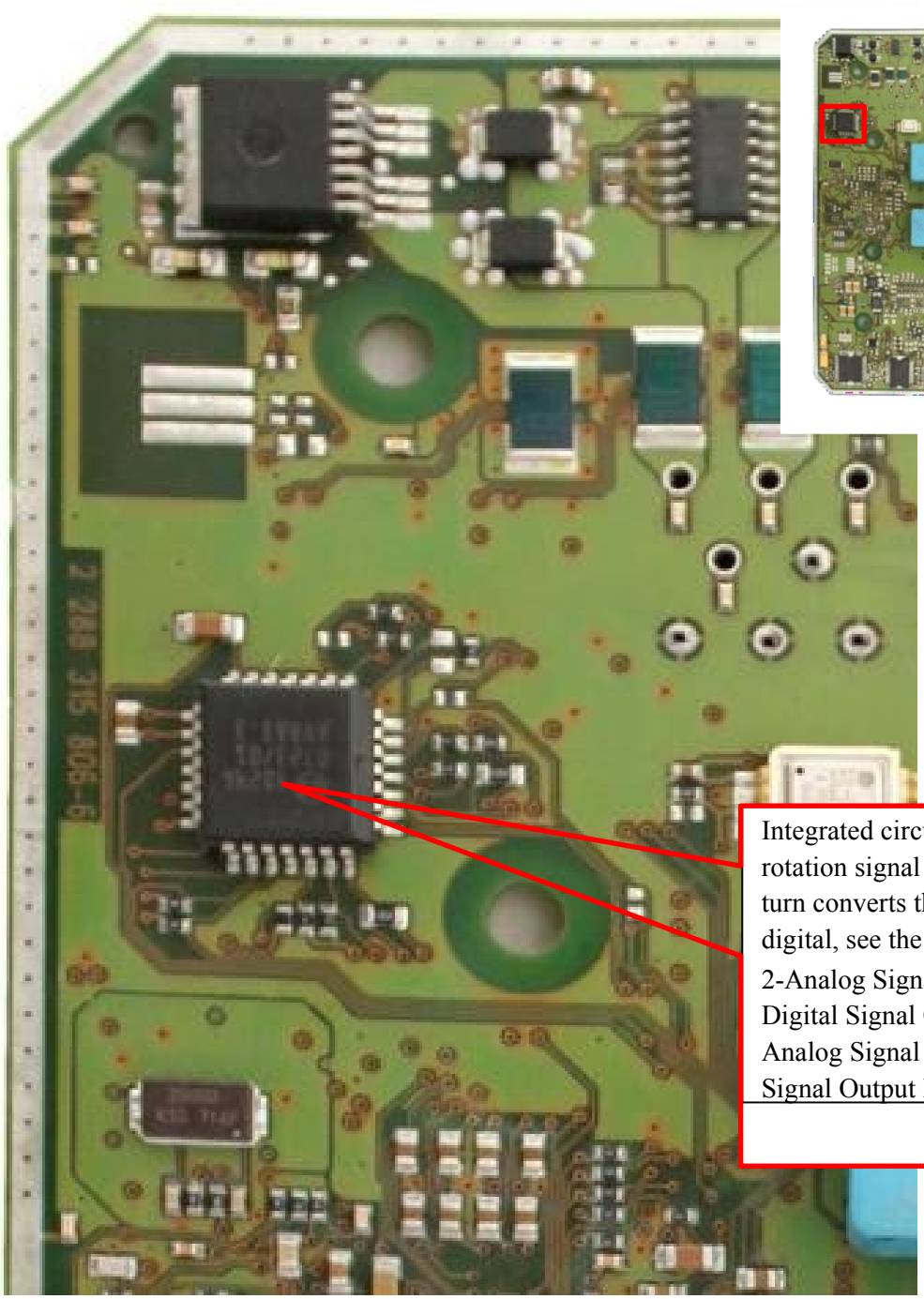
Characteristic signals from Bank 1 of the Injectors, remembering that each N715AP transistor controls a specific bank in case Bank 1 and 2



An important detail is that in the visualization of the signals we realize that although different in their amplitude, the timing of the signals and their characteristics are identical

Motor Phase and Rotation Sensor Circuit

Important circuit for the operation and follow the same logic of operation of the other systems already observed until now. Note the circuit followed by the electrical signals we found for these sensors:



Integrated circuit nº 30296 receives a rotation signal already rectified and in turn converts the analog signal to digital, see the pins:

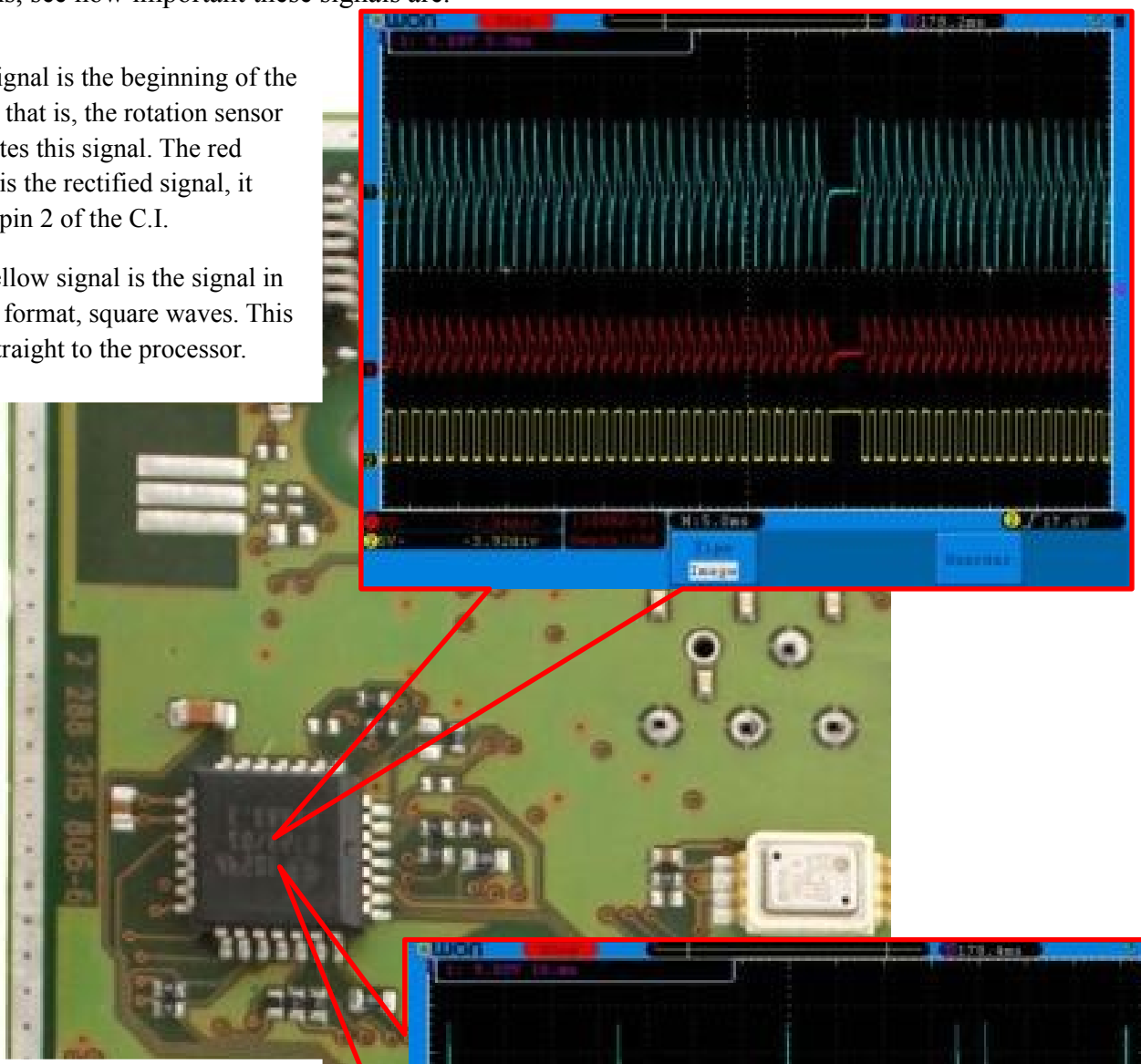
2-Analog Signal Input Rotation 27-Digital Signal Output Rotation 23-Analog Signal Input Phase 26-Digital Signal Output Phase

Electrical Signals of the Motor Rotation and Phase Circuit

The electrical signals observed with the oscilloscope are very similar to those of other power stations, see how important these signals are.

Blue signal is the beginning of the signal, that is, the rotation sensor generates this signal. The red signal is the rectified signal, it enters pin 2 of the C.I.

The yellow signal is the signal in digital format, square waves. This goes straight to the processor.

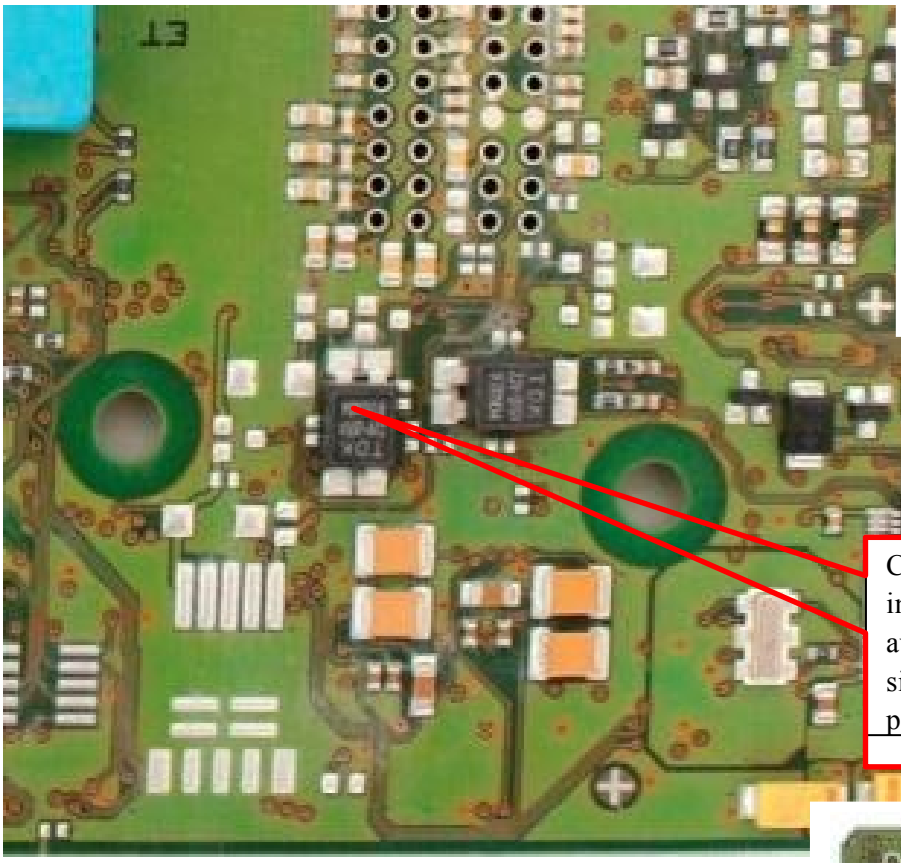


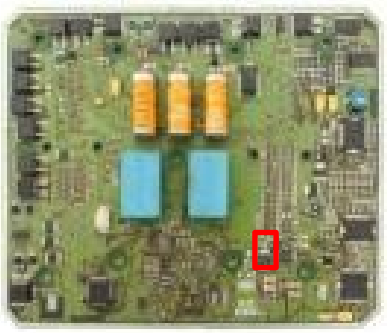
Blue signal is the beginning of the signal, that is, the phase sensor generates this signal. The red signal is the rectified signal, it enters pin 23 of the C.I.

The yellow signal is the signal in digital format, square waves. This goes straight to the processor.

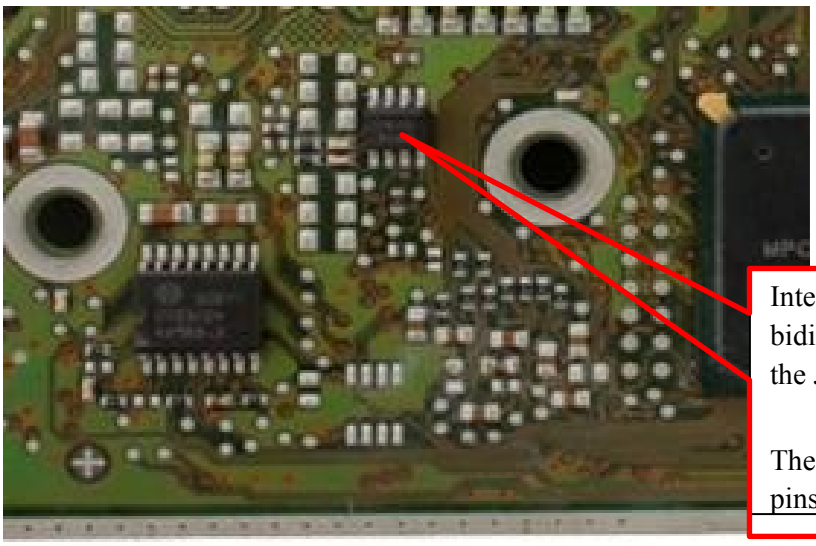
Communication Circuit Protocol J1939 Data Link

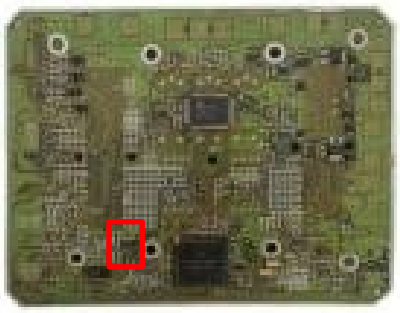
Essential circuit for the system to communicate with scanner and other electrical system modules, a detailed description will be presented, see:





Communication line filter, information passes through it to avoid interference and noise in the signal can interfere with its plausibility



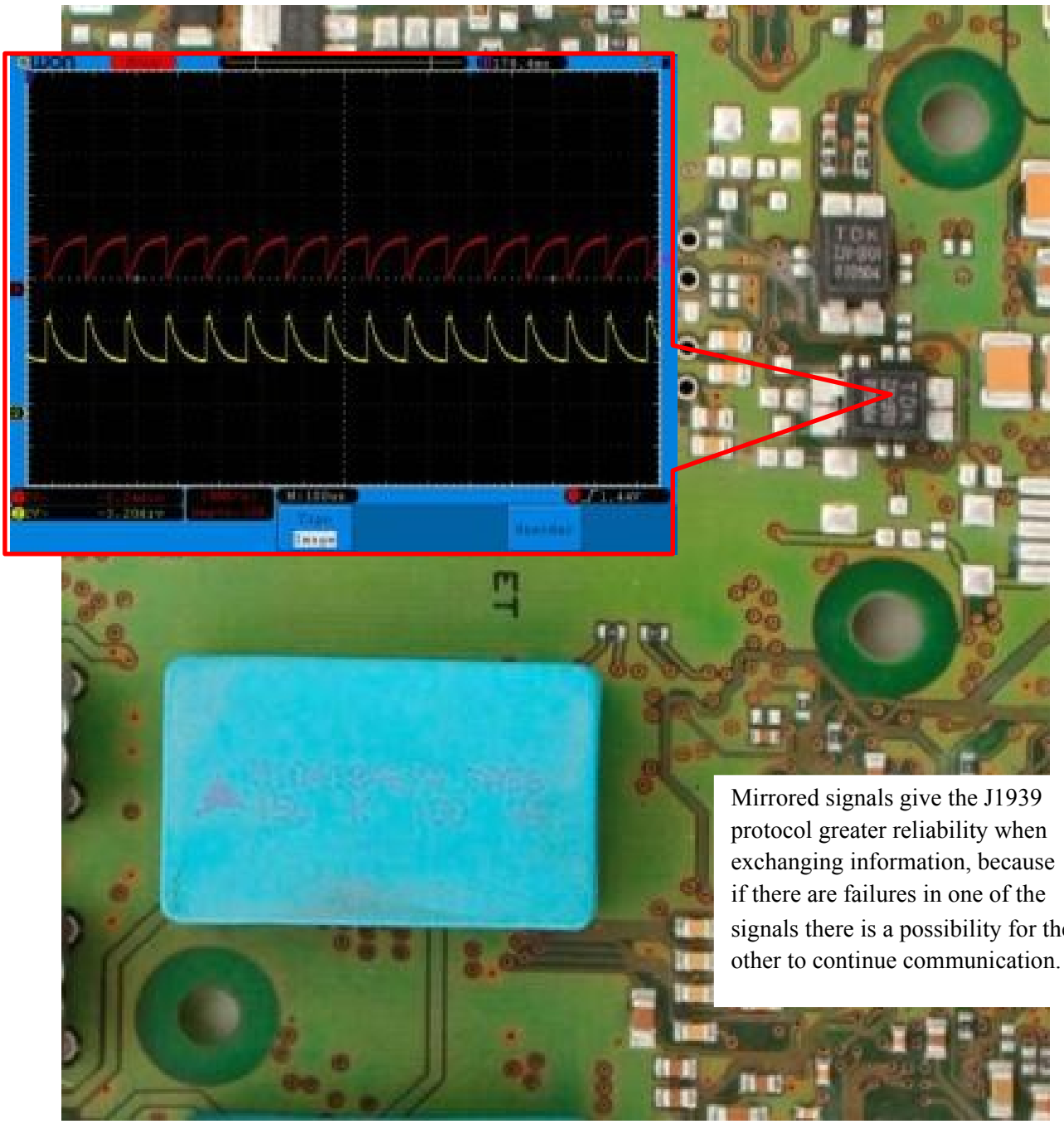


Integrated circuit responsible for bidirectional communication of the J1939 Protocol.

The information travels through pins 1 and 2

Electrical Signals of Communication J1939

It has the characteristic of being mirrored in relation to each other and they work with a speed rate of 1,000 kbit / s, remembering that, as in the case of the CAN network, this protocol works with the sending and receiving of data packets with a priority identifier. , indicating the urgency of the signal, divide it into high traffic priority or low priority. Now see the electrical signal that this circuit contains.

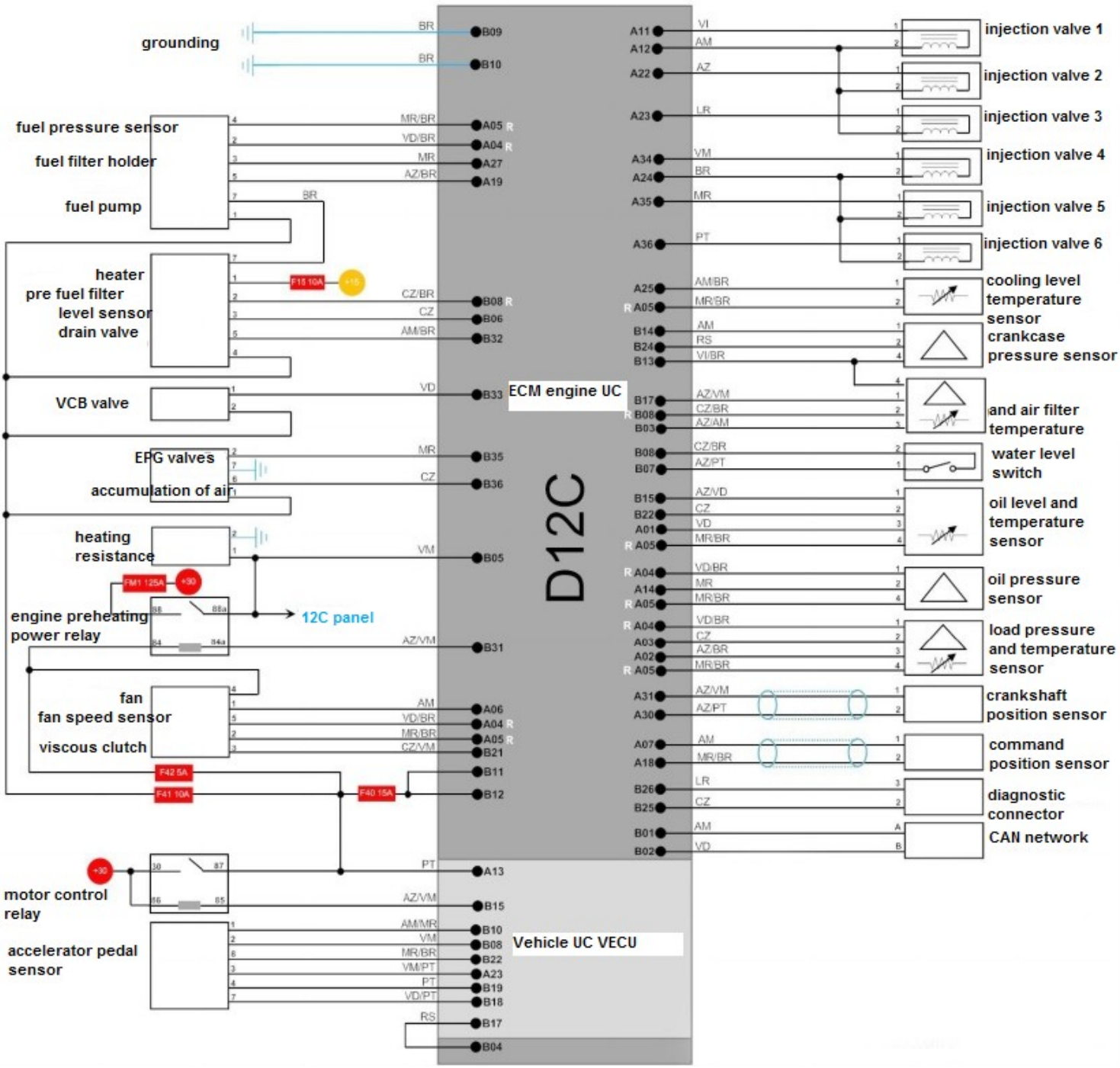


Mirrored signals give the J1939 protocol greater reliability when exchanging information, because if there are failures in one of the signals there is a possibility for the other to continue communication.

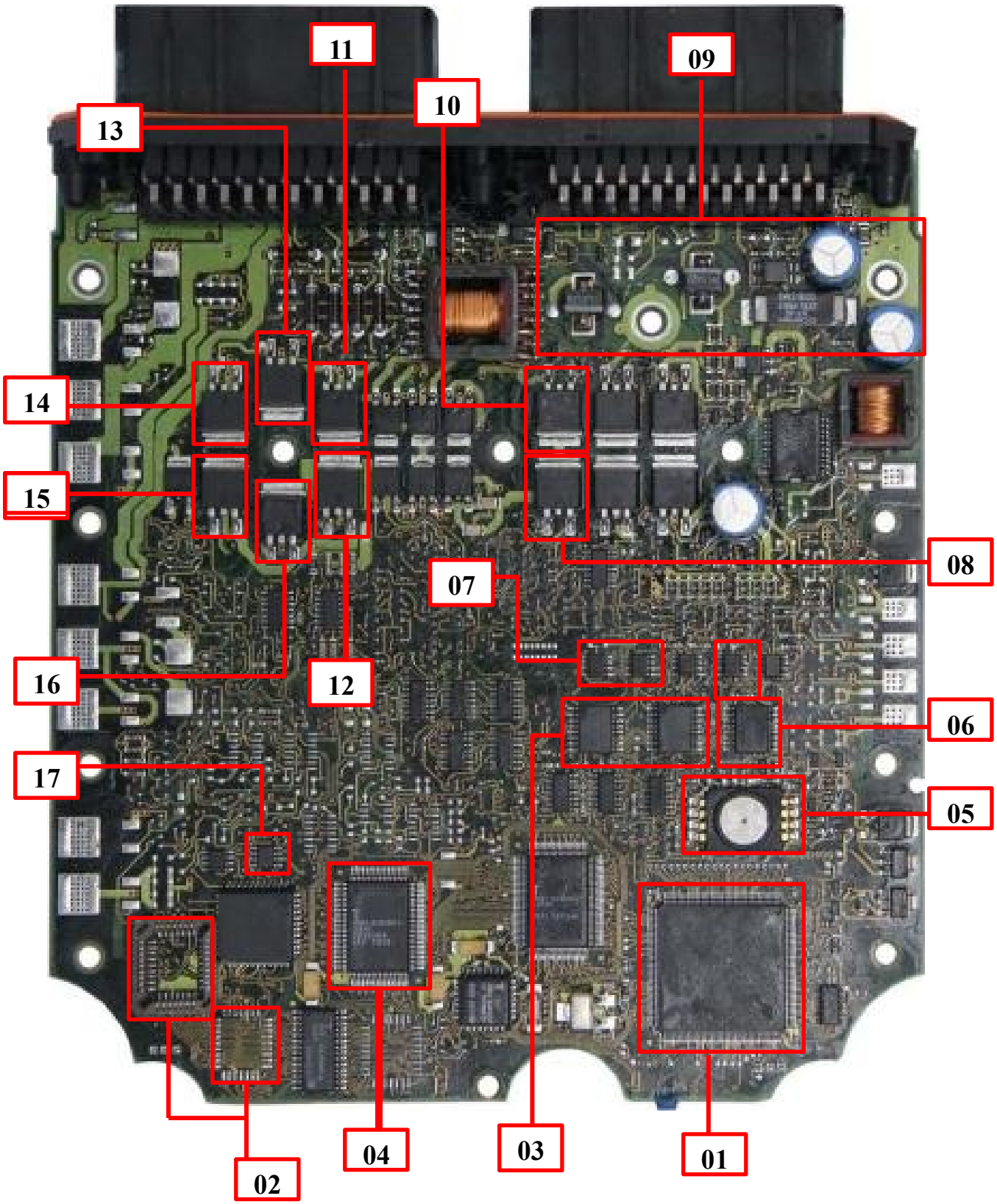
Volvo D12C

TEA

Volvo D12C TEA Wiring Diagram



Components Overview



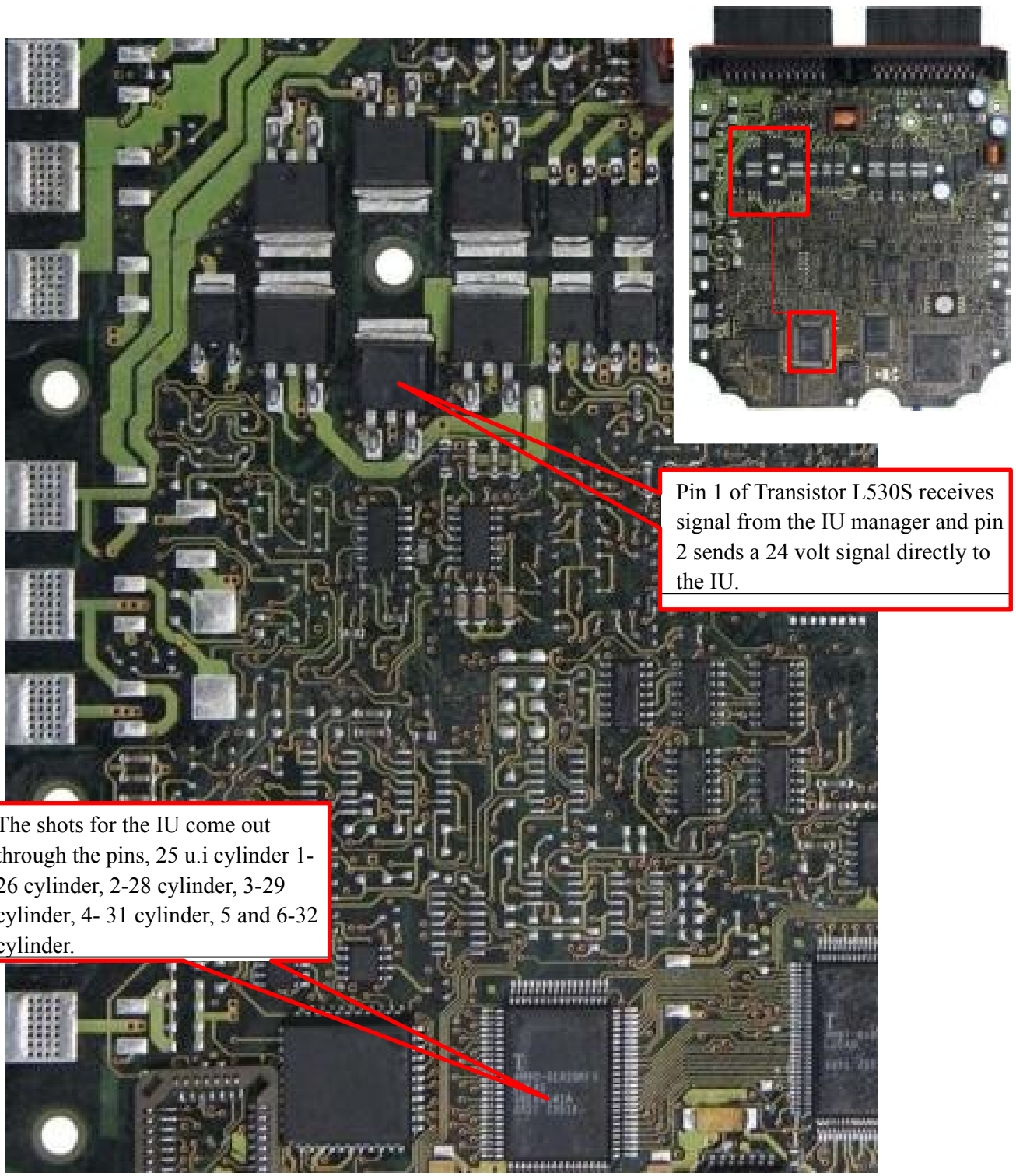
Component Description and Function

Component	Component function
1-Processor No. 59101520A	It controls all engine management functions working in conjunction with the memory.
2-Memory PLCC Am29F400	Contains all engine management information and operating strategies.
3-Integrated Circuit No. HC4951A	Oil temperature sensor interface (left), Air temperature sensor interface (right)
4-Integrated Circuit nº G1020KF9	Injection Unit Manager
5-Component No. SPXS 4010A	Atmospheric pressure sensor
6-Integrated Circuit nº HC4051A	Water Temperature sensor interface
7-Integrated Circuit nº 77260	Oil pressure and turbo pressure sensor interface
8-Transistor nº R038M	Injector Units Common 4/5/6
9-Protection circuit	Peak voltage protection circuit
10-Transistor No. R038M	Injection Units Common 1/2/3
11-Transistor nº L530S	Injection Units Inejtora 3
12-Transistor nº L530S	Injection Unit Individual 1
13-Transistor nº L530S	Injection Unit Individual 2
14-Transistor nº L530S	Injection Unit Individual 4
15-Transistor nº L530S	Injection Unit Individual 6
16-Transistor nº L530S	Injection Unit Individual 5
17-Integrated Circuit nº A52C251	CAN protocol decoder

Detailed Description of the Circuits

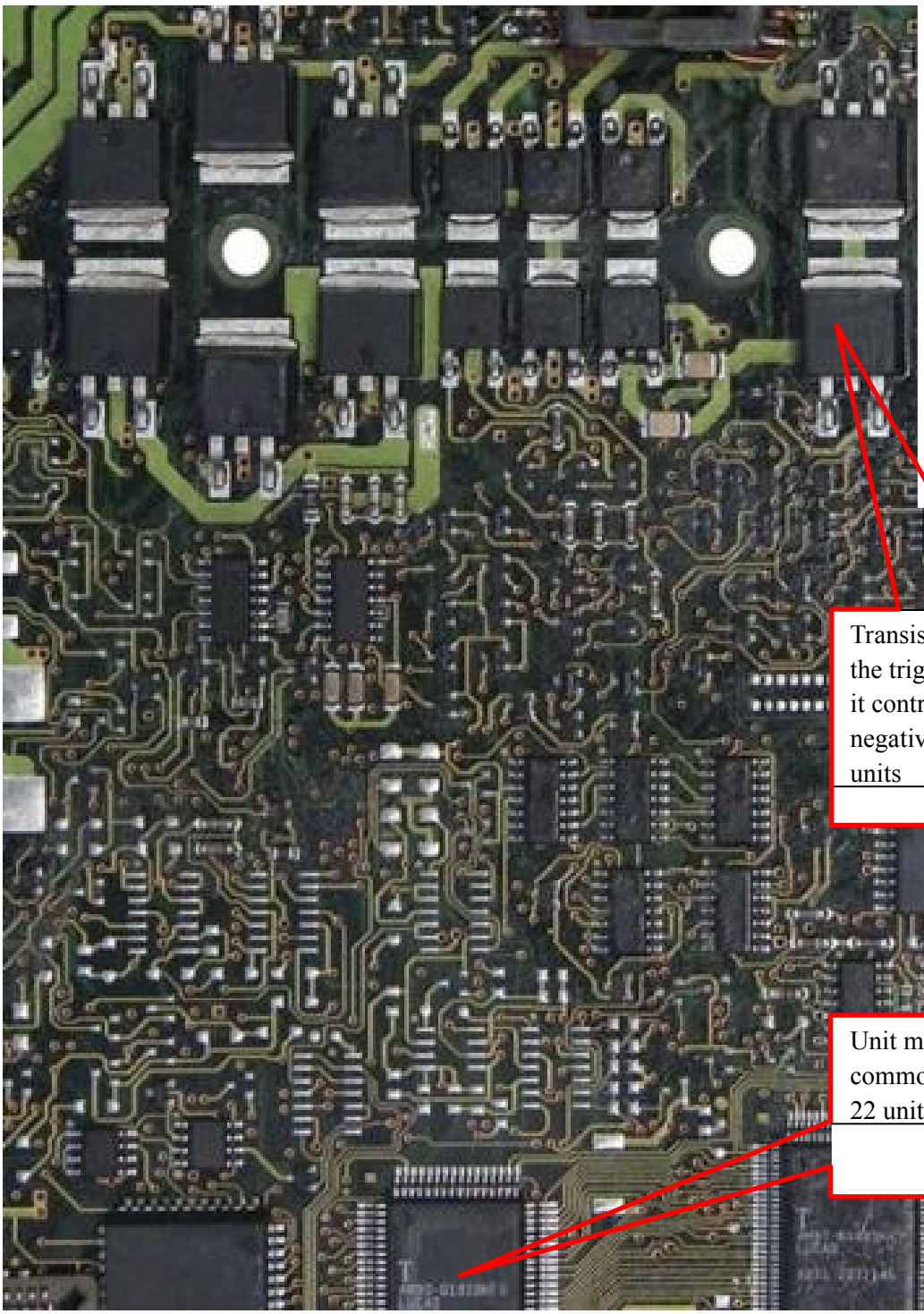
Injection Units

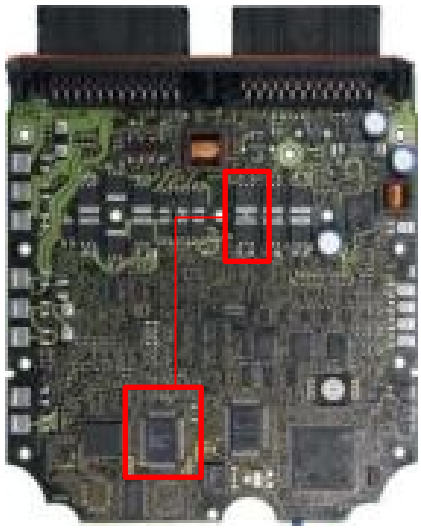
As in other systems, Volvo also uses an individualized circuit for the UIs of each cylinder and a common circuit for switching seats one and two. See the details.



Common Injection Units

This circuit is also similar to the other circuits of other diesel injection systems where we have one transistor switching three IUs at a time.





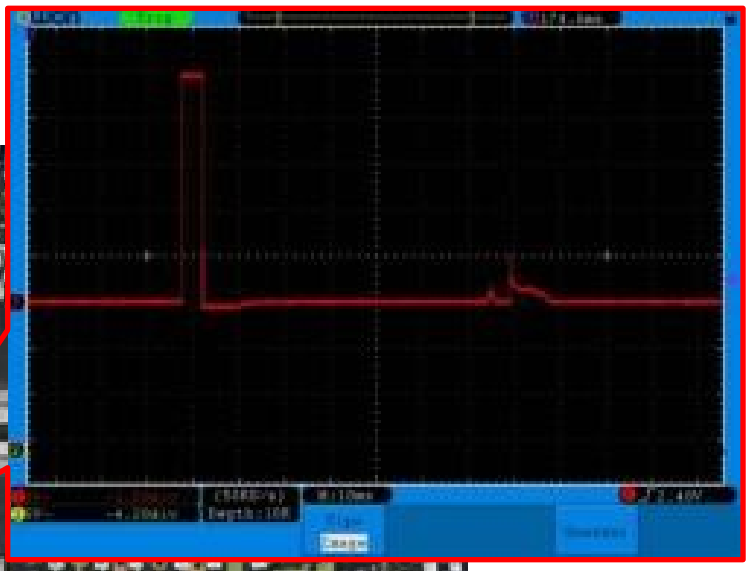
Transistor R038M receives by pin 1 the trigger signal of the three units it controls and by pin 2 it triggers a negative switching for the same units

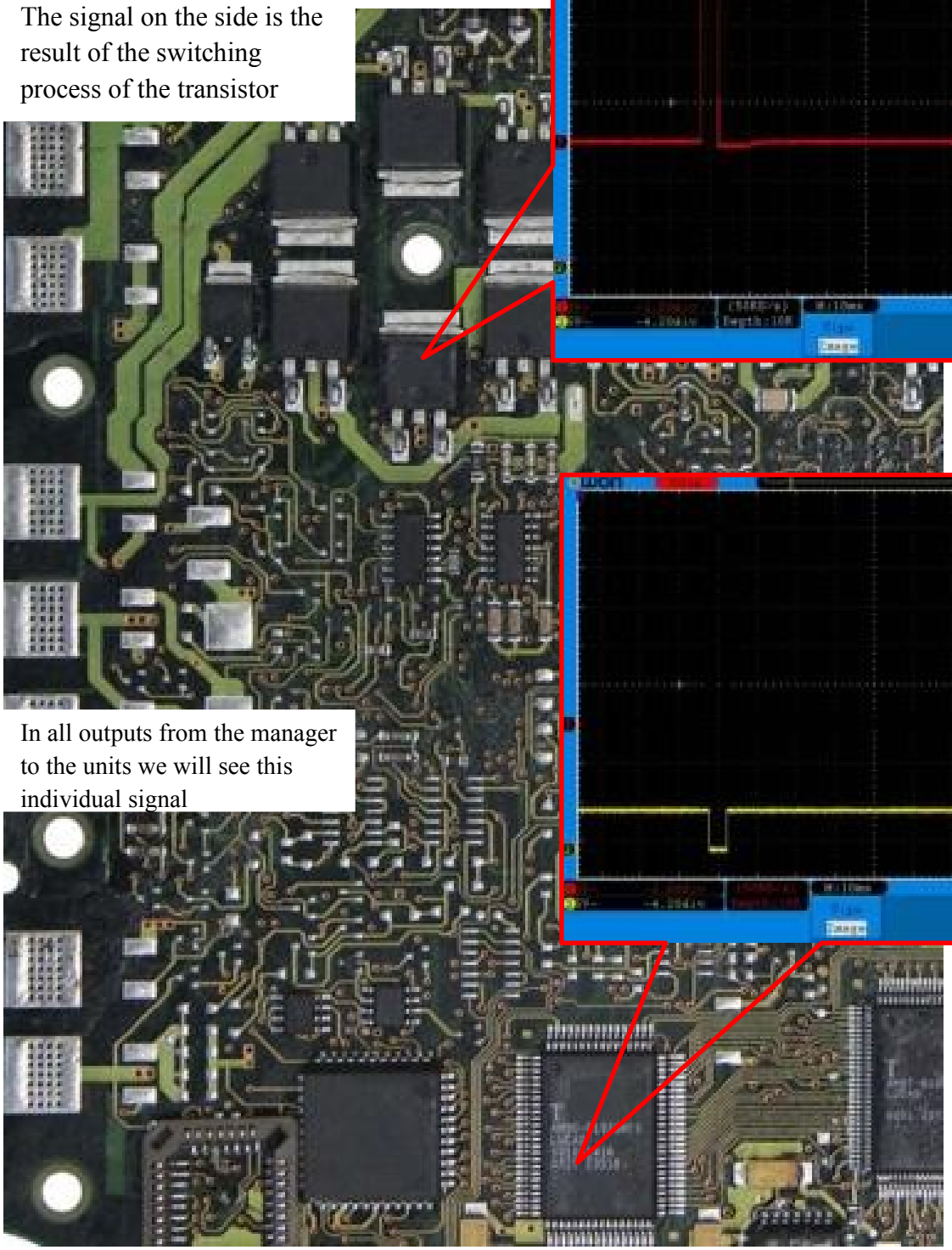
Unit manager releases trigger for common units via pins 23 1/2/3 and 22 units for 4/5/6 units

Electrical Signals of Injector Units Circuits

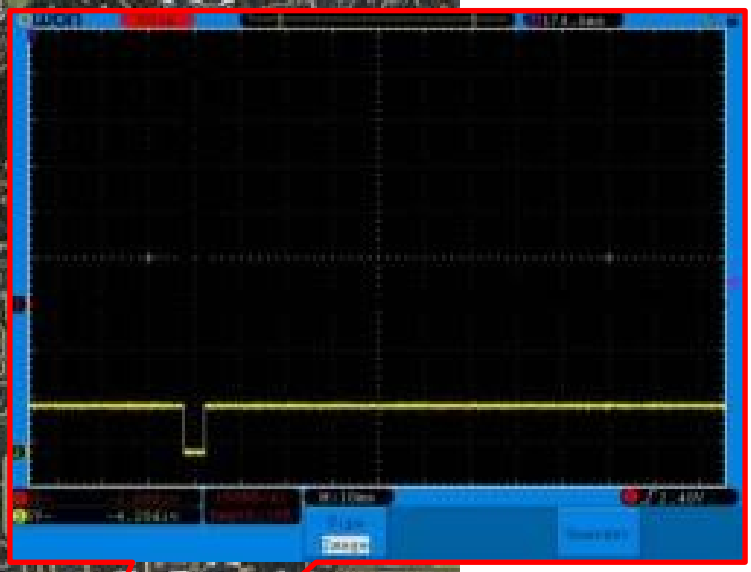
See the possible signs of the Individual of the IU

The signal on the side is the result of the switching process of the transistor



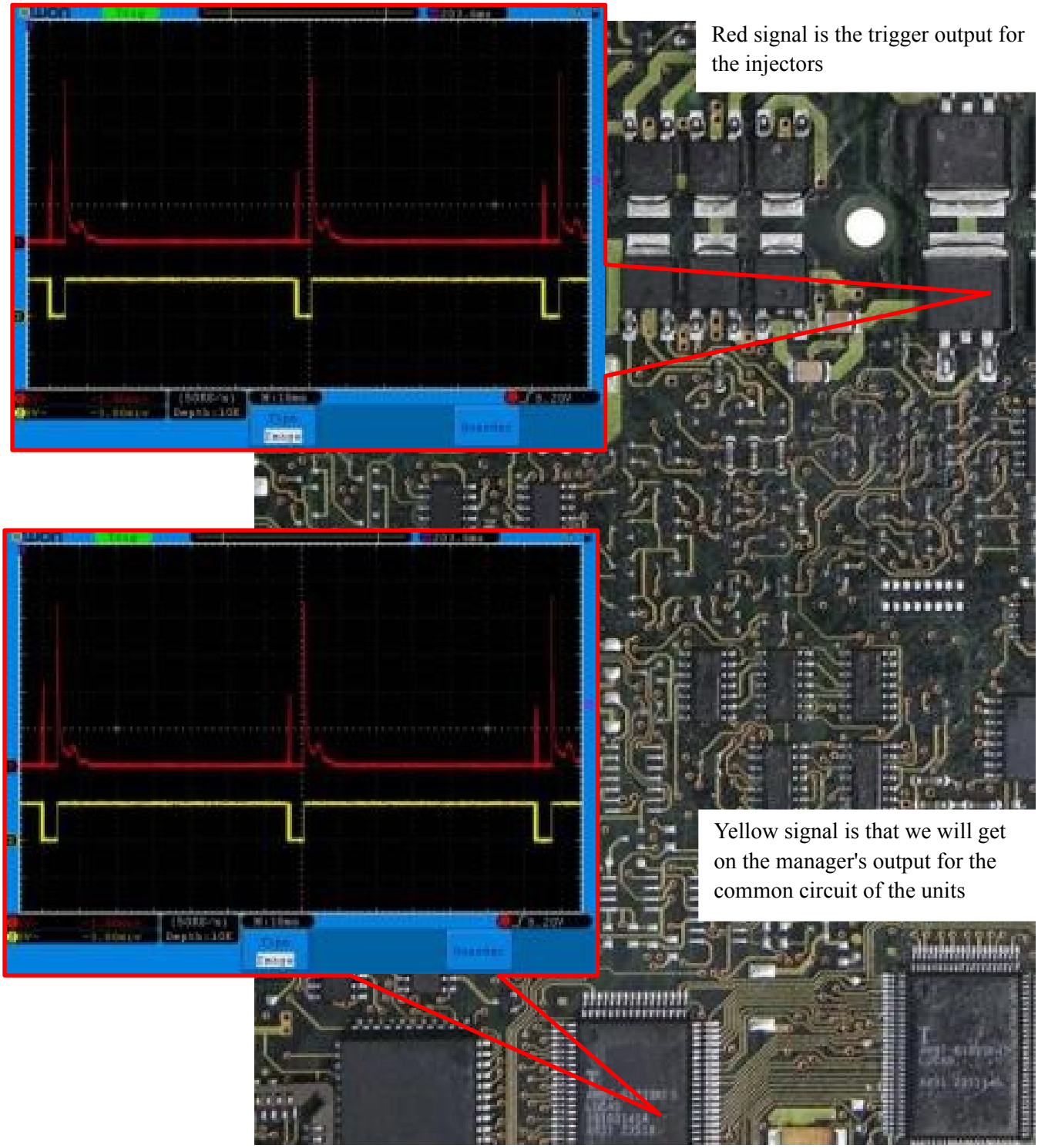


In all outputs from the manager to the units we will see this individual signal



Common Electrical Signals of Injection Units

As is typical of the common circuits of the units, we will have characteristic signals.

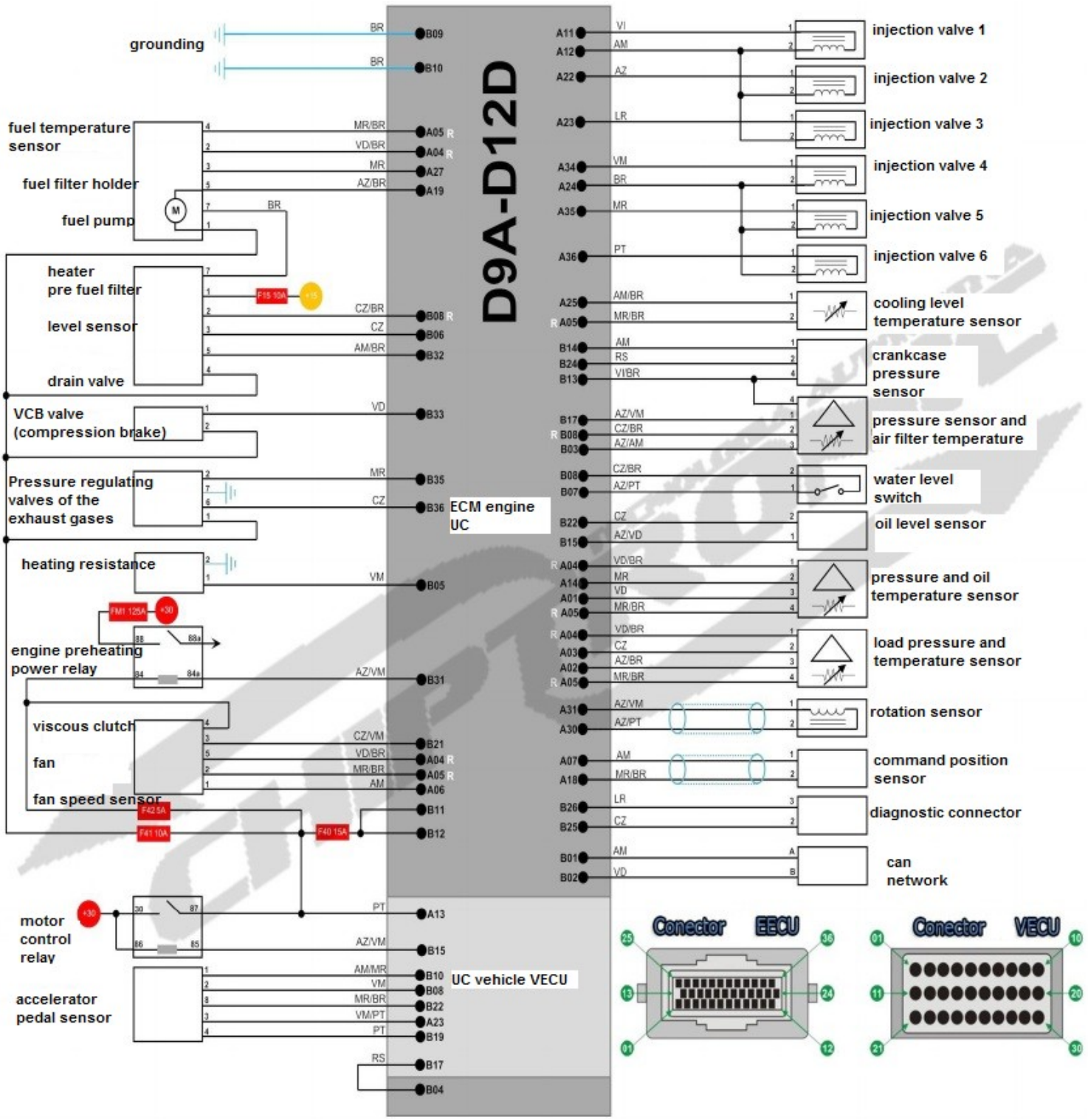


Red signal is the trigger output for the injectors

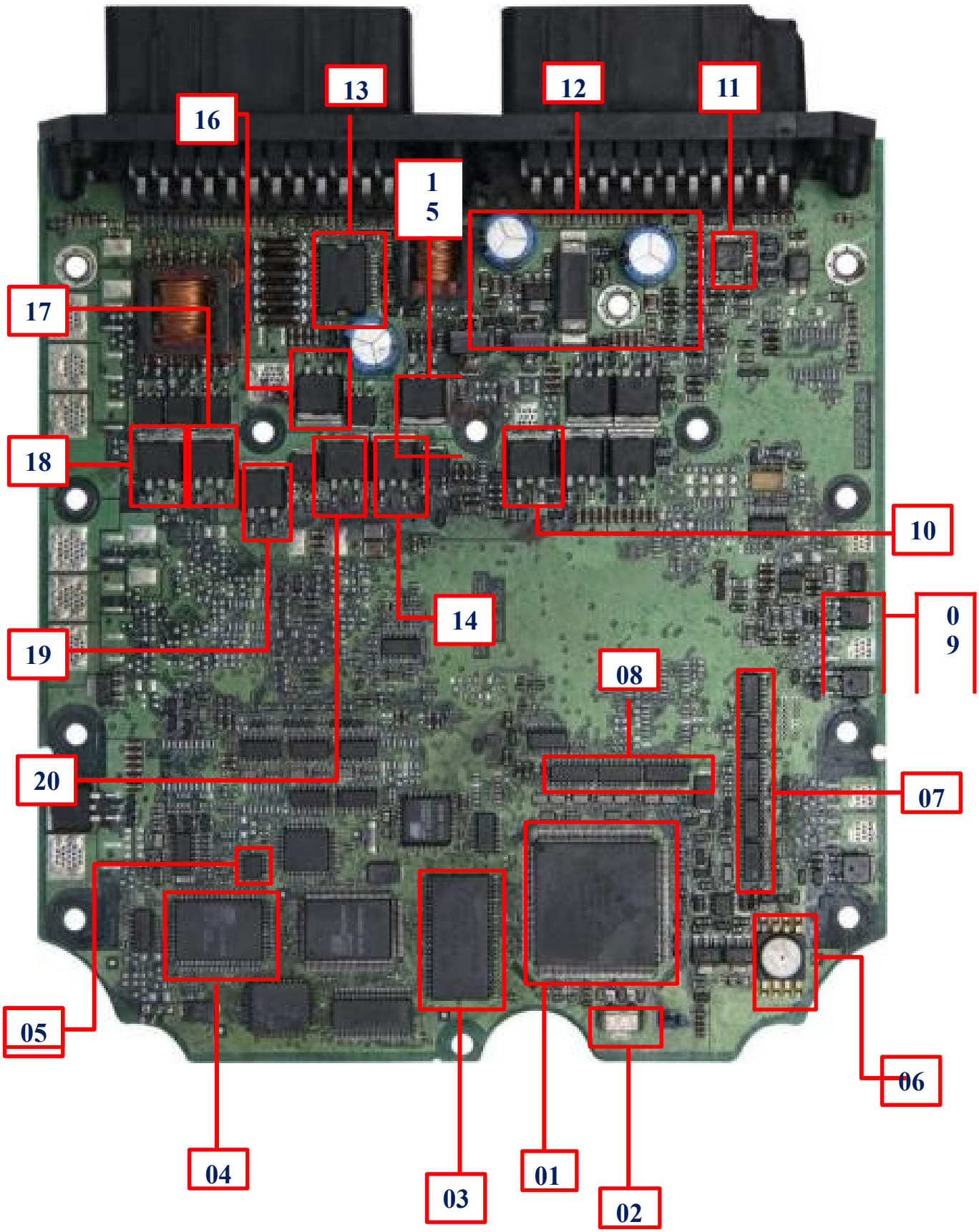
Yellow signal is that we will get on the manager's output for the common circuit of the units

Volvo D12D
TEA v.2

Volvo D12D TEA Electrical Scheme v.2



Components Overview



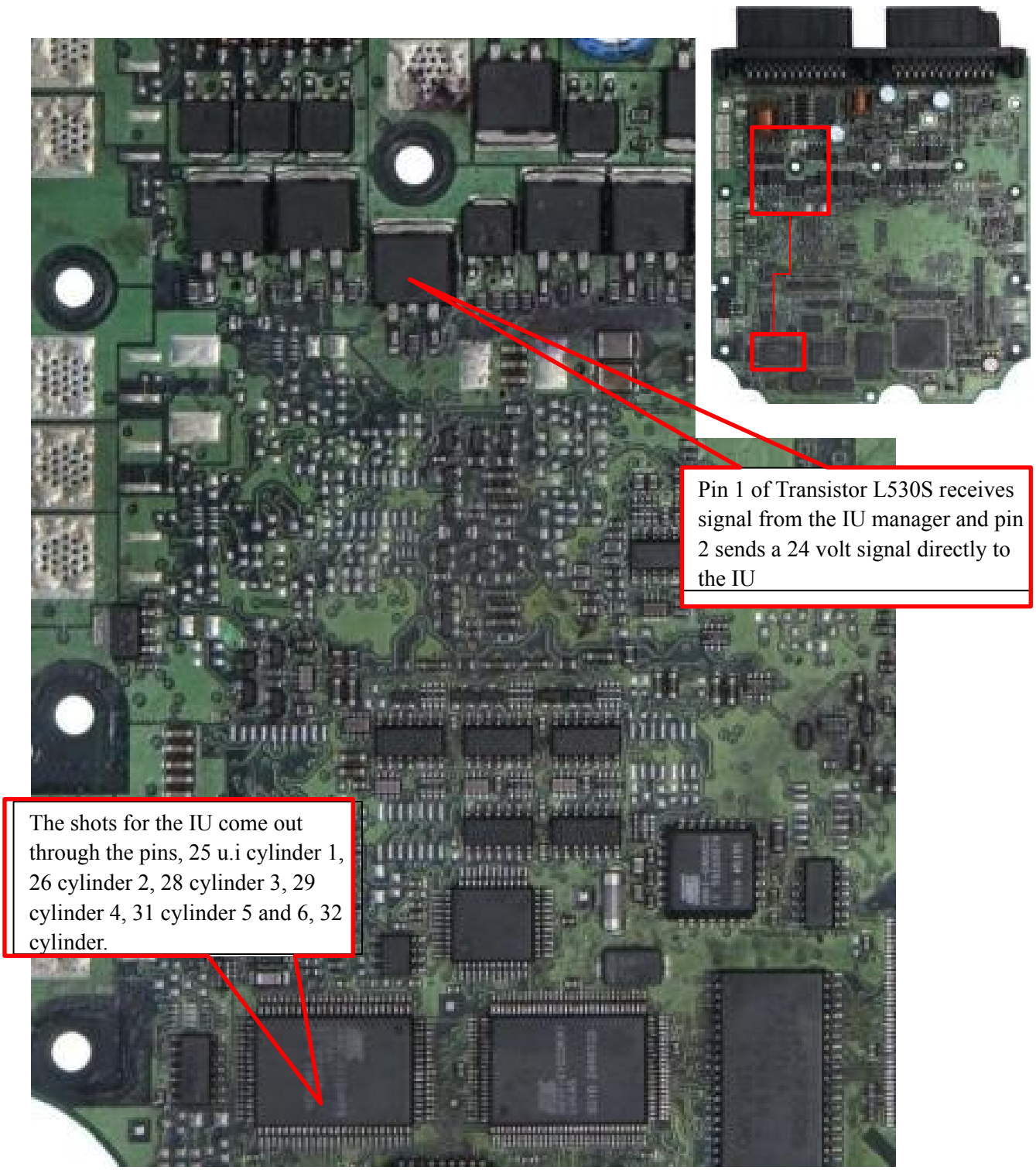
Component Description and Function

Component	Component function
1-Processor No. 59305837A	It controls all engine management functions working in conjunction with the memory.
2-Piezoelectric Crystal	Generates a signal for the processor to work
4-Integrated Circuit nº G1020KF9	
7-Integrated Circuit nº HC4066A	Rotation sensor interface
8-Integrated Circuit nº HC4066A	Oil temperature and air temperature sensor interface
9-Transistor nº LR120N	External Regulator
10-Transistor nº L530S	Injection Unit Individual 4
11-Transistor nº LR120N	Motor control relay
12-Protection circuit	Protects the module against voltage spikes
13-Integrated Circuit nº 30443	Internal voltage regulator from 24 volts to 5 volts
14-Transistor nº L530S	Individual of the Inejtora Unit 5
15-Transistor nº L530S	Individual of the Inejtora Unit 2
16-Transistor nº L530S	Individual of the Inejtora Unit 3
17-Transistor nº L530S	Individual of the Inejtora Unit 1
18-Transistor nº R038M	Injector Unit Common 4/5/6
19-Transistor nº L530S	Injection Unit Individual 6
20-Transistor nº R038M	Injection Units Common 1/2/3

Detailed Description of the Circuits

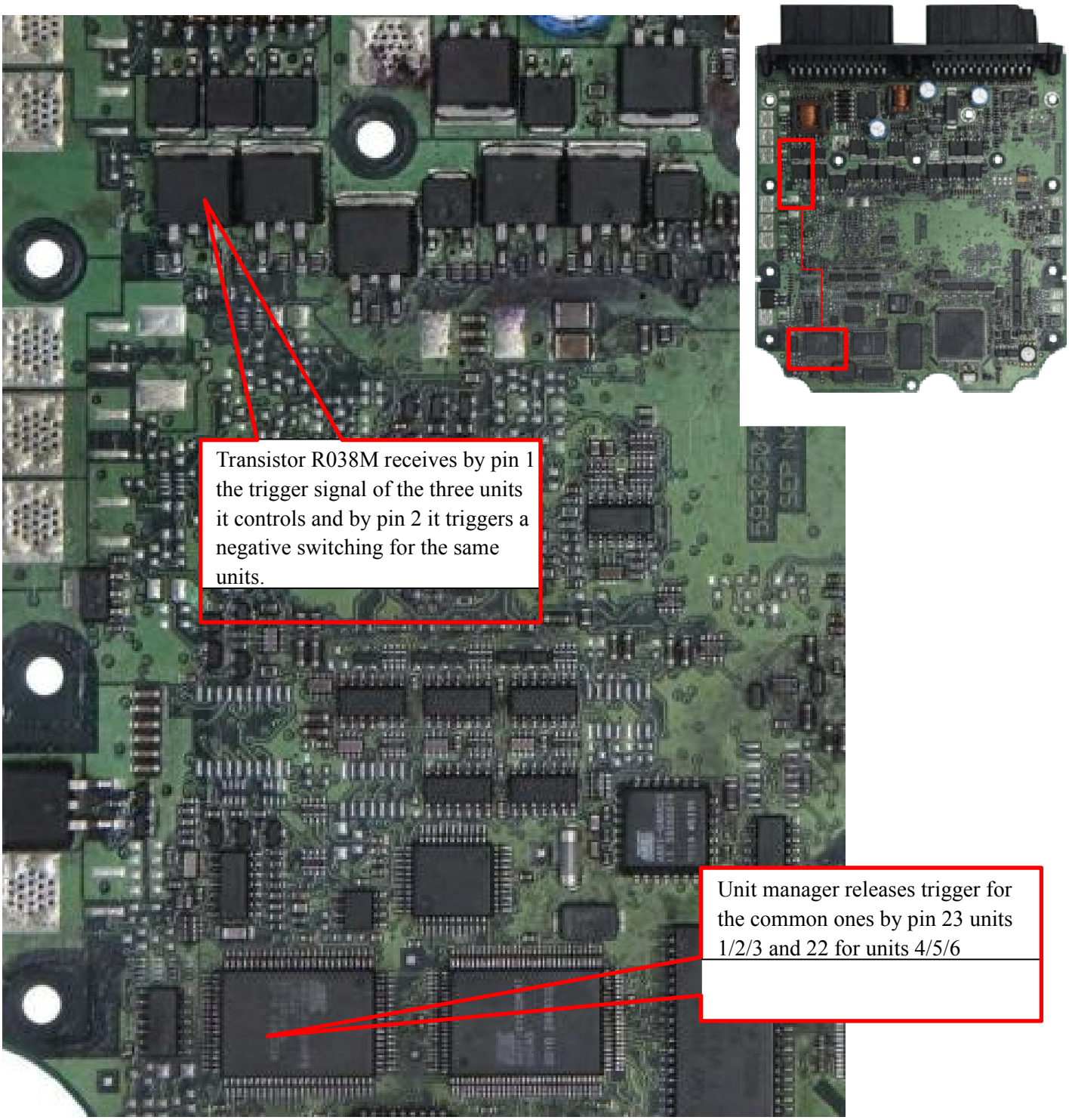
Injection Units

As in other systems, Volvo also uses an individualized circuit for the UIs of each cylinder and a common circuit for switching seats one and two. See the details.



Common Injection Units

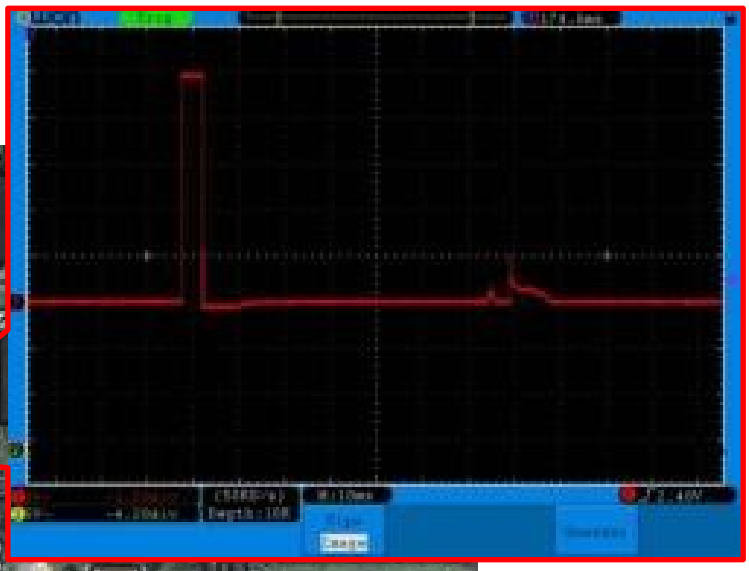
This circuit is also similar to the other circuits of other diesel injection systems where we have one transistor switching three IUs at a time.

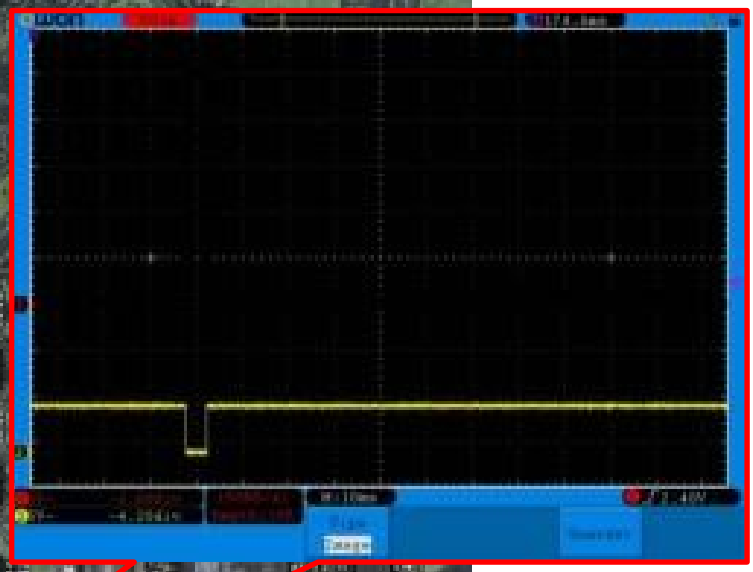


Electrical Signals of Injector Units Circuits

See the possible signs of the Individual of the IU

The signal on the side is the result of the switching process of the transistor

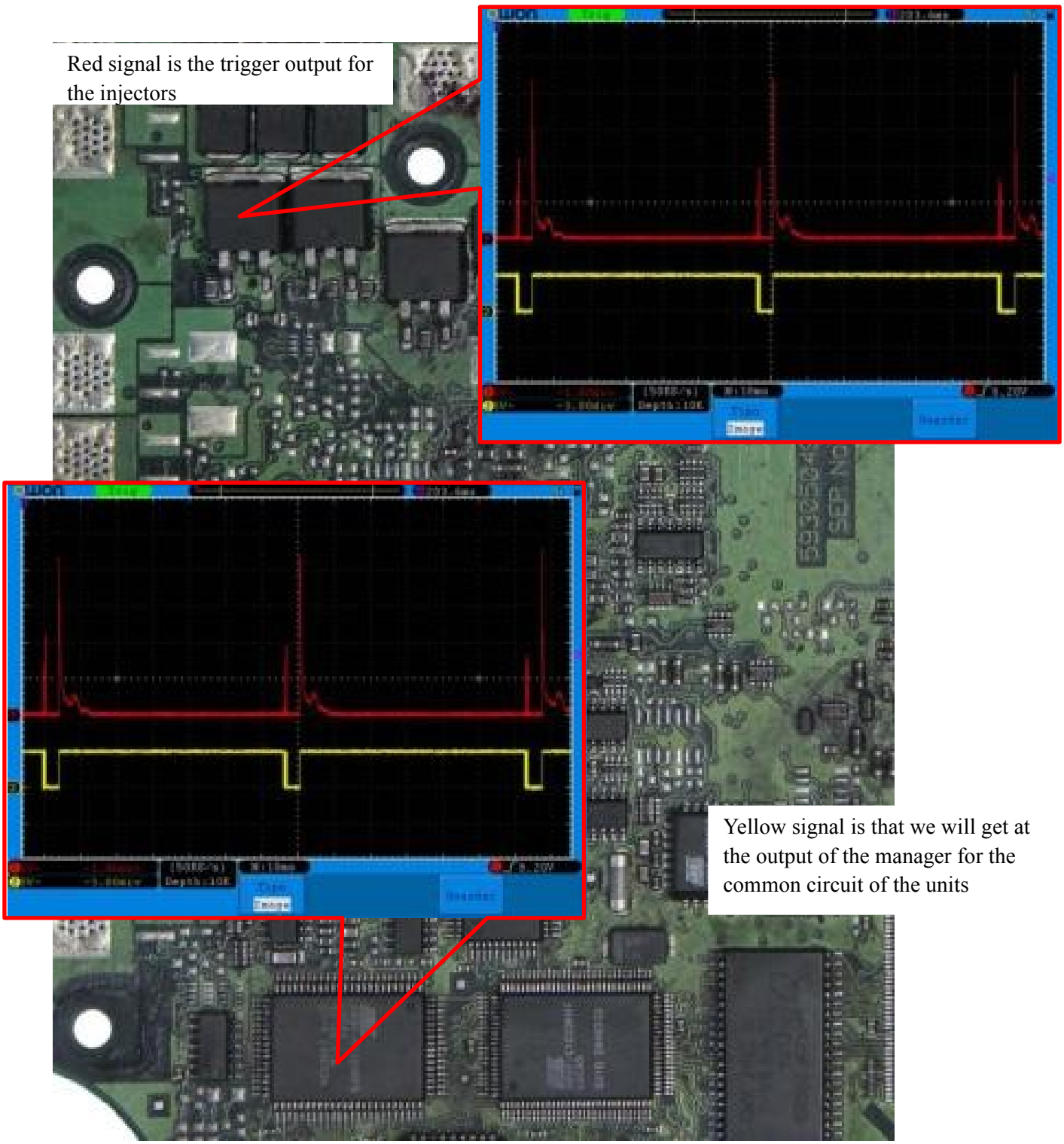




In all outputs from the manager to the units we will see this individual signal

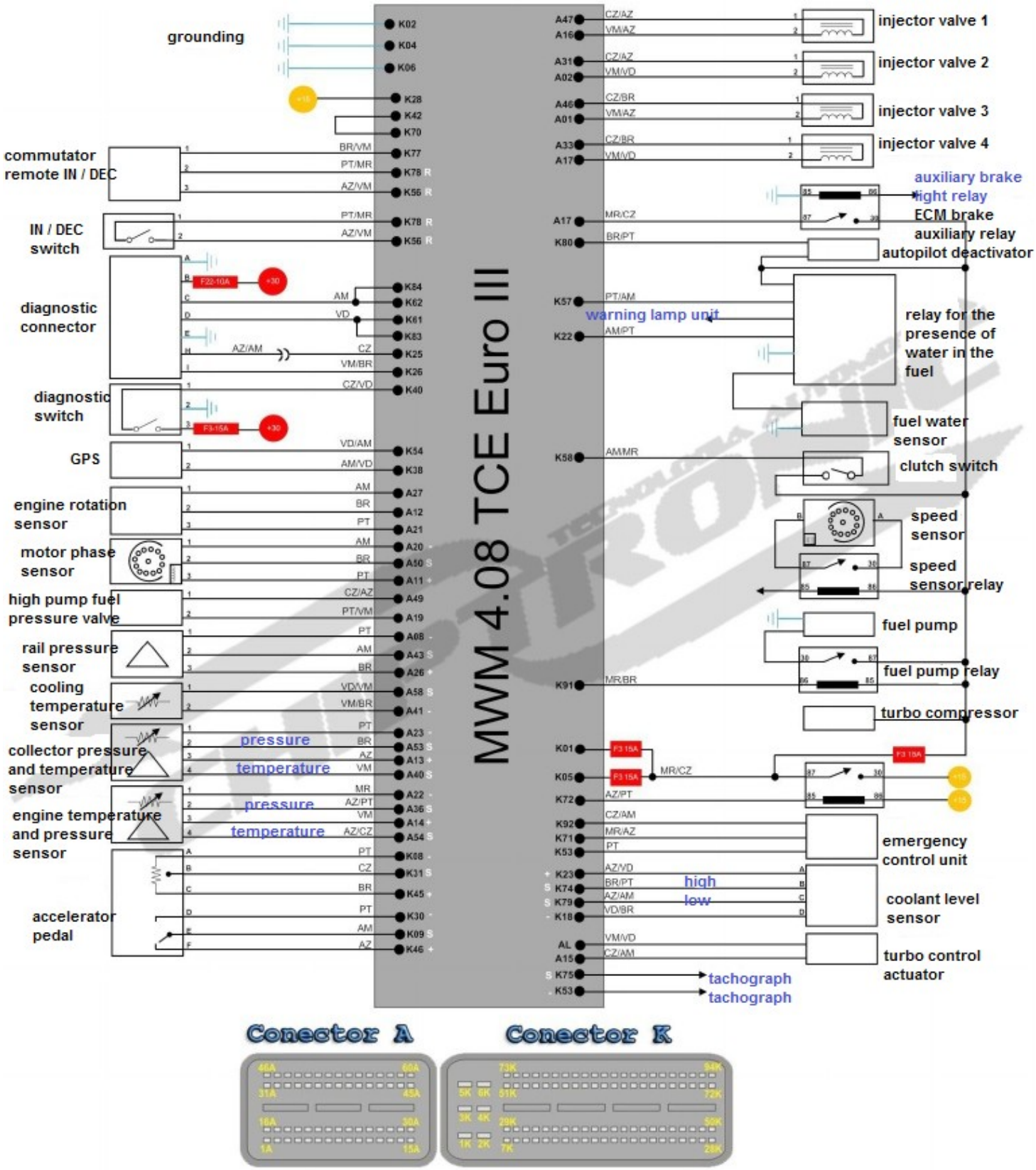
Common Electrical Signals of Injection Units

As is typical of the common circuits of the units, we will have characteristic signals.

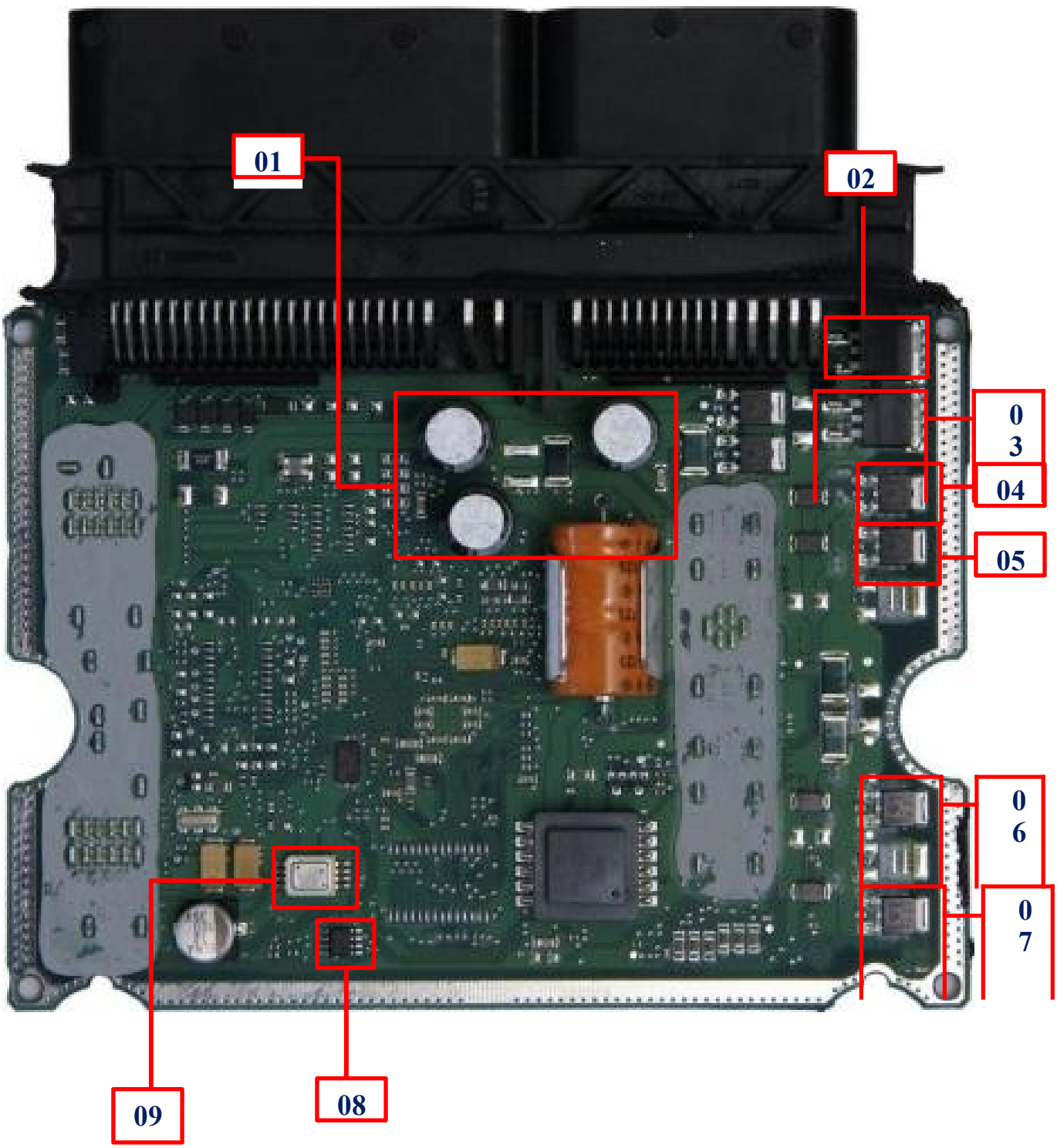


VW
EDC 16C8
System
Common Rail

EDC 16C8 Common Rail Wiring Diagram



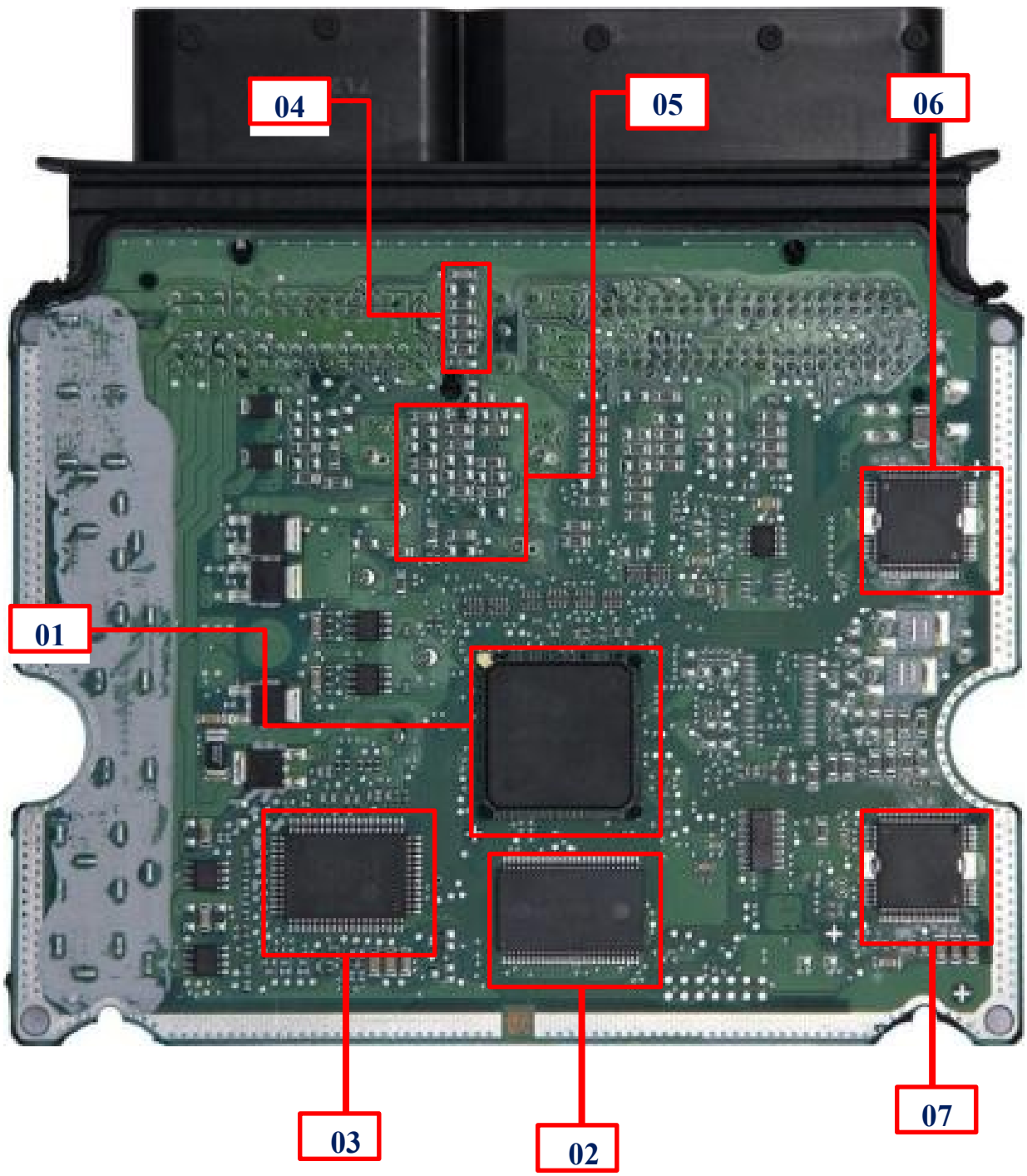
Components Overview



Components Overview

Component	Component function
1-Circuit Protection	Protection circuit and responsible for loading the load to assist the activation of the injectors
2-Transistor nº F20UP20DN	Common Injectors (CRIN) 1/4 cylinders
3-Transistor nº F20UP20DN	Common Injectors (CRIN) 2/3 cylinders
4-Transistor nº BUK 9237	Individual Injector (CRIN) cylinder 2
5-Transistor nº BUK 9237	Individual Injector (CRIN) cilindro 3
6-Transistor nº BUK 9237	Individual Injector (CRIN) cilindro 1
7-Transistor nº BUK 9237	Individual Injector (CRIN) cilindro 4
8-Soic 8 pin nº 95640	Immobilizer memory
9-Component No. SMD284	Atmospheric pressure sensor

Components Overview (back)

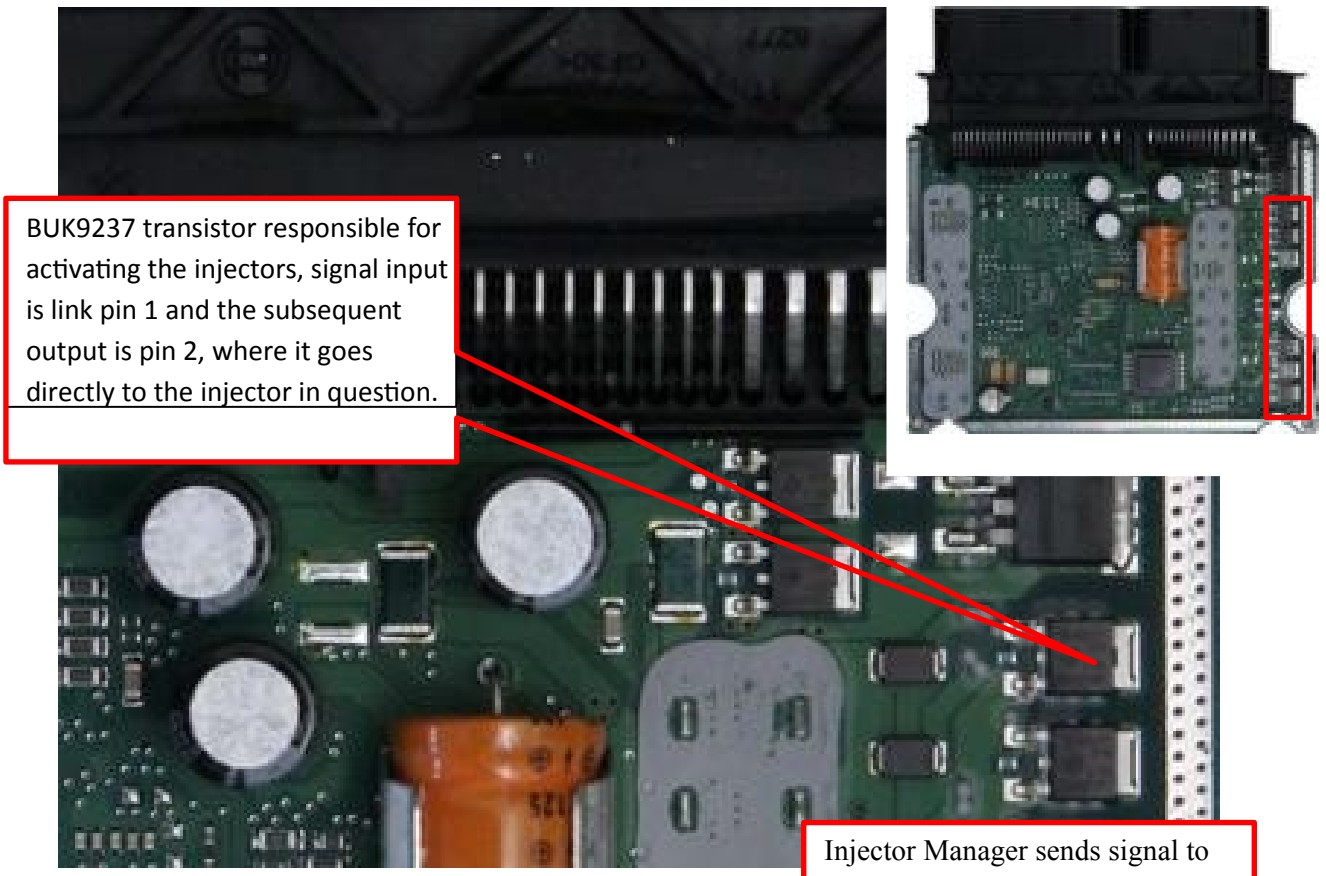


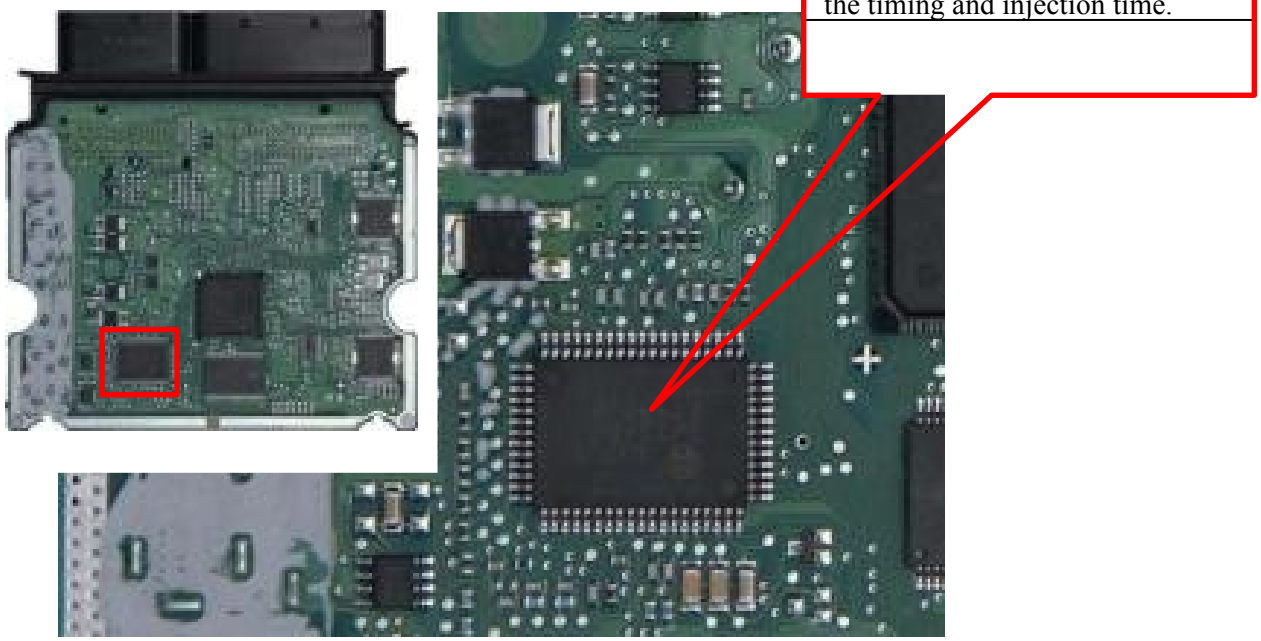
Description and Function of Components (Back)

Component	Component function
1-Processor No. MPC55LF	Performs all engine management functions
2-Eprom AM29BL802CB	Contains injection files
3-Integrated Circuit nº 30505	Discharge Injector Manager (CRIN), responsible for the activation of the injectors by the following pins: **Individual Injectors 25-Shot Injector 1** **26 Injector Trigger 3** **27 Injector Trigger 2** **29 Injector Trigger 5** **30 Injector Trigger 6** **31 Injector Trigger 4** **Common Injectors** **35-Shot of Common Injectors 1/2/3 37-Shot of Common Injectors 4/5/6**
4-Resistor circuit	Circuit is related to engine speed sensor
5-Resistor circuit	RAIL tube pressure sensor circuit
6-Integrated Circuit nº 30618	Operates on the fuel pressure valve and turbo control actuator
7-Integrated Circuit nº 30616	Activates main relay, feed pump relay, rotation interface and voltage regulator. Rotation sensor analog signal input pin 2 and digital output pin 26.

Detailed Description of the Injector Circuit

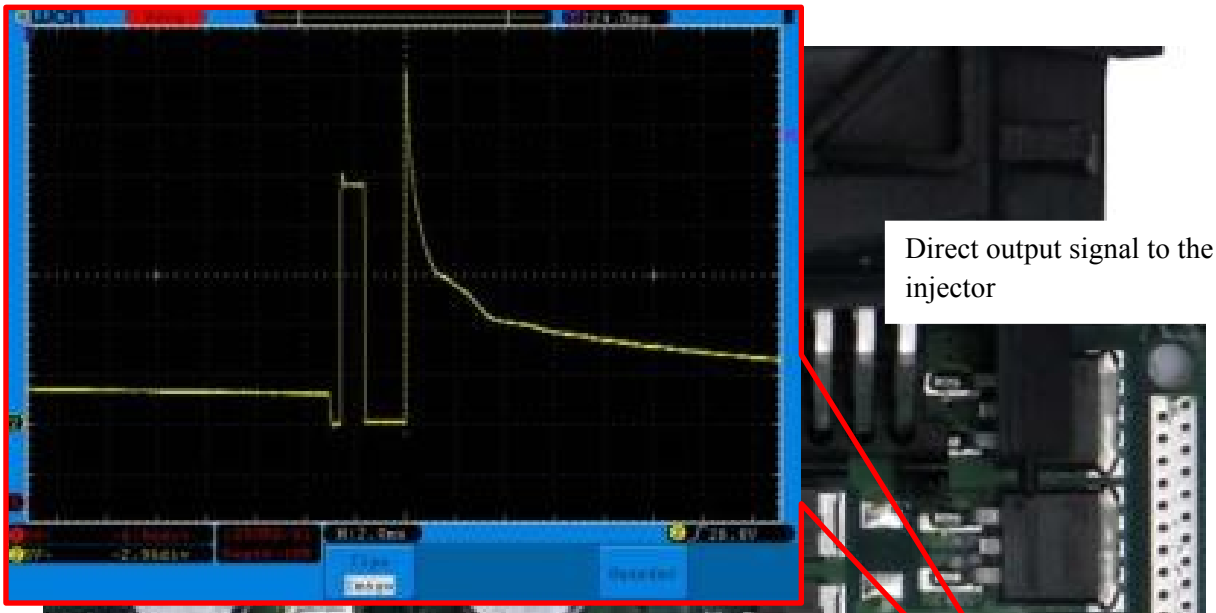
We also observed in this circuit the occurrence of a specific transistor for the positive and another for the negative switching, similar to Cummins' EDC 07, already considered in this material. No major news follows a detailed description with electrical signals from this circuit.



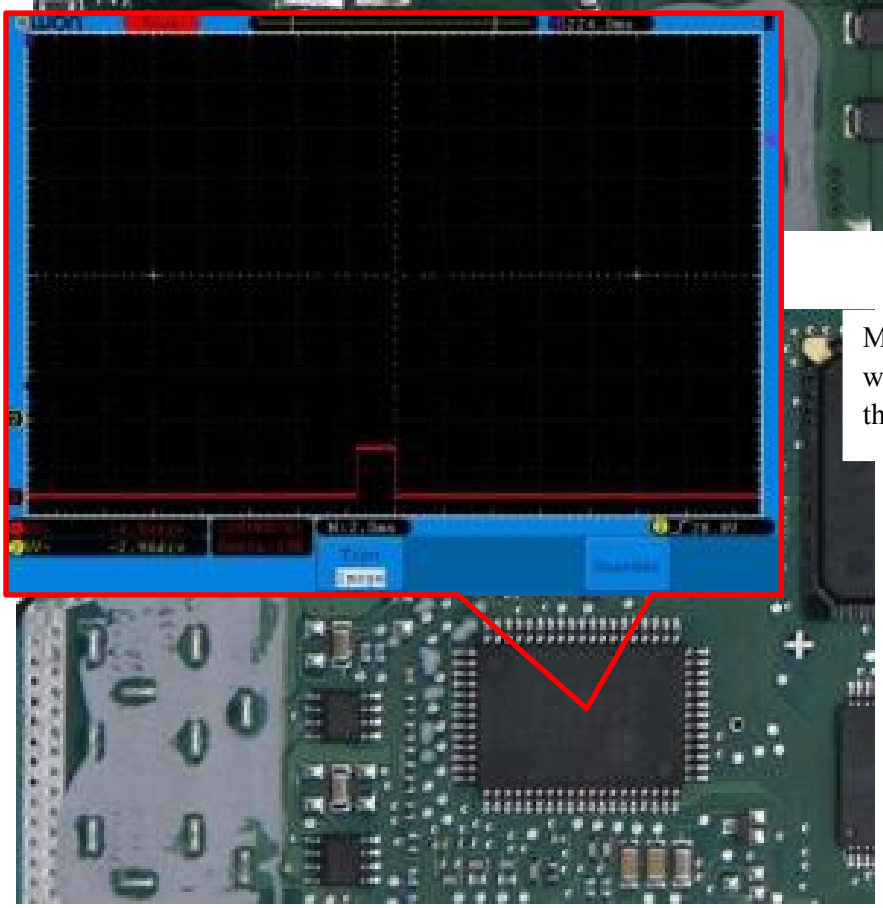


Injector Electrical Signals (CRIN)

Electrical signals from common rail injectors are similar, but of course what can be their amplitudes, everything will depend on the battery circuit mounted on the vehicle, 12 or 24 volts.

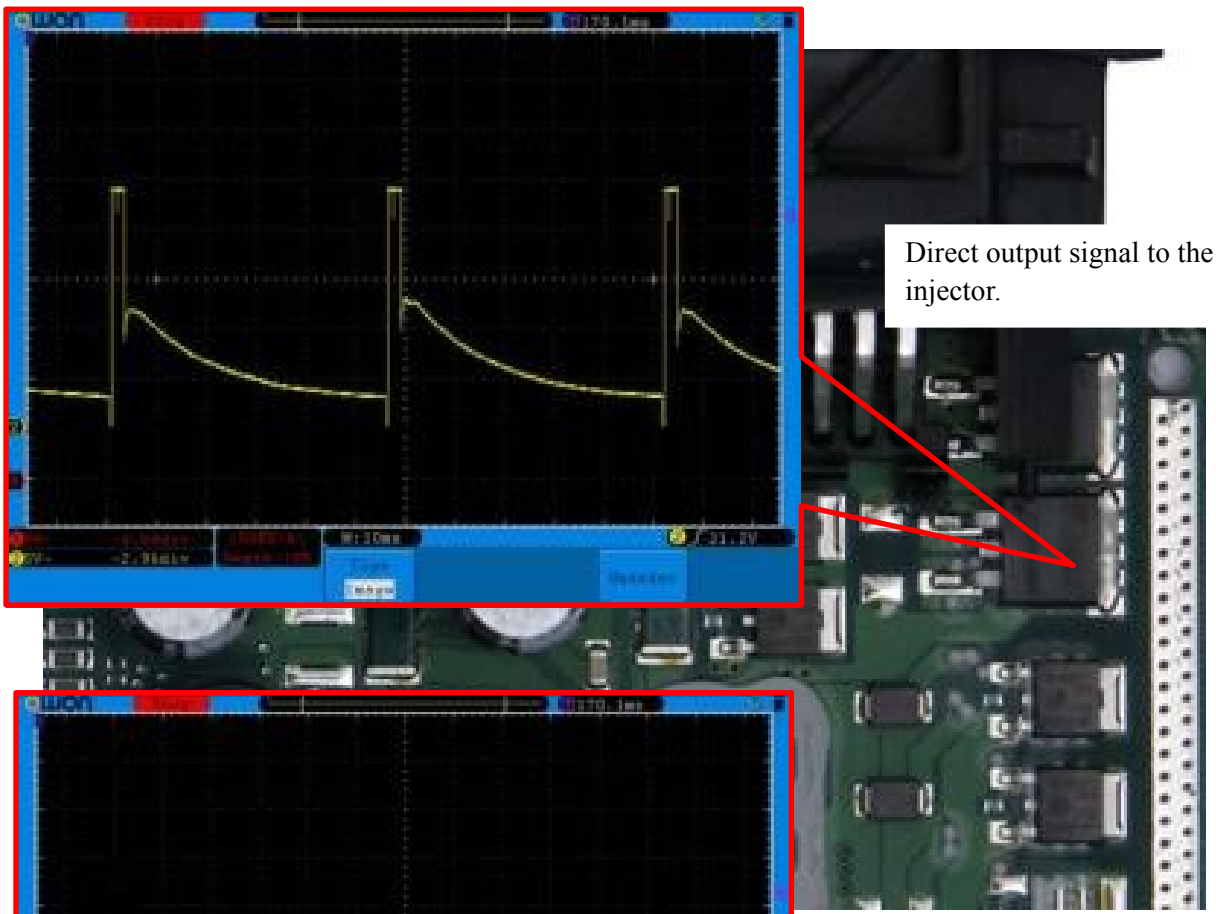


Direct output signal to the engine injector

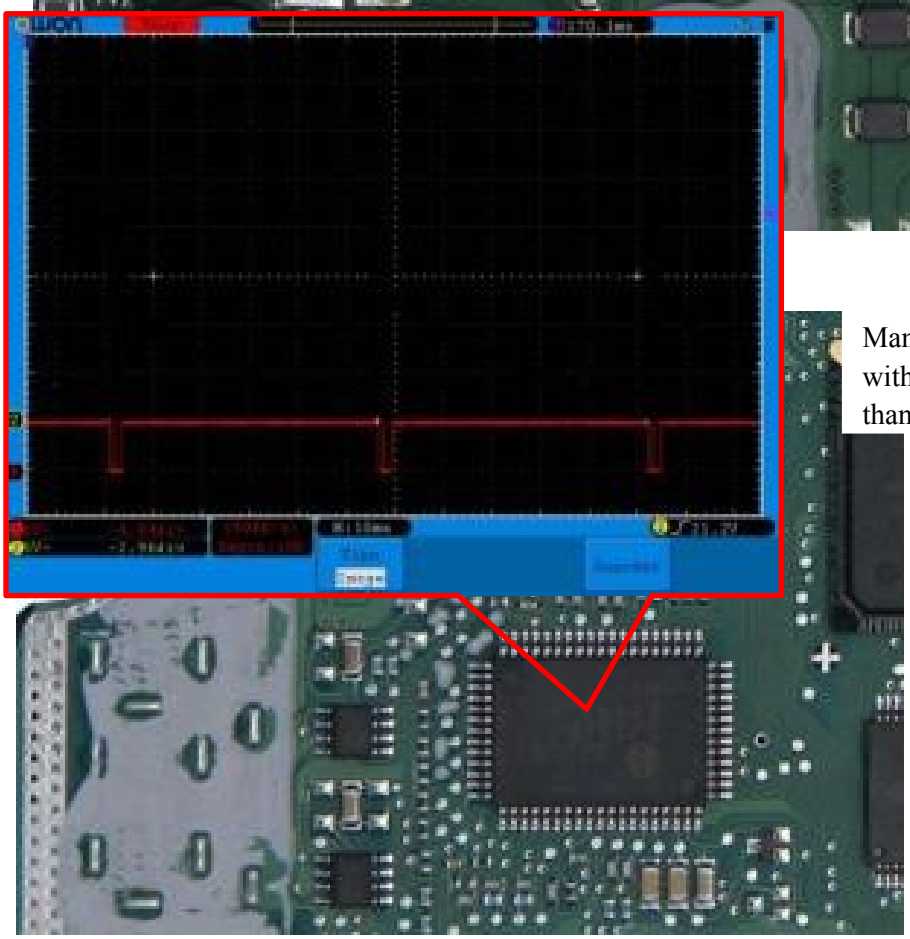


Manager output signal is digital with amplitude equal to or less than 5 volts

Electrical Signals of the Common Injector Circuit



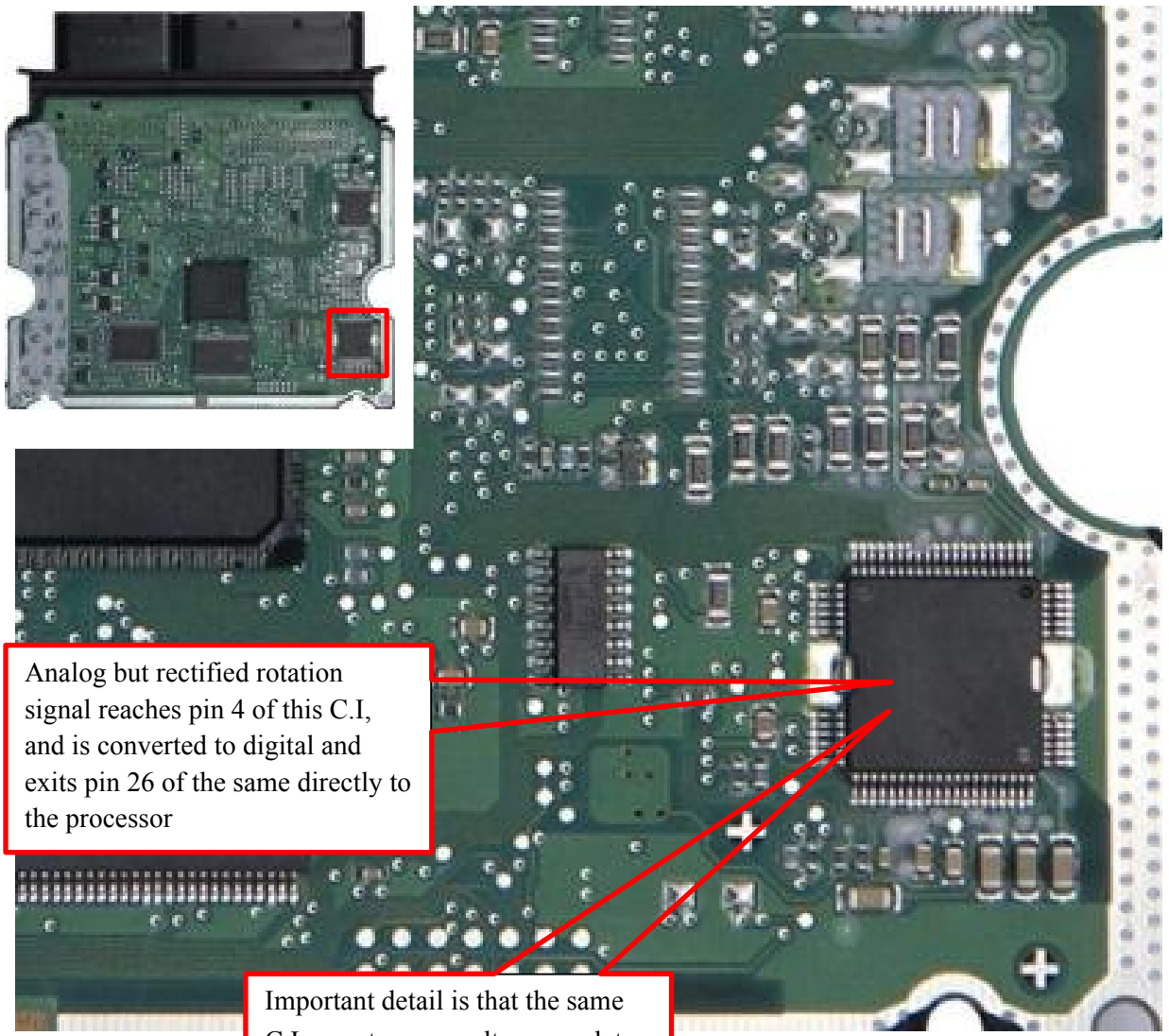
Direct output signal to the engine injector.



Manager output signal is digital with amplitude equal to or less than 5 volts.

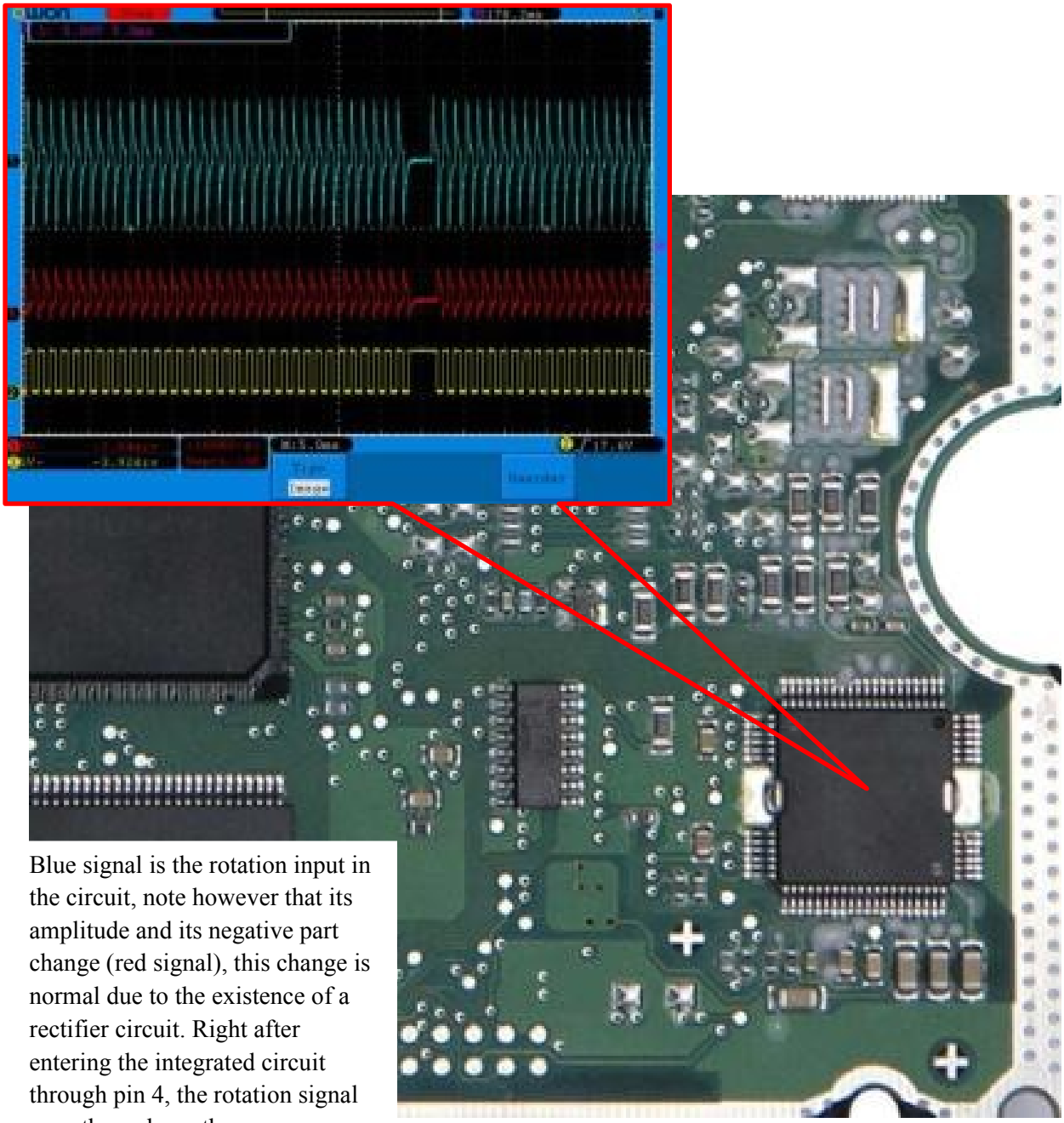
Engine Speed Sensor Circuit

We noticed in this circuit as well as others the presence of resistors and diodes because the characteristic signal of this system is analog and alternating, because of this present in this circuit there is also an integrated circuit with its own functions of a digital analog converter.



Rotation Circuit Electrical Signals

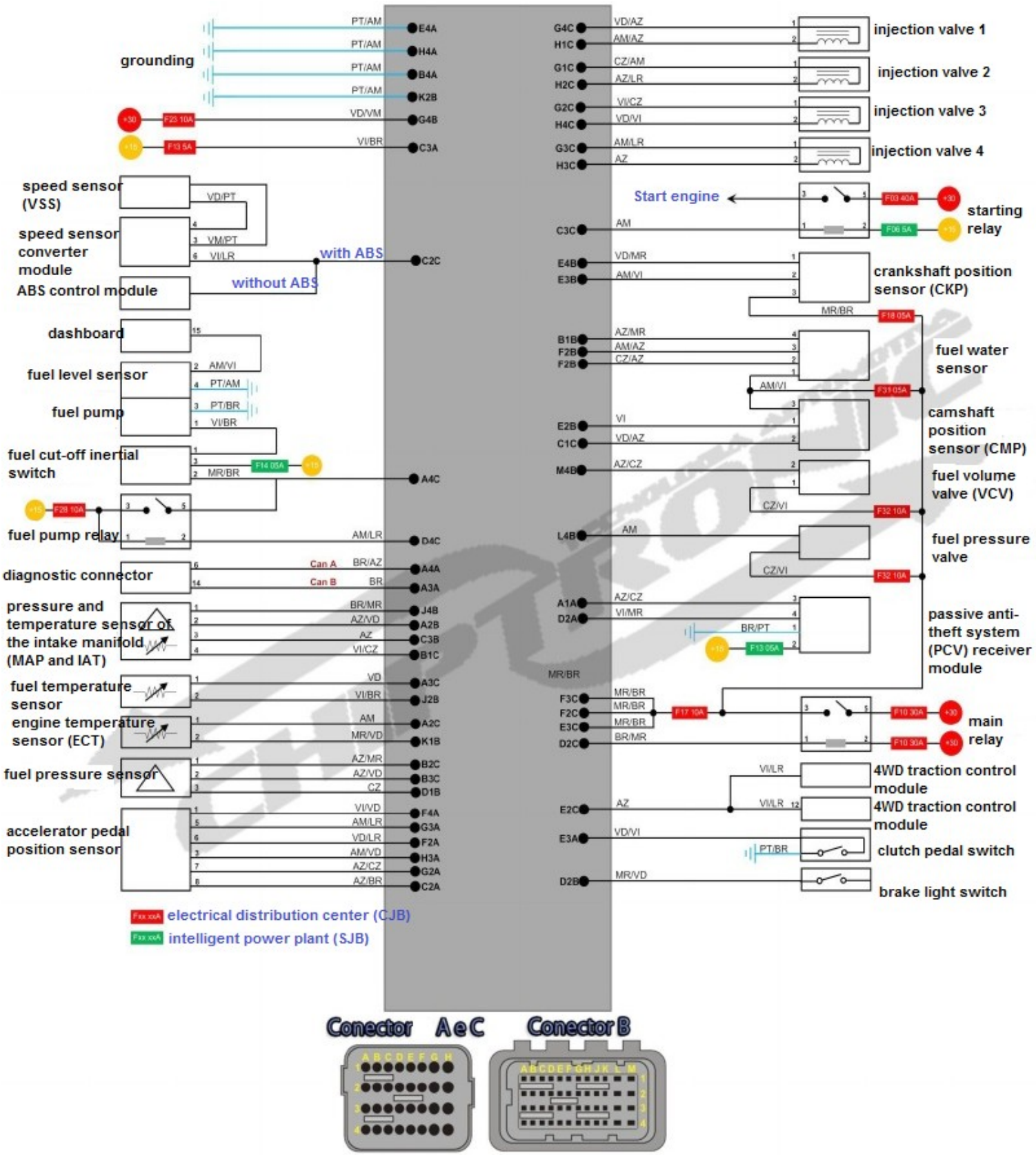
No difference with respect to the EDC 07 system, observe the electrical signals.



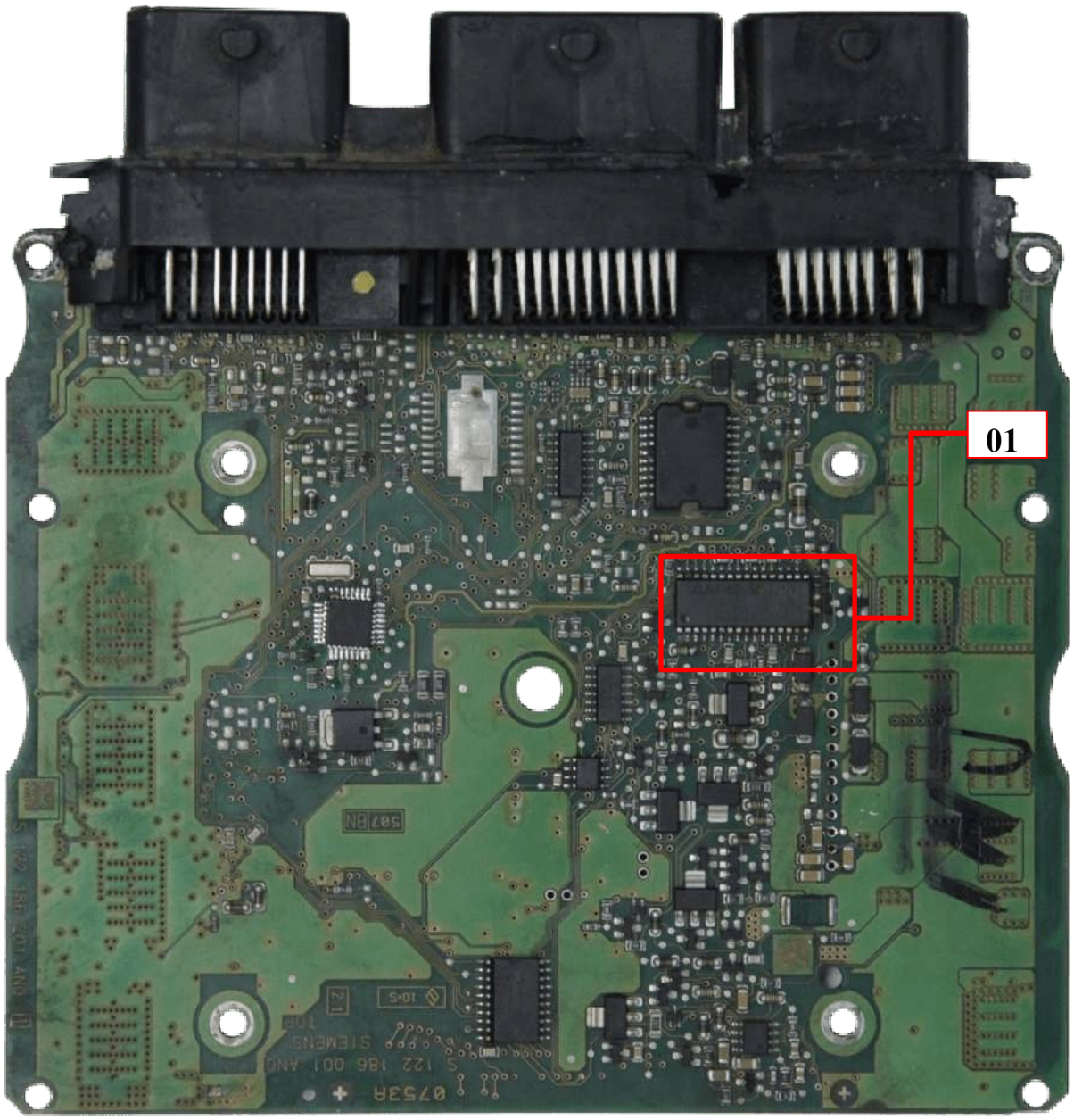
Blue signal is the rotation input in the circuit, note however that its amplitude and its negative part change (red signal), this change is normal due to the existence of a rectifier circuit. Right after entering the integrated circuit through pin 4, the rotation signal goes through another transformation (yellow signal), that digital signal that comes goes directly to the BGA encapsulation processor.

Ford Siemens SID 901 System Common Rail

Ford SID 901 System Common Rail



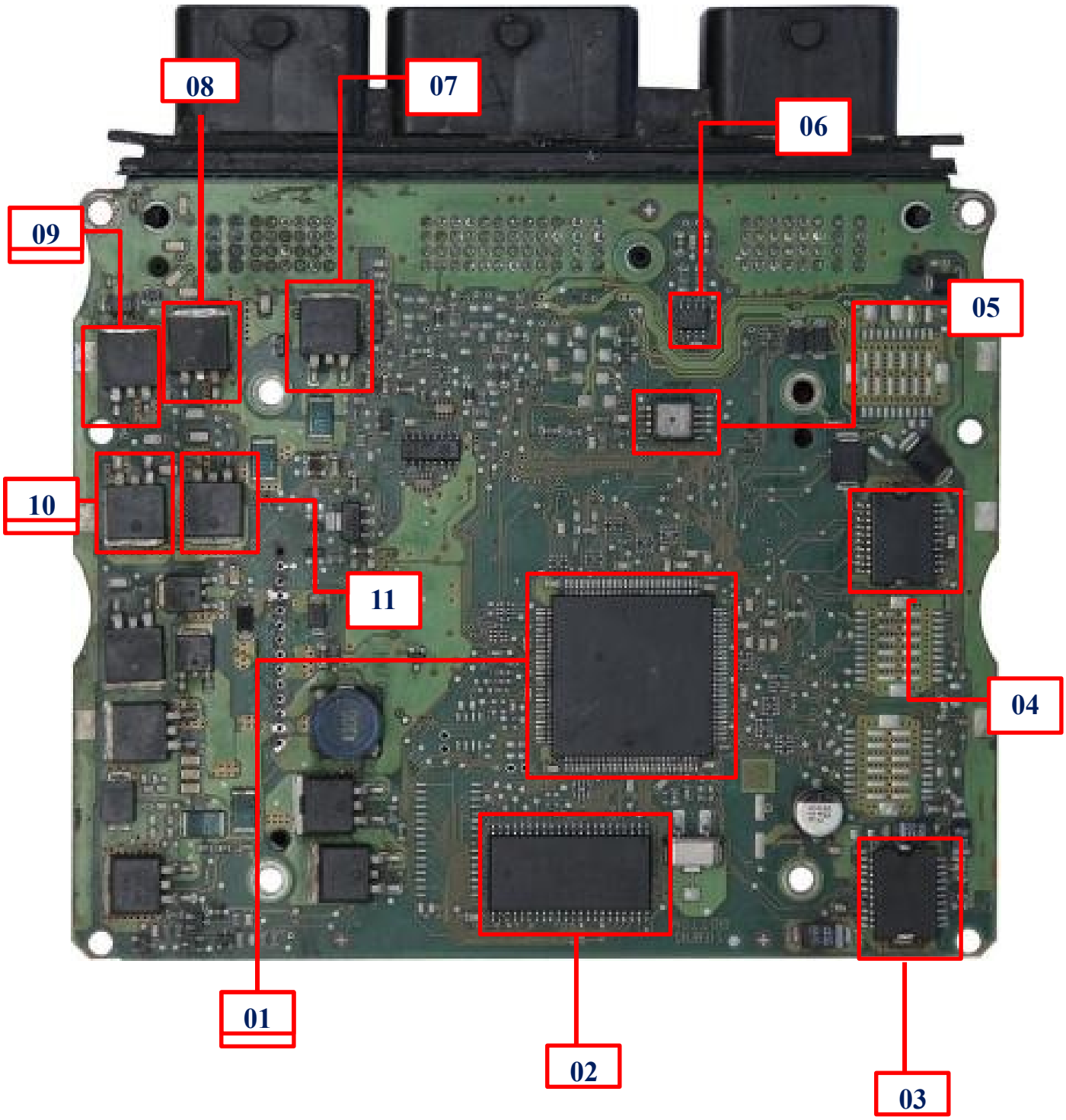
Overview of SID 901 Components (front)



Description and Function of Component SID 901

Component	Component function
1-Integrated Circuit nº 0639NZW	Piezo Injector Manager, see pins: 1-Shot Cylinder Injector 1 2-Shot Cylinder Injector 4 3-Shot Cylinder Injector 3 4-Shot Cylinder Injector 2 9-Common Injection of Injectors 1/2/3/4

Overview of SID 901 Components (back side)



Description and Function of Components SID 901 (back)

Component	Component function
1-Processor No. SAKC167C5	Performs all engine management functions
2-Eprom AM29BL802CB	Contains injection files
3-Integrated Circuit nº A2C3648	Voltage regulator
4-Integrated Circuit nºATM38	Fuel pressure valve and main relay
5-Component No. MPXH6115A	Atmospheric pressure sensor
6-Integrated Circuit nº 62506	Diagnostic connector and communication function
7-Transistor nº N523AL	Common injectors 1/2/3/4
8-Transistor nº N523AL	Individual do Injector 3
9-Transistor nº N523AL	Individual do Injector 1
10-Transistor nº N523AL	Individual do Injector 4
11-Transistor nº N523AL	Individual do Injector 2

BASIC ECU DIAGNOSTIC SCREENPLAY

To make an accurate diagnosis at the Centers as well as in any job, it is important to follow some work routines and execute them to be successful. We will now observe some work routines based on symptoms claimed by customers and what procedure is important to do in order to obtain an eventual repair diagnosis of the ECU.

ECU DON'T WORK

1-Circuit Supply (in. Line +30, +15, +50 and grounding)

2- Voltage Regulator 5 volts

3-Power supply for logic part (processor, memories, C.I) 4-Broken track
5- Oxidized terminal
6- Rotation sensor circuit 7-Grounding
8- Cold weld
9- Corrupt injection file 10-Processor
11-Crystal

ECU DOES NOT PULSE INJECTORS OR OTHER ACTUATORS

1-Actuator trigger driver 2-Broken track

3-Filter capacitor 4-Oxidized terminal

5-Cold welding

SENSOR FAILURE

1-Broken trail

2-Filter capacitor

3-Sensor supply and mass

4-Circuit of the sensor in question (resistors and capacitors)

Acronyms of Embedded Electronics

Initials	Meaning
A/C	Air Condintioning
A/D	Analogic/Digital
ACC	Air Conditioner Clutch
ACT	Air Charge Temperature
AT	Automatic Transmission
BDC	Bottom Dead Center
Bhp	Brake horse-power
BOO	Break On-Off
CAN	Controller Area Network
CAN P	Canister Purge Valvle Evaporative Emission
CID	Cramshaft Identification Sensor
CKP	Crankshaft Positioning
CMP	Crankshaft Positioning
CO	Carbon Monóxide
CO^2	Carbon Dióxide
CPP	Clutch Pedal Positioning
CPS	Crankshaft Positioning Sensor
CPU	Central de Temperature Unit
CTS	Coolant Temperature Sensor
DBW	Drive By Wire
DIS	Distribuitorless Ignition System
DLC	Data Link Conector
DPFE	Diferencial Pressure Feedback
EGR	Duty Cicle
ECM	Eletronic Module Control
ECT	Engine Coolant Temperature Sensor
ECU	Eletronic Central Unit
EECIV	Eletronic Engine Control-Fourth Generation
EEC-V	Eletronic Engine Control –Fifth Generation

Acronyms of Embedded Electronics

Initials	Meaning
IGN	Ignition
IMMO	Immobilizer System
INJ	Injector Fuel
KS	Knock Sensor
LSFC	Low Speed Fan Control
LTFT	LONG TIME FUEL TRIM
MAF	Mass Air Flow
MAP	Manifold Absolute Pressure
MPFI	Multipoint Fuel Injection
NOx	Nitrogen Oxide
NTC	Negative Temperature Coeficient
OCT	Octane Adjust
PAT	Pressure and Air Temperature
PATS	Passive Anti-Thieft System
PCM	Powertrain Control Module
PIP	Profile Ignition Pickup
PWM	Pulse Wave Modulation
PWR	Power Relay
RAM	Random Acess Memory
ROM	Read Only Memory
RSH	Rollen Shepp Hebel
SPOUT	Spark Output Signal
STFT	Short Time Fuel Trim
TDC	Top Dead Center
TFI	Tick Film Ignition Top-Feed
TPS	Throttle Position Sensor
TWC	Three Way Catalytic Converter
VAF	Vane Air Flow
VSS	Vehicle Speed Sensor
WAC	Wide Open Throttle Air Conditioner
WOT	Wide Open Throttle