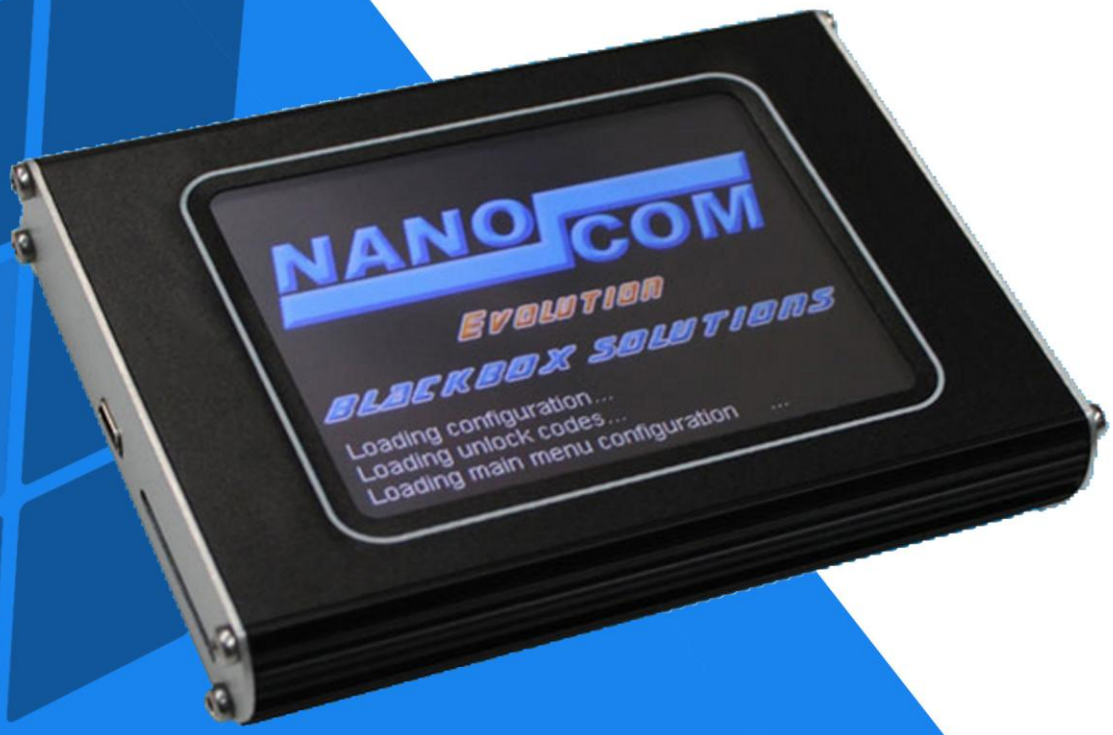
LUCAS

10AS ALARM



BLACKBOX SOLUTIONS

Table of Contents

LUCAS 10AS ALARM- System Overview

This Alarm, which is always housed in a green enclosure, besides performing the usual Alarm functions, also, forms the intelligent immobilization link to a number of different Engine Management systems. It also, performs Central Locking control functions. However, some versions have the required components omitted for this. The degree of adjustability of this alarm is extensive and in some applications such as the TD5 Defenders, the functionality is reduced to little more than an automatic engine mobilizing box. In this instance the purchase of a key fob and activation of the alarm features adds instant alarm capabilities to the vehicle.

Known Fitments

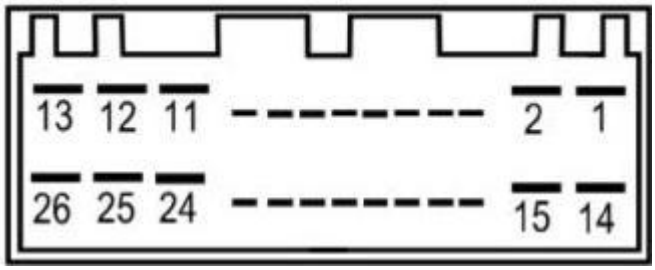
Vehicle make, model and variant known or believed to be using this vehicle system, required diagnostic lead and degree of known compatibility.

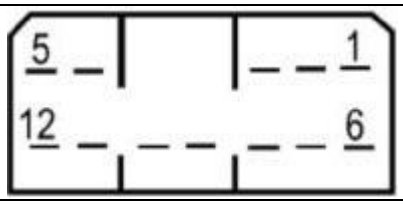
Vehicle Make	Vehicle Model	Vehicle Variant	Diagnostic lead	Compatibility level
Land Rover	Defender TD5	All with 2 button FOB	Blue/Green OBDII lead	Verified
Land Rover	Defender Puma **	All with 2 button FOB **	Blue OBDII lead	Verified

** Note
From Mid 2013 (2014 Model Year, beginning with VIN EA000001) Land Rover replaced the 10AS with an Alarm from a different manufacturer that although is still called the 10AS and is in the same shape Case, but is Black in color and not Diagnostically compatible with the Early Lucas Green 10AS. As such this version is currently not supported.

Pin-Outs

These are the details of the pin usage for the ECU connector(s).

Grey Connector	
1	Interior lights – inputs
2	Not used
3	Volumetric signal - input
4	DDS serial link - output
5	Drivers door – input
6	Passengers still - input
7	Drivers still – input
8	Door key switch - input
9	Bonnet
10	Ignition – input
11	Malfunction indicator lamp - input
12	Ground – input
13	Not used
14	Active low immobiliser - output
15	Active high immobiliser - output
16	Passenger's doors / tailgate - input
17	Serial comms
18	Not used
19	Not used
20	Volumetric power - output
21-23	Not used
24	Serial ground – input
25	Battery voltage – input
26	Aerial – input

Green Connector	
1	Hazard right - output
2	CDL lock - output
3	CDL unlock - output
4	Security LED - output
5	Sounder drive - output
6	Hazards left - output
7	Transponder drive - output
8	Hazard power input
9	EIWL - output
10	Crank output
11	Ground - input
12	Transponder power - output

Diagnostic Capabilities (EVENTS) and Clear Events

This starts the Read of the fault code memory. The ECU can self detect up to 47 different problems with itself, its wiring and its associated sensors, storing the respective code if it detects any malfunction or reading outside of predefined acceptable limits. Not all stored faults may cause the fault warning lamp to illuminate. In the trigger memory (fitted after 1996) are stored the last five events which caused the alarm to trigger allowing sensor faults which cause false triggers to be found.

Diagnostic Capabilities (Settings)

Values, configuration settings, and other stored information which can be read from the ECU, are edited and then rewritten back. Read settings can also be stored as a standard HTML page for future reference. Then, these pages can later be reloaded and rewritten back to the ECU. Please note that some values may be read only due to the fact that they are supplied from the ECU's ROM or are internally calculated. Clicking on the settings link, it will open a page with four choices, Settings Group 1, Settings Group 2, Alarm Coding Data and Write Settings.

SETTINGS GROUP 1

- **Time Error**: Both the alarm and the plip each have a timer in them which stays in synchronization and can be used as part of the correct key verification sequence every time the key is used. However, it is possible for one of the timers to run marginally faster or slower than the other. Setting this value to yes, allows the alarm to accept an error rate of up to 9 seconds in every hour between the two as a pass.
- **Comms**: This setting controls communications activity standby control.
- **Interior Light**: This setting controls the level of operation of the interior light.
- **Welcome light**: This function decides if the interior light will come on automatically when the alarm is disarmed.
- **Arm/disarm flash**: These settings determine if the hazard lights will be used to indicate the arming or disarming of the alarm.
- **Arm disarm confirm**: If the alarm is armed or disarmed twice in succession this setting will determine if the hazard lights are used to confirm the status of the alarm or not.
- **Arm on lock**: This setting configures the alarm to not set whenever the vehicle is locked using the plip or the key. Setting this to DISABLED effectively turns off all alarm protection although it does not affect the immobiliser. This can be disabled using the PLIP IMMOBILISE and KEY IMMOBILISE. Turning off all three literally turns the alarm ECU into a central locking controller only.
- **Resync on arm**: When set to ENABLED the alarm and the key will synchronize to each other whenever the alarm is armed.
- **Relock**: This determines if the automatic arming with central door relocking function is ENABLED or DISABLED.
- **Mislock**: In the event of a mislock, which is usually due to a door being open, the alarm will continue to activate the volumetric sensors if this setting is set to ENABLED, or it will omit them from the vehicle's protection if this setting is set to NO.
- **Mislock noise**: This setting determines if the alarm will issue a mislock noise if a mislock condition is detected.
- **Resync on lock**: When set to ENABLED the alarm and the key will synchronize to each other whenever the vehicle is locked.
- **Plip immobilize**: This setting configures the alarm to not immobilize the vehicle whenever the vehicle is locked using the plip. Setting this to NO effectively turn’s off engine immobilization protection when the plip is used to arm the alarm although it does not affect the immobilization when the key is used or the alarm itself. This can be disabled using the KEY IMMOBILISE and the ALARM ARMING. Turning off all three literally turns the alarm ECU into a central locking controller only.
- **Plip relock**: When set to ENABLED the alarm will relock the CDL after a short time if the ignition has not been turned on after it was unlocked using the plip.
- **Key Mobilize**: This determines if the alarm will mobilize the engine if it has been disarmed by using the key in the lock after it was armed using the remote plip. KEY DISARM would obviously have to be set to ALLOWED preventing the alarm from being triggered.

- **Passive immobilize**: This settings configures the alarm to automatically activate the immobiliser a certain period of time after the key is removed.

SETTINGS GROUP 2

- **Key Disarm**: This determines if the alarm can be disarmed by using the key in the lock after it was armed using the plip. The engine would also mobilize if KEY mobilize was set to ALLOWED.
- **C.D.L. when arm**: This determines if the central door locking will still operate when the alarm is armed.
- **Flash on alarm**: This setting determines if the hazard lights will flash when the alarm has been triggered.
- **Alarm sound**: This setting determines if the horn will sound in a continuous tone or if it will be pulsed when the alarm has been triggered.
- **Time Sync**: Both the alarm and the plip each have a timer in them which stays in synchronization and can be used as part of the correct key verification sequence every time the key is used. Setting this value to No turns off this function.
- **Low battery error**: This configures the alarm to notify the user via the Security LED either on the first receipt of a key code in which the low battery flag is set or to wait until it has received a number of them in succession. The exact number is determined by the value stored in the LOW BAT COUNT box.
- **Battery Error**: When set to ENABLED this configures the alarm to notify the user via the security LED that the plip has a low battery in accordance with the other settings which affect this function's operation. When set to NO the function is totally disabled.
- **Tamper Warn:**
- **Cat Overheat**: The 10AS alarm had a function built into it to monitor temperature sensors on the Catalytic converters. This was no doubt to accommodate markets where it is a legal requirement to have a warning indicator in the event of failure of one of the two catalytic converter heaters. The Dynamic inputs screen shows the values derived from the Analogue to Digital converters which are connected to the two input pins reserved for this feature.
- **MEMS failure indicator**: The MEMS, upon receipt of a valid mobilize code, not only mobilizes the engine but sends back a signal via its MIL circuit which indicates its change from immobilised to mobilized status. This setting instructs the alarm that the MEMS failed to mobilize.
- **Immobiliser**: This option allows the verification and configuration of the 10AS alarm's immobiliser function to suit one of the fitted engine options. It is important to select the correct engine management type to ensure that the engine starts afterwards.
  There are 5 options which the immobiliser type can be set to:

· **SPIDER:** this is used on vehicles which use an engine management which has no immobilizer facility built in. It is basically an add-on style immobilizer box which communicates with the alarm. The engine types that use the Smart Spider are 14CUX and non EGR Diesels. The spider has to learn a fixed code which is sent out from the 10AS alarm unit to mobilize. This feature is not supported on the Nanocom Evolution.

· **EDC:** this is selected to configure the alarms immobiliser for the EDC engine management. The alarm sends a code (the EDC code) to the EDC engine management

control unit. This code can be read from the EDC control unit using the 'READ EDC CODE' function provided in the EDC diagnostic section. This code can then be entered into the EDC code box provided. Failure to enter the correct EDC code number will result in the vehicle not starting unless the EDC ECU is was programmed to non robust.

- **DDS:** is selected to configure the alarm immobiliser for DDS. The alarm communicates with DDS control unit which is attached directly to the fuel pump and causes this to stop the engine from running. If either the alarm or DDS ECU has been replaced, the alarm and DDS have to be synchronized with each other to work correctly.
- **GEMS:** this is selected to configure the alarm for GEMS engine management systems. The alarm communicates with GEMS ECU. Should the alarm or engine ECU be changed or the stored GEMS code, the relevant engine ECU will have to learn the new code by using its learning function.
- **TD5/MEMS:** this is selected to configure the alarms immobiliser for the TD5 or MEMS engine management system. The alarm communicates with the TD5 engine management control unit directly. Should the alarm or engine ECU be changed, the relevant engine ECU will have to learn the new code using its learning function.

- **Vehicle type**: This setting configures the alarm for operation in a Defender or a Discovery.

ALARM CODING DATA

- **Coding Data**: Changing these values can produce unknown alteration in the functionality of the ECU, damage the ECU or even damage your car.
- **Year**: This is the Year of manufacture as printed on a label affixed to the lid.
- **Week**: This is the week of manufacture as printed on a label affixed to the lid.
- **Serial number**: This is the serial number of the alarm as printed on a label affixed to the lid.
- **Plip easy sync**: This is the number of presses of the plip to allow an easy resynchronization.
- **Plip for re-sync**: During a resynchronization of the plips, the plip has to be pressed this number of times.
- **Bad plip allowance**: This is the number of invalid plip codes the alarm will accept before triggering.
- **Plip for low battery**: To rule out spurious errors the alarm must receive more than one consecutive transmission of a plip in which the low battery indication is set. This value is the number of successive transmissions to be received before the alarm activates the low battery indication via the security LED.
- **Plip key code**: The plip code information uniquely identifies each key it is split in 4 parts. It is possible to obtain the number for any given key by learning it to the 10AS alarm and then reading this number from the alarms memory. Once you know what the number is for any given plip you can then simply type in its code into any alarm you wish to react to it.
- **EKA code**: This is a special Emergency Key Access code which can be entered into the alarm using either the door lock or in the case of the Defender the door ajar switch.

Exact details of the procedure can be found in the vehicles handbook.

- **EDC code**: This is the code transmitted by the 10AS alarm unit when EDC is selected as the engine immobiliser option. It is vital to ensure that this code matches that of the EDC ECU. The code can be read from this in the settings function of the EDC section.
- **EGR/DDS code**: This is the code transmitted by the 10AS alarm unit when DDS is selected as the engine immobiliser option. It can have any value between 0 and 65535. Early alarms did not support the DDS immobiliser function and therefore do not have this value.
- **GEMS code**: This is the code transmitted by the 10AS alarm unit when GEMS is selected as the engine immobiliser option. It can have any value between 0 and 65535.
- **TD5/MEMS code**: This is the code transmitted by the 10AS alarm unit when TD5/MEMS are selected as the engine immobiliser option. It can have any value between 0 and 65535.
- **Plip learnt**: Shows which Plip has been learnt
- **Volumetric Sens. G:**
- **CAT Threshold**:

Set Country

This function allows the users to set the vehicle settings to a specific country based on the legislation at the time when the vehicle was manufactured. For example, in some countries it's prohibited to have a horn louder than a given decibels limit so the vehicle needs to be set to that specific country.

The "Set Country" function might cause unwanted effects as other settings may be altered based on the pre-programmed settings contained in the Nanocom memory, like for example, the way the vehicle doors lock and unlock.
It is most recommended not to use this function unless you're replacing the 10AS ECU with a new one and you don't have the previous settings saved.

All the settings contained in the "Set Country" function, can be individually changed and saved from the 10AS "Settings" menu. Making the changes from the "Settings" menu it's also useful because in the case that you're unhappy with the changed setting this can be quickly reverted to the previous state. It is most recommended to save the vehicle initial settings as a backup in case that something unexpected may happen. If the vehicle is in perfect working condition and you're happy with the settings, then don't set the country.

Diagnostic Capabilities (Inputs)

Real time live display of the information the electronic control unit of the selected vehicle system is currently deriving from its input sensors.

- **Driver's sill**: Gives the current status of the drivers door sill switch input. These inputs to the alarm on pin 7 of connector C225 (series I discovery).
- **Passenger's sill**: Gives the current status of the passenger doors sill switch input. This inputs to the alarm on pin 6 of connector C225 (series I discovery). This pin might not be connected.
- **Driver's door:** Gives the current status of the front right hand door ajar switch. This inputs to the alarm on pin 5 of connector C225 (series I discovery).
- **Passenger's door**: Gives the current status of any secondary door's door ajar switch. This inputs to the alarm on pin 16 of connector C225 (series I discovery).
- **Door key**: Gives the current status of the door key switch. This inputs to the alarm on pin 8 of connector C225 (series I discovery).
- **Ignition stage II**: Gives the current status of ignition input to the alarm. This inputs to the alarm on pin 10 of connector C225 (series I discovery).
- **Bonnet**: Gives the current status of the bonnets open / closed switch. This inputs to the alarm on pin 9 of connector C225 (series I discovery).
- **Factory mode**: If the alarm is new it will be delivered in a special factory mode. This shows the 10AS alarm's status in respect of this mode.
- **TD5 learnt**: This shows if the 10AS alarm has learnt a valid TD5 mobilization code.
- **Mil light**: Gives the current status of the MIL input. This inputs to the alarm on pin 11 of connector C225 (series I discovery) (GEMS only).
- **Mil status**: Gives the current status of the MIL function which is only used when the 10AS alarm is configured for GEMS.
- **Spider 1**: The Spider immobilization unit has three relays which are used to disable the fuel pump, the starter motor and the coil. It can inform the 10AS alarm the current status of the relay contacts. This shows the status of the fuel pump circuit.
- **Spider 2**: The Spider immobilization unit has three relays which are used to the fuel pump, the starter motor and the coil. It can inform the 10AS alarm the current status the relay contacts. This shows the status of the starter circuit. This relay will be closed only during cranking.
- **Spider 3**: The Spider immobilization unit has three relays which are used to the fuel pump, the starter motor and the coil. It can inform the 10AS alarm the current status the relay contacts. This shows the status of the coil circuit.
- **Crank Output**: The 10AS alarm has six 8 bit Analogue to Digital (ADC) inputs. These convert a varying voltage fed into the alarm into a number ranging between 0 and 255. The higher the voltage the higher the number. By this method the alarm can read a sensor which works by having a varying resistance which changes due to some stimulus such as temperature or pressure. This is the value for the crank sense Field effect Transistor sensing input.

- **Interior light**: The 10AS alarm has six 8 bit Analogue to Digital (ADC) inputs. These convert a varying voltage fed into the alarm into a number ranging between 0 and 255. The higher the voltage then, the higher the number. By this method the alarm can read a sensor which works by having a varying resistance which changes due to some stimulus such as temperature or pressure. This is the value for the Interior lights Field Effect Transistor input.
- **Plip 1**: Gives the current rolling count of the number of valid receptions of a transmitted plip code matching that the 10AS alarm ECU has stored in position 1. The count will roll over at 255.
- **Plip 2**: Gives the current rolling count of the number of valid receptions of a transmitted plip code matching that the 10AS alarm ECU has stored in position 2. The count will roll over at 255.
- **Plip 3**: Gives the current rolling count of the number of valid receptions of a transmitted plip code matching that the 10AS alarm ECU has stored in position 3. The count will roll over at 255.
- **Plip 4**: Gives the current rolling count of the number of valid receptions of a transmitted plip code matching that the 10AS alarm ECU has stored in position 4. The count will roll over at 255.
- **Volumetric sensor 1**: The 10AS alarm has six 8 bit Analogue to Digital (ADC) inputs. These convert a varying voltage fed into the alarm into a number ranging between 0 and 255. The higher the voltage is the higher the number is. By this method the alarm can read a sensor which works by having a varying resistance which changes due to some stimulus such as temperature or pressure. This is the value for the sense 1 input.
- **Volumetric sensor 2**: The 10AS alarm has six 8 bit Analogue to Digital (ADC) inputs. These convert a varying voltage fed into the alarm into a number ranging between 0 and 255. The higher the voltage, the higher the number. By this method the alarm can read a sensor which works by having a varying resistance which changes due to some stimulus such as temperature or pressure. This is the value for the sense 2 input.
- **Catalyst Input 1**: The 10AS alarm has six 8 bit Analogue to Digital (ADC) inputs. These convert a varying voltage fed into the alarm into a number ranging between 0 and 255. The higher the voltage is, the higher the number is. By this method the alarm can read a sensor which works by having a varying resistance which changes due to some stimulus such as temperature or pressure. This is the value for the catalytic converter temperature sensor 1 input.
- **Catalyst Input 2**: The 10AS alarm has six 8 bit Analogue to Digital (ADC) inputs. These convert a varying voltage fed into the alarm into a number ranging between 0 and 255. The higher the voltage, the higher the number. By this method the alarm can read a sensor which works by having a varying resistance which changes due to some stimulus such as temperature or pressure. This is the value for the catalytic converter temperature sensor 2 inputs.

Diagnostic Capabilities (Outputs)

This gives a choice of outputs that can be tested. Click on the ON link to start the test and on OFF to end.

- **Lock Door**
- **Unlock Door**
- **Sounder**
- **Alarm LED**
- **Immobilizer light**
- **Hazard light**
- **Interior light**

Diagnostic Capabilities - UTILITY

- **PLIP learn**: This puts the alarm unit into plip (remote control key fob) programming mode. Any plip (within range) which is pressed repeatedly until the hazards flash is then accepted as an authorized one. Up to 4 may be programmed one after the other whilst in learn mode. This can be done with the ignition off.
- **RF Test**: This allows the checking of the functionality of any plip as it forces the alarm to accept any received plip code as valid.
- **Set default data**: This function also sets the alarm back into factory mode.
- **Clear factory mode**: This function clears a new alarm's factory mode status.
- **Set to immobilize**: This puts the engine immobiliser in the immobilised state and is useful for testing that the immobiliser is working properly. Remobilize in the usual way using the EKA code, plip or key.

Glossary

Diagnostic Lead	This is a general term for the cable used for connecting diagnostic equipment to the Vehicle / ECU / Communication Bus
ECU	ECU (Electronic Control Unit is a general acronym term used for any embedded control unit / vehicle system that controls one or more of the electrical system or subsystems in a vehicle.
Faults	When an ECU senses a problem or malfunction, it triggers the storage of a specific fault code. ECU fault codes, are also known as diagnostic trouble codes (DTC).
OBDII Socket	OBD or OBDII stands for On-Board Diagnostics. The OBDII socket is a socket located in a vehicle where diagnostic equipment can be connected.
SD Card	A standard type of memory card typically used in digital cameras and many other portable devices.
Members Restricted Area	An on line area of the Nanocom-Diagnostics.com web site that is specificly accessible only to Blackbox Solutions Nanocom customers in which they can find information, Unlock Codes for their nanocoms and available downloads.
Firmware	Firmware is a term used to describe software or Code that is embedded in a piece of hardware.
OBD	On-board diagnostics (OBD) is a generalized automotive term referring to a vehicle's self-diagnostic, fault detecting / storing and information reporting capability.
Unlock Codes	Codes supplied by Blackbox Solutions making the user able connecting his device and communicate with specific vehicle model.
VIN number	The car's vehicle identification number (VIN) is the identifying code for a SPECIFIC vehicle. The VIN serves as the car's unique Identifying Number, as no two vehicles in operation have the same VIN. A VIN can also contain information about vehicles unique features, specifications and manufacturer. The VIN can be used by manufacturers etc to track recalls, registrations, warranty claims, thefts and insurance coverage.
ECU MAP	Most vehicles contain an ECU that controls how the engine works. These ECU's contain a set of data commonly referred to as a MAP that controls the fuelling and other aspects to accommodate the manufacturers supplying vehicles worldwide and having to take into account different climates, laws & restrictions and varying quality of fuels.