EXHIBIT 4
MANUAL

Contents
Manual

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INTRODUCTION

Company profile

AMB i.t. is specialized in the design, manufacturing and support of identification and timing systems for various sports. Since the first AMB systems were sold in 1981, AMB has set the world standard in most motorized sports and has become the largest supplier of such systems.
The AMB organization has the capability to design and manufacture tailor-made solutions.

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The TranX 160 system

The TranX 160 system is specifically designed for the timing and identification of competition karts. For an unlimited number of competitors it is possible to give positions, best lap times, numbers, names etc. This information can be presented on a scoreboard, computer or TV screen and can be printed during and after the race or practice.
Each TranX transponder produced has a unique identification number used nowhere else in the world. This enables you to give every user his own personal transponder.
The TranX 160 system has proved to be accurate and extremely reliable and consists of 5 main parts:

TranX 160 Transponders enable you to give each kart a unique identification. The transponder is fixed on the kart, not higher than 30 centimetres above the track. The transponders can be charged in the multiple units charger rack or individually by each competitor with the single unit charger.

The Pick-Up Loop is embedded 2 centimetres into the track. When a transponder passes, its unique signal is picked up by the loop and transferred to the TranX decoder. A maximum of 6 TranX 160 transponders over 1 loop can be picked up at exactly the same time.

The TranX Decoder relates the unique transponder signal to the exact passing time. Inputs from photo cells and an external synchronisation signal are possible. The decoder sends the information to a computer on which TranX software is running.

The TranX Software is designed for Windows 95 and Windows NT and is easy to install. It has an intuitive user interface together with flexible output facilities. RTS TranX for DOS computers is also available. The decoder data are processed to create output such as position, fastest lap and driver's name. This information is shown real time on screen and can be printed at any moment. The data from each race can be saved for later use.

INSTALLATION

Installation of the transponder on karts

The transponder must be fitted in the AMB transponder holder and fixed in the holder with help of the supplied metal clip. If the transponder is in a position where the clip may be hit, please secure the clip with a tie-wrap of press is past its first lock.

The transponder <u>must</u> be mounted vertically on the kart with the fixing clip on top. The transponder holders are permanently fixed to the karts by tie-wraps, pop rivets or double sided tape (on smooth surfaces).

<u>Warning</u>: To avoid accidents, make sure the holder and the transponder can not detach themselves during a race. The metal clip must be put through the hole in the fixing pin of the transponder.
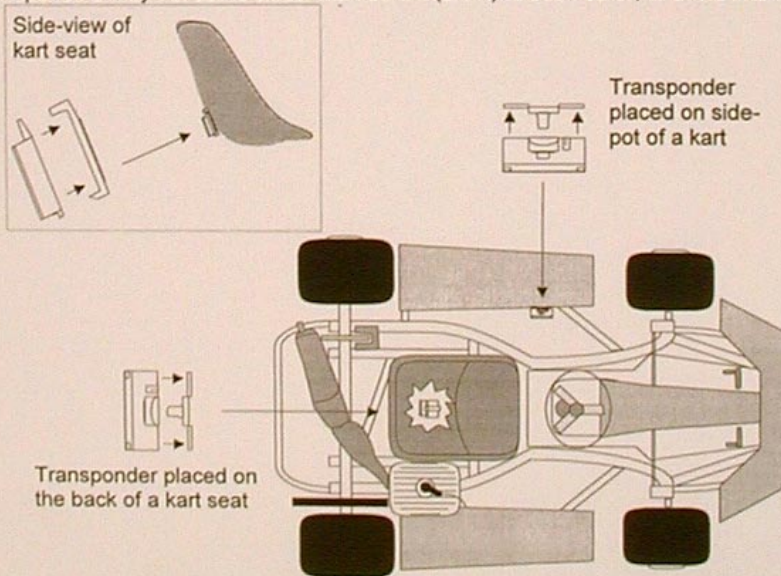
Fixing clip
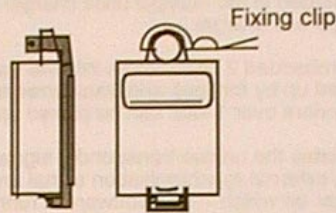
Transponders may not be placed higher than 30 cm (1 foot) above the track. No metal or carbon fibre may be in between the transponder and the pick-up loop. The position of the transponder must be identical on all karts in the race.

Preferably the transponder is placed to the back of the seat or alternatively on the inside of the kart, against the side pot. The transponders must be able to 'see' the detection loop. The opening through which the magnetic field has to pass must be at least 30 x 30cm (1ft x 1ft).

If a transponder is not placed properly, a severe reduction of 'strength' as given by the AMB TranX 160 decoder will be seen, compared to other properly placed transponders. If the strength of a transponder is significantly lower than the strength of other transponders, please compare the placement of this transponder with the other transponders.

Transponders may not come closer than 20 cm (2/3 ft) to each other, to avoid interference.

Side-view of kart seat

Transponder placed on side-pot of a kart

Transponder placed on the back of a kart seat

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Position finish line/pick-up loop

Please see connection diagram on page 8.

As the transponder is not located at the front of the kart, the position of the pick-up loop must be before the finish line. The distance between the centre of the pick-up loop and the finish line must be equal to the distance between the front of the kart and the transponder.
Due to differences in positions of transponders on the karts, the AMB TranX system can not detect up to the last centimetre which kart has passed the finish line first. This decision must remain in the hands of the officials.
The individual lap-time is not affected by the position of the transponder on the kart.

Furthermore, the pick-up loop must be installed in a position where the operator can easily see the karts pass the loop.

The pick-up loop must be at least 3 meters (10 ft) away from electronic equipment and cables to avoid possible interference.
Karts on other parts of the track must not be able to come near the pick-up loop within 180 cm (6 ft) to prevent unwanted detection of transponders.

Installation of the pick-up loop

For the AMB TranX system, the pick-up loop, the connection box, and the coax cable from a sealed unit. The pick-up loop itself consists of a single loop of any type of insulated wire, for instance the wire used in the electrical installation of houses. The wires of the loop must be 60 cm (2ft) apart. The connection box is installed at one end of the loop, the resistor of 470Ω must be installed at the opposite side of the connection.
- Cut a slot in the track (1,5 - 2,5 cm (½ "- 1 ") deep), by using a disk saw.
- Cut the wires of the loop to fit the slot.
- Put the thin shrinkable sleeve over the resistor.
- Put the second heat shrinkable sleeve over one of the two wire ends.
- Solder the resistor to the two ends of the loop wire.
- Put the second heat shrinkable sleeve also over the resistor and hold it over a heat source.
- Put the wire in the slot and fill it with silicon. Make sure the silicon remains under the surface of the track, otherwise the tires of the karts will pull the silicone and wire out of the slot.

Please make sure the wires of the pick-up loop and the connection box can never be damaged by karts that leave the track accidentally. The connection box and cables may be put in the ground without further protection.
If the AMB TranX system is to be used elsewhere, the wires of the pick-up loop may be cut at 10-20 cm (4-8 inches) from the connection box. Make sure the connections to the new pick-up loop are soldered and well insulated. A gas heated soldering iron may be very helpful.

Back-up system

If, for very important events, the use of a second AMB TranX system, to serve as a back-up system is recommended. The pick-up loop of the back-up system must be placed 2 meters or more before the main pick-up loop.

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Installation of the AMB TranX decoder

Please see connection diagram on page 8.

The operator of the AMB TranX system must be able to see the pick-up loop at all times.

The AMB TranX decoder must be kept out of the full sun to avoid internal damage due to overheating.

The AMB TranX decoder may be installed close to monitors, computers, printers etc. Make sure the connected computer is properly grounded for safety reasons and against possible interference. Laptop computers usually do not need grounding.

Connection to pick-up loop

The AMB double shielded coax cable is connected to the back of the AMB TranX decoder.

Connection to computer

Connect one end of the supplied RS 232 connection cable to the RS 232 port of the decoder and the other end to the RS 232 COM1 of your computer.

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Connection diagram AMB TranX 160 system

Single loop decoder for tracks with a width of up to 10m

AC Power

TranX Decoder
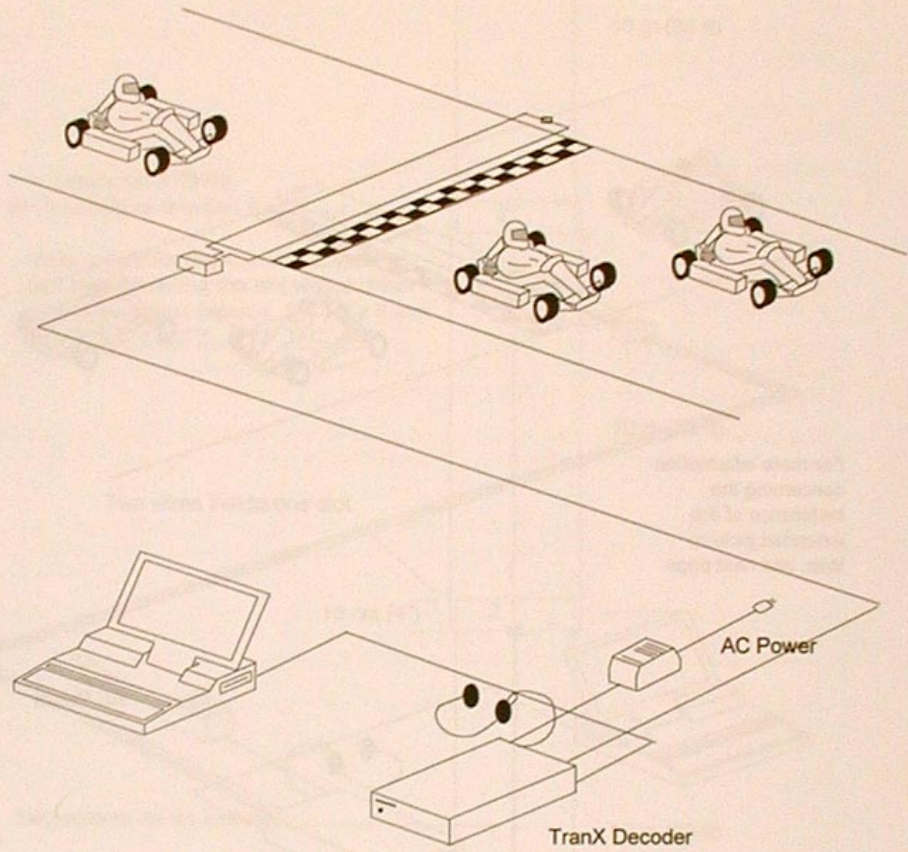
Extended loop decoder for tracks with a width of up to 30m
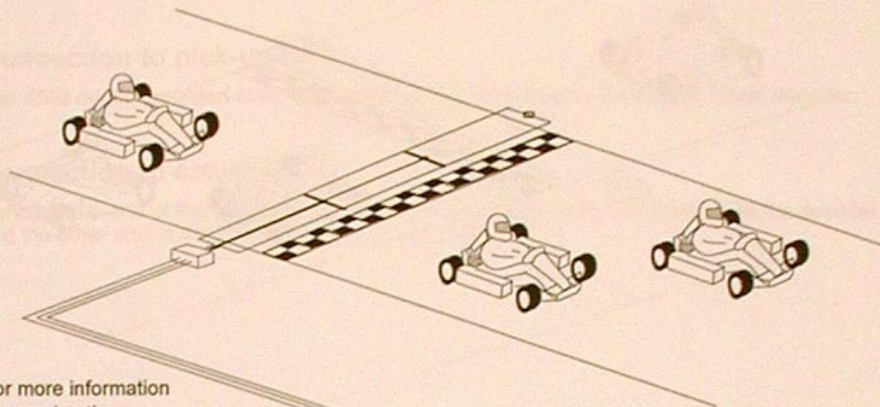
For more information
concerning the
installation of the
extended pick-up
loop, see next page

AC Power

TranX Decoder

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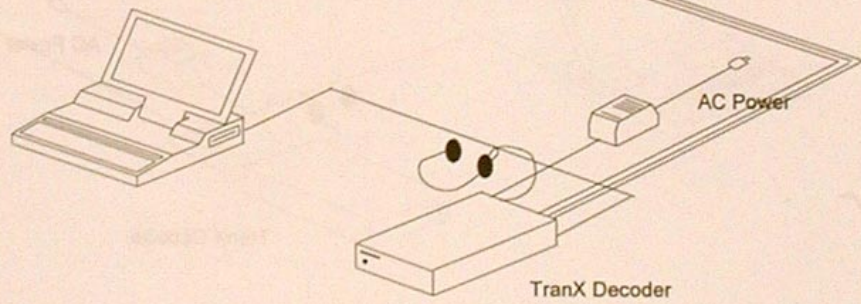
Loop installation of the extended loop

1

60 cm

2 ft

10 m (33 ft)

1 = resistor (470 Ohm)
2= (in-track) connection box

1

10 cm (4")

2

Make a hole for the in-track connection
box by broadening the slot with a chisel
or a screw-driver (approx. 5 x 3,5 x 6 mm
(1,9" x 1,4" x 0,3"))

10 m (33 ft)

Two wires inside one slot

1

10 cm (4")

2

Two coaxes inside one slot

10 m (33 ft)

2

3x coax (3 mm diameter) out of track

9

10
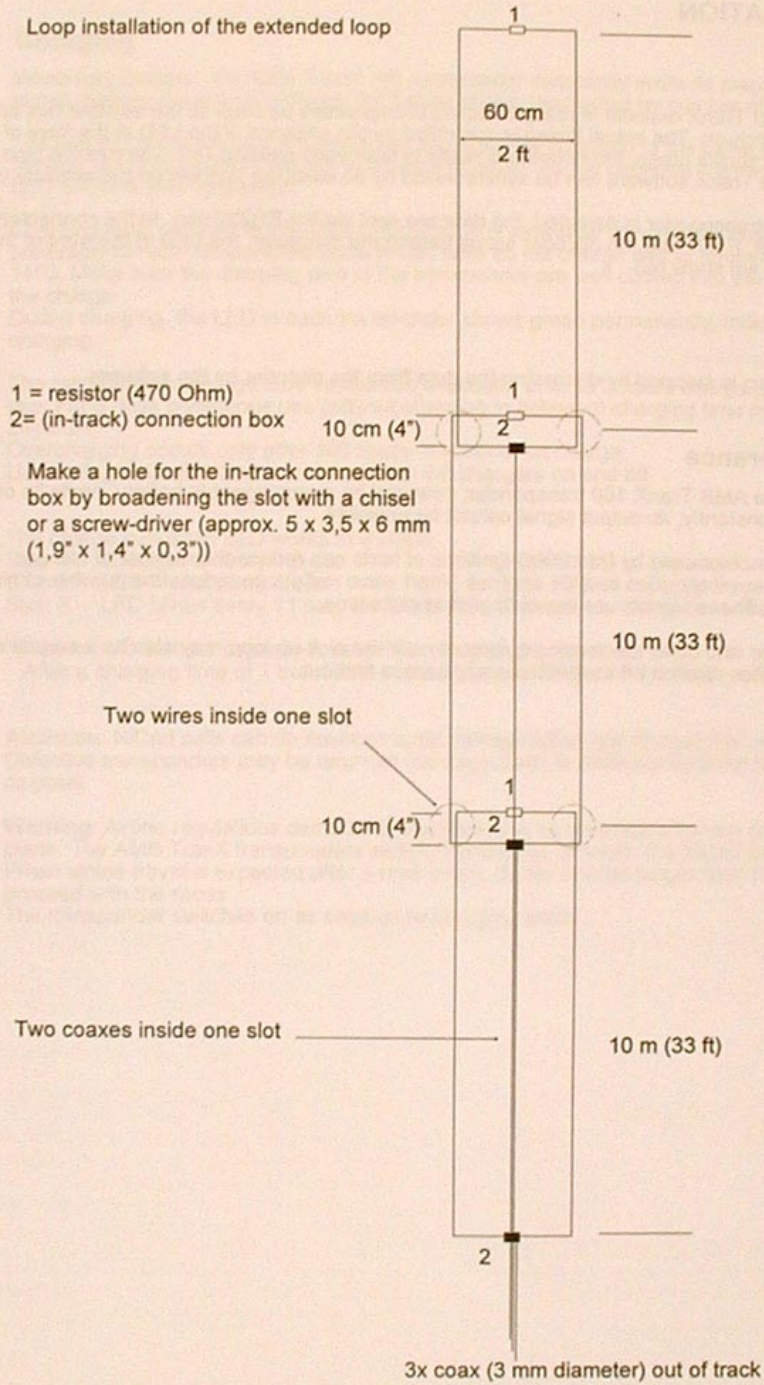
OPERATION

Start

The AMB TranX decoder is ready to detect transponders as soon as the self-test has ended after switch-on. The actual timing is controlled by the software. If the LED at the front of the decoder shows green, the decoder is ready to time each passing kart. The running time of the AMB TranX software can be synchronised by an electrical impulse on the auxiliary port.

When a transponder is detected, the data are sent via the RS232 port to the connected computer. Each time the decoder sends data to the computer, the LED at the front of the decoder will show red.

Stop

The timing is stopped by discarding the data from the decoder by the software.

Interference

Since the AMB TranX 160 transponder, powered by a rechargeable battery, emits its output signal constantly, its output signal cannot be powerful.

Interference caused by (modified) ignitions of karts can reduce the number of hits per passing severely. Also outside sources (short wave radio) can reduce the number of hits per passing. These signals are the strongest at night time.

Computer and other electronic equipment near the pick-up loop may also be a source of interference. Switch off suspected equipment to find out.

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Charging

When fully charged, the AMB TranX 160 transponder constantly emits its magnetic output signal. Battery capacity is sufficient for 3 days of use, unaffected by number of laps turned.

The blinking of the led on the transponder indicates the condition of the battery. If the LED is blinking fast, the batteries are still sufficiently charged. As the batteries are decharging, the LED will blink less frequently.

Charging must be done in the AMB charger rack or individual transponder charger, preferably at room temperature since NiCad cells do not charge well at temperatures below 14°C. Make sure the charging pins of the transponder are well clicked into the press-studs of the charger.
During charging, the LED in each transponder shows green permanently, indicating charging.

The ratio between charge time versus use is about 1 in 4, so 3 hours charge gives 12 hours use. For 3 days continuous use (without charging in between) charging time must be at least 24 hours.
Overcharging occurs only after 100 hours of continuous charge.
Use a programmable timer clock to switch the chargers on and off.

The charge indication LED works in 3 steps:
Step 1:   LED blinks every 1,5 sec   100% - 50% of capacity *
Step 2:   LED blinks every 4 sec   50% - 5% of capacity *
Step 3:   LED blinks every 11 sec, weak signal   Transponder must be recharged

* Please note that the capacity is related to the charging time.
  After a charging time of 1 hour, 50% capacity means 50% of 4 x 1 hours = 2 hours.

Attention: NiCad cells can do environmental damage when not disposed of properly. Defective transponders may be returned (carriage paid) to AMB products for repair or proper disposal.

Warning: Airline regulations demand all electronics to be switched off when on board of a plane. The AMB TranX transponders switch themselves off when the NiCad cells are empty. When airline travel is expected after a race event, do not charge longer than necessary to proceed with the races.
The transponder switches on as soon as re-charging starts.

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TROUBLE SHOOTING

Decoder

PROBLEM	CAUSE
1. False input.	• The transponders that are not used or that are on another part of the track are less than 180 cm (6 ft) away from the pick-up loop.

Transponder

PROBLEM	CAUSE
1. The transponder is not functioning.	• The transponder is placed too high above the track or the transponder does not have the right orientation. The transponder can not properly "see" the pick-up loop. • The battery is low.
2. The battery is low.	• Exercise the batteries by charging them for 48 hours and letting them discharge until empty. Repeat this 2 or 3 times. This way the transponders are trained to keep their charge longer. • If the transponders are not used for a long period (2/3 months) they will have to be charged for a longer period than normal before the race.

Pick-up loop

PROBLEM	CAUSE
1. You receive no signal.	• The pick-up loop is not installed according to the installation chapter. • The loop-wire may be broken. Carefully check the pick-up loop and if necessary install a new pick-up loop. • The coax cable should be double shielded coax cable, 75 Ohm. • The coax cable is longer than mentioned in the specifications. • Ensure that the connections of the pick-up loop are soldered and perfectly insulated. Bad connections in the loop or incorrect connection of the loop **are the most common causes** of system malfunctions.
2. You connect an existing pick-up loop to the connection box and receive an incorrect signal	• When existing pick-up loop wires are connected it is possible that the wires are oxidized at the connection point. So check these points carefully for oxidation.

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If the above suggestions do not solve the problem, please contact AMB products. Send a fax with description of the problem and please add the following information:

1. What system are you using?
2. For which application do you use the system?
3. What is the track width?
4. How far apart are the loop wires and what resistor value is installed?
5. Do you use the AMB coax cables, and are these cables still intact (no mended pieces)?
6. How high above the track are the transponders placed?
7. How are the transponders positioned, please indicate their position in a diagram?
8. Are the transponders positioned vertically?
9. What is the speed when passing the pick-up loop?
10. What is the strength of hits when the transponders are working OK?
11. When did this problem first occur?
12. Does this problem happen all the time or only on a specific moment of the day?
13. Did you recently start using a new computer or has there been installed any other electronic equipment close to the loop or the decoder?

The answers to these questions may help us to indicate the source of your problem.

Equipment inspection

If you want us to inspect your equipment, please note the following:

When you return equipment to our workshop from outside the European Community, please include a low value (10%) invoice, to avoid delay and high costs at customs. Please also mention on the invoice:

"Equipment returned to manufacturer for inspection"

Please always include a note clearly defining the problem together with the address to which the parts should be returned.

Address:

AMB i.t. B.V.
Herenweg 29A
2105 MB Heemstede
THE NETHERLANDS

Tel: xx31 23 529 18 93
Fax: xx31 23 529 01 56

E-mail: support@amb.nl

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SUPPLEMENTS

Specifications

Number of competitors	: unlimited
Recommended speed	: 140 km/h (90 mph)
Track width	: 10 m (33 ft)
Timing resolution	: 0,003 sec, 0,001 with photocells
Transponder position	: max. height 30 cm (1 ft)

TranX 160 Transponder

Dimensions	: 73x50x22 mm (3"x2"x1")
Weight	: 95 g
Temperature range	: 0-50 C (32-122 F)
Operating time	: 3 days after full charge
Charge indicator	: LED
Humidity	: max. 100% relative
Signal transfer	: magnetic induction

Transponder Chargers

Single unit charger	: 2 press-studs on the back of the transponder
Multiple units charger	: case with 32 positions for transponders
Power supply of chargers	: 12 VDC via 115/230 VAC adapter

Pick-Up Loop

Loop length	: 10 m (33 ft), 3 loops maximum
Coax to decoder	: max. length 100 m (330 ft)

TranX Decoder

Dimensions	: 320x170x60 mm (13"x7"x3")
Timer stability	: 0,5 ppm
Humidity	: max. 90% relative
Power supply	: 12 VDC via 115/230 VAC adapter
Interface	: RS 232

AMB Software

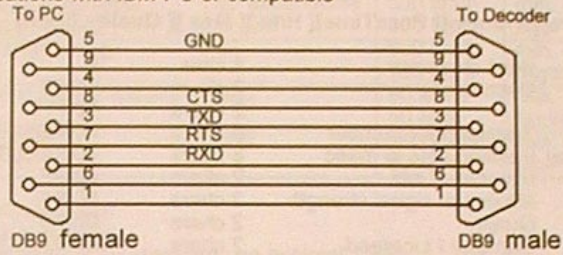|	
On-line Timing	:Processes data from decoder and calculates results
Race Management	:Stores competitor data and processes results
Results Monitor	:Displays on-line results and distributes this information
to	users

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Input/output connections TranX decoder
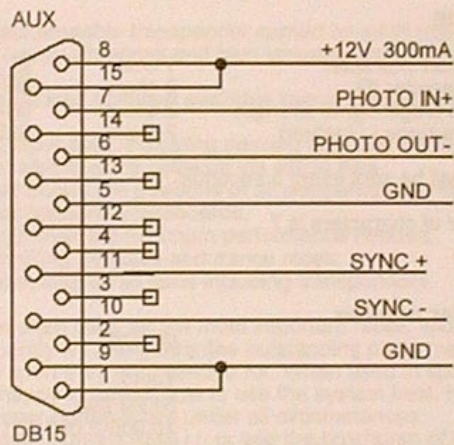
PHOTO CELL
Photo cells are connected to the auxiliary connector.

To communicate with the TranX decoder, the system has 2 connectors at the back.

I.   **RS232-A   DB - 9 female**
communications with IBM-PC or compatible

To PC   To Decoder

To PC	Signal	To Decoder
5	GND	5
9		9
4		4
8	CTS	8
3	TXD	3
7	RTS	7
2	RXD	2
6		6
1		1

DB9 **female**   DB9 **male**

II. **Auxiliary input/output   DB - 15 female**
photo cell
sync

AUX

Pin	Signal
8	
15	+12V 300mA
7	
14	PHOTO IN+
6	
13	PHOTO OUT-
5	
12	GND
4	
11	
3	SYNC +
10	
2	SYNC -
9	
1	GND

DB15

To activate the photo cell / sync inputs, supply these inputs with 5-12Vdc/ 5-15mA impulse. The 12V DC power (pins 8,15) may be used as power source.

TranX Record Descriptions

Standard communication: RS 232   9600 Bd   8 bits   2 stop-bits   no parity   no handshaking

Format: hexadecimal in ASCII characters

$[ID][Spare][TranNr][PassTime][Hits][Max][Quality][cr/lf]

$	Start character	1 char	$
ID	Decoder ID	2 chars	00-FF
Spare		2 chars	00-FF
TranNr	Transponder number	6 chars	000001-FFFFFF
PassTime	Passing time in msec	8 chars	00000000-FFFFFFFF
Hits	Number of hits	2 chars	02-FF
Max	Maximum signal strength	2 chars	00-FF
Quality	Quality	2 chars	00-FF
cr/lf	Carriage / Linefeed	2 chars	0x0D-0x0A

Total number of characters is 27

#[ID][AVG][cr/lf]

#	Start character	1 char	#
ID	Decoder ID	2 chars	00-FF
AVG	Average signal strength	2 chars	00-FF
cr/lf	Carriage / Linefeed	2 chars	0x0D-0x0A

This record will be sent every 5 seconds

Total number of characters is 7

Transponder number

		decimal	hexadecimal
Short code		1-512	000001-000200
Reserved		513-9.990	000201-002706
Long code		10.000-2.097.151	002710-1FFFFF
Special codes	photo-cell 1	9.991	002707
	sync	9.993	002709

Liable to changes without any notice

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AMB i.t.: Systems overview

	Sport	Competitors max. in a race	Max. Speed	Battery capacity	Resolution
AMB 20	RC model cars, entertainment karting	10 expandable to 20	120 km/h 75 Mph	min. 30 hours**	0,01 s
TranX 160	Entertainment karting, competition karting	unlimited	160 km/h 100 Mph*	min. 3 days**	0,003 s
TranX 260	Club racing, motorcross	unlimited	250 km/h 150 Mph*	min. 3 days**	0,02 s
AMB 9200	High speed cars, motor racing	80 expandable to 160	500 km/h 300 Mph	min. 5000 laps***	0,002 s
AMB Special	Special racing	60	500 km/h 300 Mph	min. 100 days***	0,0001 s
PegaSys	Horse racing, trotting	500	80 km/h 50 Mph	min. 15 hours**	0,01 s
AMB 300	Bicycles	300	100 km/h 60 Mph	min. 3000 laps**	0,01 s

*   recommended speed
**   rechargeable battery
*** permanent battery, for standard use minimal 1 year

specifications are subject to change without notice.

All AMB systems:
⇒ are based on a rechargeable transponder carried by each competitor in the race, that withstand water, heavy vibrations and high temperatures, and the can be mounted and removed easily,
⇒ have highly sophisticated software available free of charge (for 286 or faster computers),
⇒ produce RS232 output data, indicating passing time and transponder number,
⇒ can communicate with existing software via ASCII files,
⇒ have software that shows the positions of all competitors during the race in real time,
⇒ have software that supports scoreboards,
⇒ have a wide margin over the minimum performance needed,
⇒ are capable of handling 24 hours endurance races,
⇒ have a full year warranty on all parts including transponders,

As the AMB systems are often used for the most important races, wide performance margins are necessary. Consequently we can guarantee outstanding performance when the AMB systems are used in the sport they are intended for. When used in sports they are not intended for, we will be happy to advise how to use the system best, however, in that case we cannot guarantee proper performance under all circumstances.
For more information please contact AMB i.t. or see the brochures of the AMB systems.