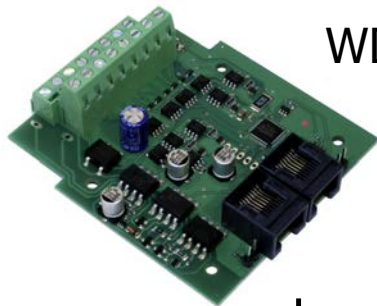


Manual
4-fold Turnout Decoders



WD-34.BiDiB

Item no.
46-12356 | 46-12357



WD-34.M.BiDiB

Item no.
46-12366 | 43-12367

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Subject to technical modification.

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1. Getting started

Notes on BiDiB®

The BiDiB devices described in this manual comply with the standards of the BiDiB specification (status V0.7). The BiDiB specification has been published on: www.bidib.org.

BiDiB® is a registered trademark. Copyrights and trademarks to BiDiB are held by Wolfgang Kufer, OpenDCC.de.

In order to increase the readability of this text, we have refrained from referring to it whenever the term BiDiB is used.

How to use this manual

This manual gives step-by-step instructions for safe and correct connecting of the decoder, and operation. Before you start, we advise you to read the whole manual, particularly the chapter on safety instructions and the checklist for trouble shooting. You will then know where to take care and how to prevent mistakes which take a lot of effort to correct.

Keep this manual safely so that you can solve problems in the future. If you pass the decoder on to another person, please pass on the manual with it.

Intended use

The turnout decoders WD-34.BiDiB and WD-34.M.BiDiB are designed to be operated according to the instructions in this manual in BiDiB-controlled model railway layouts. Any other use is inappropriate and invalidates any guarantees.

The turnout decoders should not be mounted by children under the age of 14.

Reading, understanding and following the instructions in this manual are mandatory for the user.

Package contents

- one solenoid decoder, depending on the model
ready-built module, item number 46-12356 or 46-12366 or
ready-built module in a housing, item number 46-12357
or 46-12368
- an Ethernet patch cable with RJ-45 connectors (length: 0.5 m)
- two short-circuit jumpers
- a CD (containing the manual and further information)

Required materials

In order to connect the module you need wire. Recommended cross-sections: $\geq 0,25 \text{ mm}^2$ for all connections.

WD-34.BiDiB only: When using motor-run turnouts, you need an additional adapter AMW-1 or AMW plus for each turnout (item-no. 72-00076 or 72-00176).

2. Safety instructions



Caution:

The decoder contains integrated circuits. These are very sensitive to static electricity. Do not touch components without first discharging yourself. Touching a radiator or other grounded metal part will discharge you.

Mechanical hazards

Cut wires can have sharp ends and can cause serious injuries. Watch out for sharp edges when you pick up the PCB.

Visibly damaged parts can cause unpredictable danger. Do not use damaged parts: recycle and replace them with new ones.

Electrical hazards

- Touching powered, live components,
 - touching conducting components which are live due to malfunction,
 - short circuits and connecting the circuit to another voltage than specified,
 - impermissibly high humidity and condensation build up
- can cause serious injury due to electrical shock. Take the following precautions to prevent this danger:
- Never perform wiring on a powered module.
 - Assembling and mounting the kit should only be done in closed, clean, dry rooms. Beware of humidity.
 - Only use low power for this module as described in this manual and only use certified transformers.
 - Connect transformers and soldering irons only in approved mains sockets installed by an authorised electrician.
 - Observe cable diameter requirements.

- After condensation build up, allow a minimum of 2 hours for dispersion.
- Use only original spare parts if you have to repair the kit or the ready-built module.

Other dangers

Children can cause any of the accidents mentioned above because they are inattentive and not responsible enough. Children under the age of 14 should not be allowed to mount this module.

In schools, training centres, clubs and workshops, assembly must be supervised by qualified personnel.

In industrial institutions, health and safety regulations applying to electronic work must be adhered to.

3. Operation overview

In terms of the BiDiB specification the decoder WD-34.(M.)BiDiB is a node operated on an interface. It complies with the requirements for the class "Accessory Control" defined in the BiDiB-specification.

Note: The WD-34.BiDiB **cannot** be controlled by digital control units sending digital accessory decoder commands to the accessory decoders (e.g. in Motorola or DCC format).

3.1. Controlling accessories

The decoders WD-34.BiDiB and WD-34.M.BiDiB are designed to control accessories, activated by a short switching impulse. Since the switching time can be set as required, both accessories with as without tape shut-off can be connected. Examples of use:

		WD-34.BiDiB	WD-34.M.BiDiB
Solenoid accessories	Coil driven turnouts	X	X
	Semaphore signals with twin coil drive	X	X
	Decouplers	X	X
Motor driven turnouts		AMW-1 required	X

With one turnout decoder you can control a maximum of:

- four turnouts or semaphores with twin coil drive or
- eight other solenoid accessories or
- four motor driven points.

It is possible to connect different types of accessories to the four pairs of outputs.

3.2. Features according to the BiDiB-specification

The BiDiB-specification provides characteristics for the class "Accessory Control" which all nodes of this class have to comply with ("obligatory features"). They mainly refer to the transmission of commands and sending of confirmations.

According to the BiDiB specification the points decoder WD-34.BiDiB confirms the reception of an operation command by reporting the approximate operation time to the PC, and sends a status signal after having finished the operation. In case problems occur during the operation (e.g. short circuit) the decoder automatically sends an error message.

In addition to the obligatory features the points decoder WD-34.BiDiB has the following optional features:

Monitoring and spontaneous message (WD-34.BiDiB only)

In combination with points with limit stop the points decoder WD-34.BiDiB can identify and report the actual position of points. In case the points are set by hand or mechanical problems occur during operation, the decoder sends an automatic message to the PC.

With the decoder WD-34.BiDiB, in state of delivery monitoring and reporting of the actual position of points is activated (for use with points with limit stop).

Short-circuit protection

In case a short-circuit occurs while switching a connected accessory, the decoder stops the switching operation and the WD-34.(M.)BiDiB sends a spontaneous notification to the PC.

User configuration

The on-time can be set to a time between 100 msec and 127 sec individually for each of the 4 points (each pair of outputs). In state of delivery the time is set to 300 msec.

After the set on-time has elapsed the decoder WD-34.BiDiB compares the actual position of points with limit stop with the position they should have according to the operation command.

Firmware update

It is possible to update the firmware of the WD-34.(M.)BiDiB.

3.3. Use in BiDiBus

In terms of the BiDiB specification the decoder WD-34.(M.)BiDiB is a node to be operated together with up to 31 other nodes on one level. Depending on the structure of the system the nodes of one level are connected to

- an interface providing the connection to the PC
- a hub allowing to extend the structure by an additional level

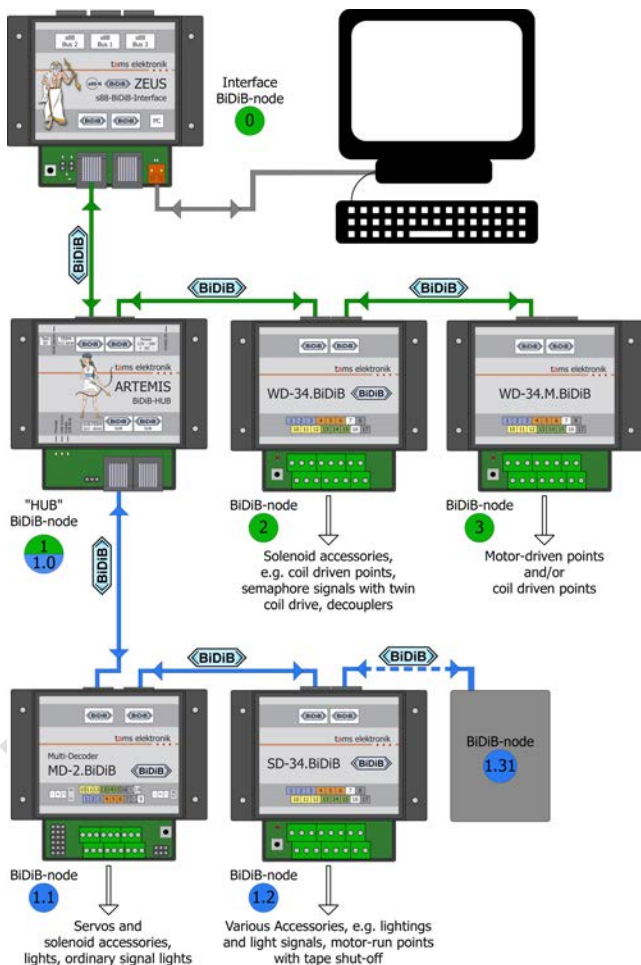
Example for a BiDiB controlled layout part

The interface (ZEUS) provides the connection between PC control and the nodes on the different levels of the system. The example shows different turnout decoders in the highest level switching for example coil driven points (WD-34.BiDiB) and motor-driven points (WD-34.M.BiDiB).

The hub (ARTEMIS) provides an additional level with a maximum of 32 nodes. The example shows a servo decoder (MD-2.BiDiB) and a switching decoder (SD-34.BiDiB) in this level.

The operation commands for the accessory decoders and the reporting messages of the accessory decoders are transmitted via the BiDiBus line.

Compared to conventional digital control systems there is no need for a digital control unit including boosters for this BiDiB controlled layout part.



3.4. Wiring

According to the BiDiBus specification patch cables with RJ 45 connectors (Cat5 cables) are used as bus lines for the points decoder WD-34.(M.)BiDiB. These cables allow simple and quick handling and provide safe connections to the interface and other nodes. Plugging in and out the cables during operation is permitted (hotplug).

3.5. Assignment in the BiDiBus system (addressing)

According to the BiDiB-specification the assignment of the decoder WD-34.(M.)BiDiB in the BiDiBus system is made automatically. As a basis for the automatic assignment, the turnout decoder has a unique number (unique ID) programmed by the manufacturer. When switching on the BiDiB system, the interface scans the present nodes within its structure, and makes a list with the available nodes, their unique IDs and a local address valid for this session only.

With a new node connected to the bus, the list of the present nodes is upgraded automatically, and the interface sends a corresponding message to the PC. By means of the control software the decoder is assigned to the points and configured.

The turnout decoder WD-34.(M.)BiDiB has a so-called "identify button" according to the BiDiB specification. After pushing the button on the PCB the decoder is highlighted in the screen display and the LED on the decoder flashes.

4. Technical specifications

Features according to the BiDiB-specification	Node, class "Accessory Control" Optional Features: <ul style="list-style-type: none"> ▪ adjustable on-time: 100 msec - 127 sec. ▪ Firmware update
Additional optional features of the WD-34.BiDiB (not with WD-34.M.BiDiB)	<ul style="list-style-type: none"> ▪ monitoring of the actual position of points (with points with limit stop) ▪ spontaneous message if the position of points is different
Status of the BiDiB specification	V0.7
Supply voltage	12 – 18 V a.c. voltage or 14 – 24 V d.c. voltage
Current consumption (without connected devices)	approx. 60 mA
Number of outputs	8
Max. total current	3.000 mA
Max. current per output	up to 2 seconds: 1.500 mA persistent: 800 mA
Protected to	IP 00
Ambient temperature in use	0 ... +60 °C
Ambient temperature in storage	-10 ... +80 °C
Comparative humidity allowed	max. 85 %

Dimensions of the PCB / including housing	approx. 72 x 82 mm / approx. 100 x 90 x 35 mm
Weight of the assembled board / including housing	WD-34.BiDiB: approx. 45 g / 93 g
	WD-34.M.BiDiB: approx. 49 g / 97 g

5. Connecting the decoder

On one side, the decoder has terminal strips inserted to plug in and screw on the connecting wires for turnouts and/or solenoid accessories and the power supply. On the other side the decoder has two RJ 45 connection sockets for the connection to the BiDiBus.

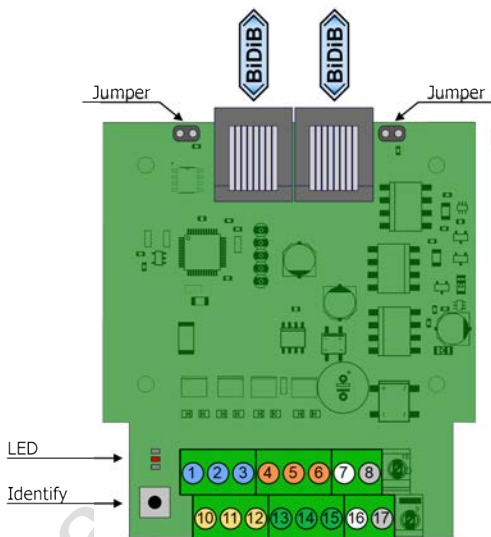
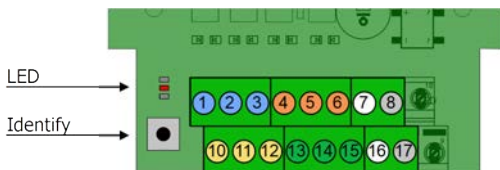


Figure:
WD-34.BiDiB

Make the connections one after the other:

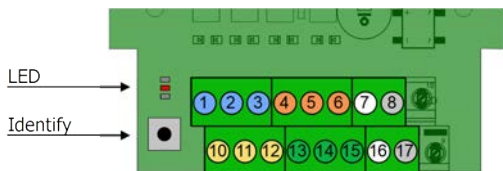
- the turnouts and/or solenoid accessories
- the interface and/or other nodes on the same level
- the power supply

5.1. Pin connections WD-34.BiDiB

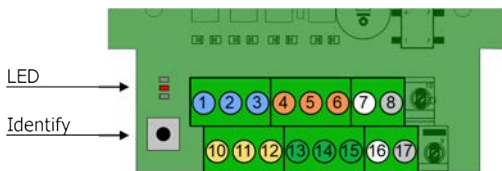


Turnout decoder WD-34.BiDiB	
1	Solenoid accessory / turnout 1 "diverging"
2	Solenoid accessory / turnout 1 return conductor
3	Solenoid accessory / turnout 1 "straight "
4	Solenoid accessory / turnout 3 "diverging"
5	Solenoid accessory / turnout 3 return conductor
6	Solenoid accessory / turnout 3 "straight "
7	not in use
8	Power supply (12–18 V ~ or 14–24 V =)
9	not in use
10	Solenoid accessory / turnout 2 "diverging"
11	Solenoid accessory / turnout 2 return conductor
12	Solenoid accessory / turnout 2 "straight "
13	Solenoid accessory / turnout 4 "diverging"
14	Solenoid accessory / turnout 4 return conductor
15	Solenoid accessory / turnout 4 "straight "
16	not in use
17	Power supply (12–18 V ~ or 14–24 V =)
18	not in use
RJ45	BiDiBus (connected in parallel)

5.2. Pin connections WD-34.M.BiDiB



Turnout decoder WD-34.M.BiDiB		
	Motor-run turnouts	Solenoid accessories
1	Motor-run turnout 1 connection 1	Solenoid accessory / turnout 1 "diverging"
2	not in use	Solenoid accessory / turnout 1 return conductor
3	Motor-run turnout 1 connection 2	Solenoid accessory / turnout 1 "straight"
4	Motor-run turnout 3 connection 1	Solenoid accessory / turnout 3 "diverging"
5	not in use	Solenoid accessory / turnout 3 return conductor
6	Motor-run turnout 3 connection 2	Solenoid accessory / turnout 3 "straight"
7	not in use	
8	Power supply (12–18 V ~ or 14–24 V =)	
9	Input DCC signal / central unit	

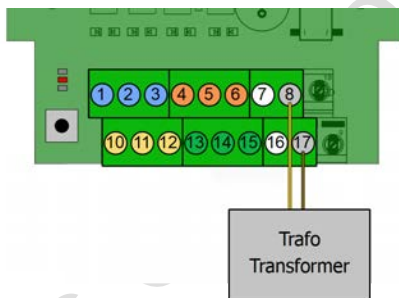


Turnout decoder WD-34.M.BiDiB		
	Motor-run turnouts	Solenoid accessories
10	Motor-run turnout 2 connection 1	Solenoid accessory / turnout 2 "diverging"
11	not in use	Solenoid accessory / turnout 2 return conductor
12	Motor-run turnout 2 connection 2	Solenoid accessory / turnout 2 "straight"
13	Motor-run turnout 4 connection 1	Solenoid accessory / turnout 4 "diverging"
14	not in use	Solenoid accessory / turnout 4 return conductor
15	Motor-run turnout 4 connection 2	Solenoid accessory / turnout 4 "straight"
16	not in use	
17	Power supply (12–18 V ~ or 14–24 V =)	
18	not in use	
RJ45	BiDiBus (connected in parallel)	

5.3. Power supply

As a power supply for the decoder and the connected solenoid accessories and/or turnouts you need an AC voltage transformer (12–18 V ~) or a DC voltage power pack (14–24 V =).

Caution: You can use one transformer or powerpack to supply several BiDiB nodes. But, do **not** connect digital devices integrated in a conventional digital control system (with digital control unit) to the power supply used to supply BiDiB nodes.



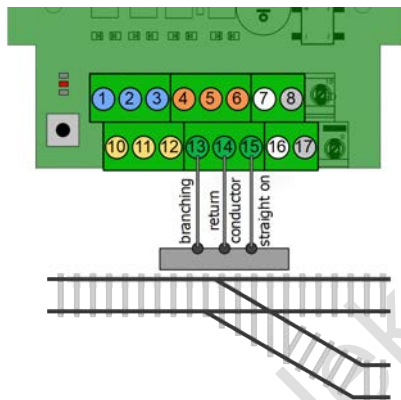
When connecting a node to the power supply the polarity is of no importance. In case several similarly designed decoders (e.g. WD-34.(M.)BiDiB, SD-34.BiDiB or MD-2.BiDiB) are connected to the same power supply, the assignment of ground / plus of the transformer or plus / minus of the power pack should be the same with all decoders.

Caution: Switch off the power supply when connecting the decoder.

Caution: If a component gets too hot, disconnect the decoder and the power supply from the mains **immediately**. Possible short circuit! Check the assembly!

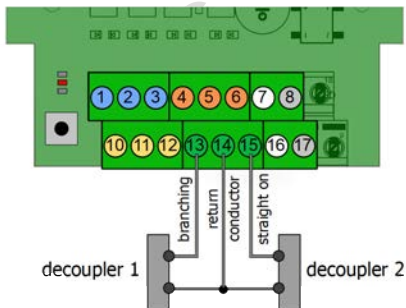
5.4. Connection examples

Connecting coil driven turnouts



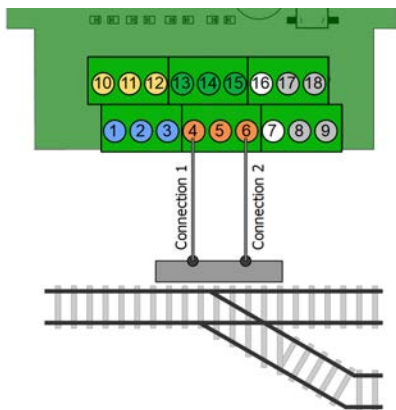
Connection of points to terminals 13 to 15 ("points 4")

Connecting decouplers



Connection of two decouplers to terminals 13 to 15

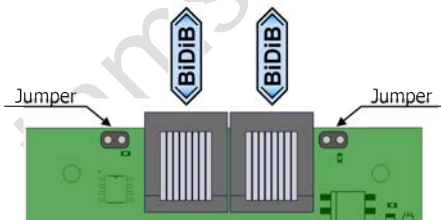
Connecting motor driven turnouts to WD-34.M.BiDiB



Connection of turnouts to terminals 4 and 6 ("turnout 4")

5.5. Connection to the BiDiBus

The two RJ 45 connection sockets are connected in parallel and thus can be used optionally for the connection of the decoder to the BiDiB interface and/ or other BiDiB nodes on the same level.



In case the WD-34.(M.)BiDiB is the last node in a level, you have to bypass the two-2-pole socket pins beside the RJ 45 connection sockets.

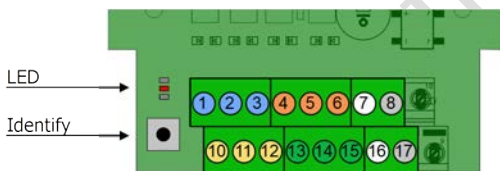
The easiest way is to insert the jumpers included in the scope of supply.

6. Settings

When switching on the BiDiB system all nodes are identified automatically by the interface. As far as supported by the control software, all new nodes that have not been configured, are displayed when switching on and can be configured immediately afterwards.

6.1. Identify button

In order to identify a WD-34.(M.)BiDiB in the screen display of the control software, you have to push the identify button on the PCB. Then, the assigned BiDiB node is highlighted in the screen display, and the LED on the decoder flashes.



6.2. Firmware update and configuration

By means of the applications BiDiB-Wizard and BiDiB-Monitor (both available as free downloads), you can perform a firmware update and configure the decoder. Please check the description to determine whether a particular program provides these possibilities as well.

Firmware update

The current firmware is available as a free download under:
<http://tams-online.de/download/firmware>

WD-34.BiDiB only: Identifying and reporting of the actual position of points

The configuration is valid for all points connected to the WD-34.BiDiB. In state of the delivery the function is switched on (for use with points with limit stop). If points without limit stop are connected, the function has to be switched off.

On-Time

The settings are made individually for each of the 4 points (each pair of outputs). The on-time can be set to a time between 100 msec and 127 sec individually for each of the 4 points (each pair of outputs). Value in state of the delivery: 300 msec.

7. Check list for troubleshooting

- Parts are getting too hot and/or start to smoke.



Disconnect the system from the mains immediately!

Possible cause: One or several connections are faulty. → Check the connections. If the in- or outputs of the decoder have been connected to live cables the decoder usually is damaged beyond repair.

- The decoder is not displayed by the control software (the node has not been identified).

Possible cause: The patch cable(s) is/are incorrectly inserted into the connection sockets or is/are defective. → Check the cable(s) and the connection(s).

Possible cause: The interface's connection is faulty or the interface is defective. → Check the interface and the connections. Check whether other nodes connected to this interface are also not displayed.

- Connected accessories do not switch.

Possible cause: The decoder's connection to the power supply has been interrupted. → Check the connections.

Possible cause: The decoder's connections to the accessory(s) have been interrupted → Check the connections.

Possible cause: The accessory is defective. → Check the accessory.

Hotline

If problems with your decoder occur, our hotline is pleased to help you (mail address on the last page).

Repairs

You can send in a defective decoder for repair (address on the last page). In case of guarantee the repair is free of charge for you. With damages not covered by guarantee, the maximum fee for the repair is 50 % of the current sales price according to our valid price list. We reserve the right to reject the repairing of a module when the repair is impossible for technical or economic reasons.

Please do not send in decoders for repair charged to us. In case of warranty we will reimburse the forwarding expenses up to the flat rate we charge according to our valid price list for the delivery of the product. With repairs not covered by guarantee you have to bear the expenses for sending back and forth.

8. Guarantee bond

For this product we issue voluntarily a guarantee of 2 years from the date of purchase by the first customer, but in maximum 3 years after the end of series production. The first customer is the consumer first purchasing the product from us, a dealer or another natural or juristic person reselling or mounting the product on the basis of self-employment. The guarantee exists supplementary to the legal warranty of merchantability due to the consumer by the seller.


The warranty includes the free correction of faults which can be proved to be due to material failure or factory flaw. With kits we guarantee the completeness and quality of the components as well as the function of the parts according to the parameters in not mounted state. We guarantee the adherence to the technical specifications when the kit has been assembled and the ready-built circuit connected according to the manual and when start and mode of operation follow the instructions.

We retain the right to repair, make improvements, to deliver spares or to return the purchase price. Other claims are excluded. Claims for secondary damages or product liability consist only according to legal requirements.

Condition for this guarantee to be valid, is the adherence to the manual. In addition, the guarantee claim is excluded in the following cases:

- if arbitrary changes in the circuit are made,
- if repair attempts have failed with a ready-built module or device,
- if damaged by other persons,
- if damaged by faulty operation or by careless use or abuse.

9. EU declaration of conformity

 This product conforms with the EC-directives mentioned below and is therefore CE certified.

2004/108/EG on electromagnetic. Underlying standards: EN 55014-1 and EN 61000-6-3. To guarantee the electromagnetic tolerance in operation you must take the following precautions:

- Connect the transformer only to an approved mains socket installed by an authorised electrician.
- Make no changes to the original parts and accurately follow the instructions, connection diagrams and PCB layout included with this manual.
- Use only original spare parts for repairs.

2011/65/EG on the restriction of the use of certain hazardous substances in electrical and electronic equipment (ROHS). Underlying standard: EN 50581.

10. Declarations conforming to the WEEE directive



This product conforms with the EC-directive 2012/19/EG on waste electrical and electronic equipment (WEEE).

Don't dispose of this product in the house refuse, bring it to the next recycling bay.

Information and tips:

<http://www.tams-online.de>

Warranty and service:

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