Warranty & Support

This product is provided with a one year warranty for problems found during normal usage. Mistreating the Pro-Bot or opening the unit will invalidate this warranty. Any data stored on the unit and any consequential loss is not covered by this warranty. The battery is not user replaceable.

Technical Support

Please visit www.tts-group.co.uk for the latest product information.
Email feedback@tts-group.co.uk for technical support.

TTS Group Ltd.
Park Lane Business Park
Kirkby-in-Ashfield
Nottinghamshire,
NG17 9GU, UK.
Freephone: 0800 318686 Freefax: 0800 137525

WARNING:
Do not dispose of this product in household waste.
Hand it over to a collection point for recycling
electronic appliances. Not suitable for children under
36 months due to small parts – choking hazard.

Made in China, on behalf of the TTS Group Ltd.

TTS Product Code:
EL00535

TTS is proud to be part of **RM** plc

tts Pro-Bot®

Programmable floor robot for
more advanced control techniques

Age
3+

USER GUIDE

Contents

Pro-Bot®

Pro-Bot® is a programmable floor robot designed for more advanced control techniques. It is ideal progression from the TTS Bee-Bot® (TTS Code - EL00363). Pro-Bot can be used simply by programming arrows or inputting more complex commands and procedures. Built-in light, touch and sound sensors" (x2) and the ability to add a pen to the device so that Pro-Bot can draw its own route. There are also four locator points on the body so that K'Nex can be used to build frames.

Also available is Probotix software (TTS Code - EL00477) which allows children to create their Pro-Bot program using the software and then transfer to the robot using a USB connection. Similarly programs created on the Pro-Bot can be transferred to the software. See www.tts-shopping.com for more information.

Important Information

Please read all instructions carefully before use.

Please retain all instructions for future reference.

WARNING: CHOKING HAZARD - Small parts. Not for children under 3 yrs.

Care & Maintenance of Pro-Bot

To clean, wipe the Pro-Bot gently with a clean, damp cloth.

Keep the Pro-Bot away from direct sunlight and heat.

Do not allow the Pro-Bot to come into contact with water or other liquids.

In the event of static, your Pro-Bot may malfunction or lose memory: in this case, insert a paper-clip or similar into the reset hole located near the On/Off Switch to reset the Pro-Bot.

The normal function of the product may be disturbed by strong Electro Magnetic Interference. If so, simply reset the product to resume normal operation by following the instructions in the user guide. In the event that the function does not resume, please use the product in other location.

Battery Precautions

Use a 3V CR2032 battery (included) for back-up. This will need replacing approximately once per year or more often if Pro-Bot is left discharged.

On first use, fully charge before inserting the backup battery.

Only use the recommended or equivalent type batteries.

Do not short-circuit the battery terminals.

Always dispose of old batteries safely.

Rechargeable batteries are only to be charged by an adult.

Manually examine for damage the plug enclosure and other parts. In the event of any damage, the toy and charger must not be used until the damage has been repaired.

Non-rechargeable batteries are not to be recharged.

Different types of batteries or new and used batteries are not to be mixed.

Batteries are to be inserted with correct polarity.

Exhausted batteries are to be removed from the toy.

Recharging your Pro-Bot

Insert the USB cable into the charging socket on the rear of your Pro-Bot.

Connect the other end to a spare USB port on a PC or laptop. Alternatively, connect to a USB charging plug.

If you have the Pro-Bot docking station, then place the Pro-Bot into the docking station and connect the power cable.

The green LED in the left eye will turn on to show that the Pro-Bot battery is charging.

The green LED in the left eye switches off when the Pro-Bot is fully charged

It may take up to 2 hours to fully charge the Pro-Bot if the battery has been fully discharged.

Once fully charged your Pro-Bot will have approx. 8 hours of normal usage, approx. 2 hours when in continuous use.

Battery life will be extended if the battery is recharged when power is low rather than allowing battery to become completely exhausted.

Always fully charge your Pro-Bot before storing for long periods. It is strongly reccomended that the Pro-Bot is recharged every six months.

Pro-Bot®

Installing the Battery in Pro-Bot

On first use, fully charge before inserting the backup battery.

Ensure the power slide switch is set to "OFF".

Use a cross head screwdriver to remove the backup battery cover.
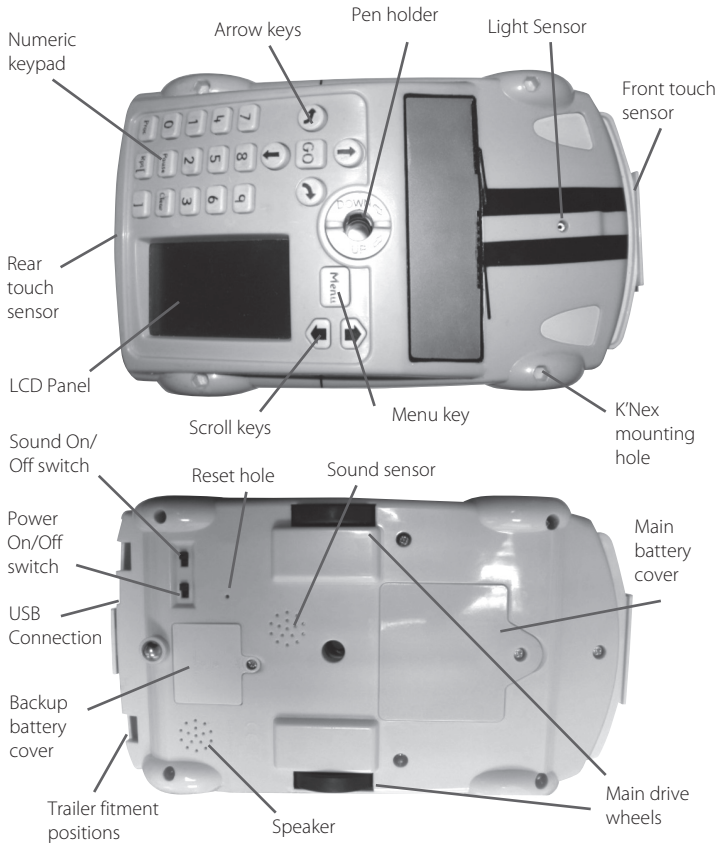
Remove an exhausted battery by moving spring clip sideways.

Insert the battery with the +ve sign uppermost.

Close the cover and tighten the screw.

Know Your Pro-Bot

Numeric keypad

Arrow keys

Pen holder

Light Sensor

Front touch sensor

Rear touch sensor

LCD Panel

Scroll keys

Menu key

K'Nex mounting hole

Sound On/Off switch

Reset hole

Sound sensor

Power On/Off switch

USB Connection

Main battery cover

Backup battery cover

Trailer fitment positions

Speaker

Main drive wheels

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Pro-Bot Basics – A Program

In a programming language, such as Logo, a program is a sequence of commands that are executed in the order specified. With the Pro-Bot, like the multi-award winning Bee-Bot®, a simple program can be developed using only the four arrow keys. Surprisingly complex and extended sequences can be created without requiring any other keys.

By default, pressing a ⬆ or ⬇ moves the Pro-Bot 25cm and pressing the ↰ or

↱ rotates 90°. Pro-Bot's memory can hold over 200 steps, making it possible to create longer and more complex program sequences.

Here's a sample program to get you started. After entering the following commands ⬆ ↱ press (Go) and the Pro-Bot will trace out a square with 25cm sides
When writing programs on the Pro-Bot, the short form of the program commands is displayed on the LCD screen of the Pro-Bot:

⬆	Forward	Fd	⬇	Back	Bk
↱	Right turn	Rt	↰	Left turn	Lt
Rpt [	Repeat	Rpt	Pause	Pause	Ps

TIP: If you want to stop the Pro-Bot when it is going, press the (Go) key again.

Editing Your Program

One of the great strengths of the Pro-Bot is its ability to edit the programs using the built-in LCD. Use the scroll keys above the display to move the cursor up and down the list of commands.

To insert a command in between two commands, move the cursor onto the command you want to insert after, then type the new command.

TIP: To insert in front of the first command of a program, move the cursor to the very top of the display (above the first command).

To delete a command, press the `Clear` key.

Pressing `Clear` will only delete the last key pressed on each line.

TIP: To delete the whole program or individual procedures, hold the `Clear` key down for 3 seconds and select the required option using the scroll keys and key to confirm.

Repeat Loops

Clearly, typing those 8 commands in to draw a square is a very inefficient use of time and can be confusing to students. What we actually want the Pro-Bot to do is draw one side of the square, then turn 90º, and do that four times.

Of course, Pro-Bot can do that for you. Just tell it to repeat the two commands four times. Use the `Rpt [` key to start this, then a number specifying how many repeats are required, then your command list, and finally the `]` key to finish the sequence. Pro-Bot will repeat all commands between these two keys as many times as you specify. For instance, to draw a 25cm square, press the following keys:

Rpt [4 ↑ ↱]

Notice that Pro-Bot changes the order slightly on the display. This is to conform better to the Logo language specification whilst minimising the number of keys that need to be pressed. With only five key presses, we have made a much simpler program that can easily be modified to create other regular shapes.

TIP: If the number after the `Rpt [` key is omitted, the loop will be executed 255 times.

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Different Step Lengths and Angles

Pro-Bot is not limited to 25cm steps and 90º turns. To go different distances and angles, simply use the same commands you are used to but add the number of cm or degrees afterwards. For instance, to move 37cm forward, press: ⬆ 3 7

To turn Pro-Bot left by 30º, press: ↰ 3 0

Using the number keys and the repeat loops, we can make Pro-Bot trace out more complex regular polygons, using the same program structure as before, but with changed numbers and 5cm sides. For instance:

Triangle:	Rpt[3 ⬆ 5 ↱ 1 2 0]
Pentagon:	Rpt[5 ⬆ 5 ↱ 7 2]
Hexagon:	Rpt[6 ⬆ 5 ↱ 6 0]
Octagon:	Rpt[8 ⬆ 5 ↱ 4 5]
Circle (approx):	Rpt[2 0 ⬆ 1 ↱ 1 8]

TIP: To work out how many degrees to turn, divide 360 by the number of sides in the polygon. So a nine sided nonagon would need to turn by 360/9 = 40º at each step.

Using the Pen Mechanism

With pen mechanism, you can bring these shapes to life. Insert a standard (Berol) dry wipe marker into the pen holder, then twist the levers clockwise to place the pen under slight pressure onto the writing surface. Ensure the surface below is capable of taking a dry wipe pen without damage.

When you have finished drawing, twist the levers anti-clockwise to lift the pen off the surface. There is no need to take the pen out every time.

TIP: It is easiest to fit the pen in correctly when the mechanism is in the "Up" position. Twist the levers anti-clockwise and ensure that the top of the mechanism is proud of Pro-Bot's top surface.

TIP: Don't put the pen in with the lid still attached or the lid will stay in! To remove the pen lid from the Pro-Bot, put the pen back in so that it fits back into the lid then push the pen up from the underneath using a ball-pen or similar.

K'Nex Compatibility

The Pro-Bot has been designed to be compatible with K'Nex. It has 4 K'Nex shaped mounting holes one in each corner to allow K'Nex pieces to be inserted.

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Procedures – What is a Procedure?

Logo is a "procedural language". This means that the main program can call other "secondary programs" (procedures) that each perform a specific function. For instance, one procedure could trace out a leaf, another could trace out a petal and a third could draw a stem.

The main program could use all these three procedures to draw a complete flower. Pro-Bot, of course, can do exactly this. In fact different groups of students could write the different procedures and the main program, then put them all together and see how well it works!

Pro-Bot has several different types of procedure. They are numbered from 1 to 39. Procedure numbers 1 to 32 are fully definable by you, numbers 33 to 37 are for sensors and 38 to 40 are the built-in, invisible, demo sequences. The other special procedures are also shown differently in the display and are:

        33   FRONT: Run when the front touch sensor is triggered

        34   REAR: Run when the rear touch sensor is triggered

        35   DARK: Run when the light sensor goes from light to dark

        36   LIGHT: Run when the light sensor goes from dark to light

        37   SOUND: Run when the sound sensor is triggered

        38   HEXGN: Draws a hexagon (not visible)

        39   DIAMND: Draws a diamond (not visible)

        40   FLOWER: Draws eight diamonds using proc 39 (not visible)

Procedures – Using Procedures

To use an existing procedure in your program, press the **Proc** key followed by the number of the procedure you want to run. For example, to run the built-in hexagon procedure, you would use: **Proc** **3** **8**

The following example draws a simple flower, with each petal being drawn using a Procedure 1 (petal), which itself uses Procedure 2 (half petal).

Main	Proc 1	Proc 2
Rpt 6 [	Proc 2	Rpt 10 [
Proc 1	Lt 120	Fd 1
]	Proc 2	Lt 6
	Lt 60	]

TIP: On complex programs it is best not to use "Pause after command", so switch it off in the Config menu.

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Procedures – Defining and Editing

To create a new procedure, press the `Menu` key then scroll down to the <New Proc> menu entry and press `Menu` again. You are then presented with a list of procedures from Proc1 to Proc32 and the sensor procedures. You can use any of the first 32 procedures for what you want, but the sensor ones are fixed and can only be used for their allocated sensor. Scroll down to the number you want to use then press again to select it. `Menu`

The top line of the display changes to the number of the procedure chosen, for example "Proc 3". You can then enter commands as you would normally. When you have finished entering commands for the procedure, press the `Menu` key again.

To edit a procedure you have already written, press `Menu` and scroll down to the <Edt Proc> menu entry and press `Menu` again. Scroll down to the number of the procedure you want to edit, then press . Edit the commands in the list as normal and press `Menu` once more to complete the procedure editing.

Pro-Bot allows you to run any procedure from within any other procedure, even ones that haven't any commands in yet. If you run procedures that call each other, you may get into an endless loop. Don't worry; just press the `Go` key to stop the program running.

TIP: To completely redefine a procedure that you have already written, simply use "New Proc" instead of "Edit proc" and Pro-Bot will clear the procedure for you.

Menu System

Using the menu key gives you access to a number of other functions within Pro-Bot. Special commands can be added to your program, different configuration options can be selected and procedures can be managed.

The Menu system is entered by pressing the Menu key above the display. You are then given a list of menu selections. The first in the list is always <Back>, which allows you to go back one level of the menu. Use the up and down scroll keys to move the highlight to the menu item you want to select, then press Menu again to select that item.

The Menu system is structured as follows:

Back		Goes back one level
New Proc		
o	<Select>	Edit procedure with empty program
Edt Proc		
o	<Select>	Edit procedure with existing program
Config		
o	Units	
•	Cm	Units are in Cm
•	Pro-Bot	Units are in Pro-Bot lengths
o	End of Cmd	
•	Beep on/off	Enable beep after commands
•	Pause on/off	Enable pause after commands
Sensors (NB. in version 1 all sensors are enabled together)		
o	Touch on/off	Enable both touch sensors
o	Sound on/off	Enable sound sensor
o	Light on/off	Enable light sensor

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Clear

o   Clr Main   Clears Main procedure only

o   Clr Proc   Clears specified procedure

o   Clr All   Clears the whole program

Special Commands Menu

Press and hold Menu for 1½ seconds and a list of special commands will appear. Use the scroll keys to select the desired command, then select it with the Menu key. The special commands available are:

Light On:	Switches the Pro-Bot's headlights on whilst running
Light Off:	Switches Pro-Bot's headlights off
Sound 1:	Plays sound "switch on"
Sound 2:	Plays sound "button click"
Sound 3:	Plays sound "car horn"
Sound 4:	Plays sound "data transfer"
Sound 5:	Plays sound "transfer complete"
Sound 6:	Plays sound "error"
Sound 7:	Plays sound "go to standby"
Pen Up:	Has no effect but provides compatibility with Probotix
Pen Down:	Has no effect but provides compatibility with Probotix

Using Sensors

The most exciting thing about learning to program with the Pro-Bot is the four built-in sensors that can be used to control your program. Before you can use sensors in your program, you must enable them by selecting sensors from the Menu system and checking that they say "On".

You don't need to call the procedures for the sensors; they will be run automatically whenever the relevant sensor is activated. In fact, you would be very unlikely to ever use the command "Proc 33" in a program, although it is not forbidden.

Touch Sensors

When the front touch sensor hits an obstacle, procedure 33 FRONT will run. Similarly when you activate the rear touch sensor, procedure 34 REAR will be run. You can get Pro-Bot to do whatever you like when these are activated.

TIP: Why not beep the horn, reverse and turn slightly to avoid an obstacle? Put the following commands into procedure 33 FRONT:

Sound 3 (remember to press and hold Menu to access the special commands)

Bd 10

Rt 45

Then watch what happens when your main program causes it to run into an obstacle.

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Light Sensor

The light sensor, mounted on the front of Pro-Bot, is sensitive to changes in the light level in the room. When the room lights go dark (below about 50 lux), procedure 35 DARK will be run. Similarly, when the room lights come back on (more than about 350 lux), procedure 36 LIGHT will be run.

TIP: Why not switch Pro-Bot's headlights on when the room goes dark, and switch them off again when it gets light?:

In procedure 35 DARK: "Light On"

In procedure 36 LIGHT: "Light Off"

Then watch the headlights go on and off when the room lights are switched off while running your main program. Perhaps your main program is drawing a square?

Sound Sensor

The sound sensor, mounted underneath, is sensitive to short sharp sounds such as a hand clap or a shout. It is only enabled during pauses so that the sounds of the motors do not accidentally trigger the sensor. You may want to insert a brief pause after every command – go to the Configuration menu and check that it says "Pause On" in the "End of Command" menu entry. If you do that, there will be a brief period after every command when the Pro-Bot will listen for your instruction.

Alternatively, you could insert a pause for a fixed length of time at the beginning of the program, or at specific points where you want the Pro-Bot to wait for you.

TIP: Insert a Pause 499 at the start of your program. When you press Go Pro-Bot will do nothing until you clap, or shout at it, then the program will start running. You don't even have to put anything into the Procedure 37 SOUND for this to work! This is an excellent example for including those without fine motor skills.

Examples Using Sensors

Example 1: Turning lights on when going through a tunnel

Press Menu followed by New Procedure

Select Procedure 35 'Light to Dark' [35 DARK] using scroll keys

Press and hold the Menu button to access the special commands menu.

Select 'Light On'

Press Menu again

Select procedure 36 'Dark to Light' [36 LIGHT]

Press and hold the Menu button to access the special commands

Select 'Light Off'

Press Menu to return to the main screen

At the main screen, program Pro-Bot to move forward by pressing the forward
arrow ↑ several times

Press Go to start Pro-Bot

The program will look as follows in the following three procedures

Main	**35 DARK**	**36 LIGHT**
Fd 100	Light On	LightOff

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Example 2: Reversing when front touch sensor is pressed

Press Menu followed by New Procedure

Select Procedure 33 'Front touch sensor' [33 FRONT]

Press and hold the Menu button to access the special commands menu.

Select 'Sound 3' to make Pro-Bot beep its horn

Press the back arrow key ⬇ to program Pro-Bot to reverse

Press the left arrow key ⬅ to insert a turn (by doing this Pro-Bot will continue reversing and turning until there are no obstacles in front of it)

Press Menu to return to the main screen

Press the forward key ⬆ and enter a large number such as 300 (This will ensure that Pro-Bot hits an object in the room before the program ends)

Press Go to start Pro-Bot

The program will look as follows in the two procedures

Main	33 FRONT
Fd 300	Sound 3
	Bd
	Lt

Connecting to a PC

Only use the special USB cable provided with your copy of Probotix software (TTS Code – EL00477) (available separately) to connect Pro-Bot to the PC. Follow the instructions with Probotix to install the PC software.

The upload/download process is managed completely from the PC and all that needs to be done on the Pro-Bot is to ensure that it is switched on.

More Example Programs

6-Pointed Star

Rpt 6

[Fd 10

Rt 120

Fd 10

Lt 60]

5-Pointed Star

Rpt 5

[Fd 10

Rt 132

Fd 10

Lt 60]

Complex Flower

Main	Proc 1	Proc 2
Rpt 12	Rpt 30	Rpt 15[
[Proc 1	[Fd 1	[Fd 1
Lt 30]	Lt 3]]	Lt 6]
Rpt 24[	Lt	Lt
Proc 2	Rpt 30[	Rpt 15[
Lt 15]	[Fd 1	Fd 1
	Lt 3]	Lt 6]
	Lt	Lt

Pro-Bot®
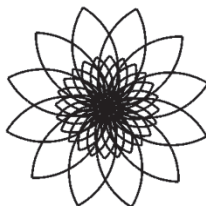
Technical Specification

Feature	Specification
Forward/backward movement	1cm (Up to 499cms [max])
Left/right turn	1° (Up to 499°)
Pause	1 second ±15%
Speed of movement	~65 mm/sec(depends on battery condition)
Batteries	850mAH LiPo (Not replaceable) & 1 x 3V CR2032 (included)
Battery life	approx 2 hours in constant usage

Waste Electrical and Electronic Equipment (WEEE)

When this appliance is out of use, please remove all batteries and dispose of them separately. Bring electrical appliances to the local collecting points for waste electrical and electronic equipment. Other components can be disposed of in domestic refuse.

The crossed-out dustbin symbols indicates that batteries, rechargeable batteries, button cells, battery packs, etc. must not be put in the household waste. Batteries are harmful to health and the environment. Please help to protect the environment from health risks. If the toy is out of use, please use common household tool to break the product for built-in rechargeable battery operated toy or unscrew the battery door for replaceable battery operated toy, then take the battery out form the toy. Dispose of battery in accordance with your local battery recycling or disposal laws.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions : (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
Reorient or relocate the receiving antenna.
Increase the separation between the equipment and receiver.
Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
Consult the dealer or an experienced radio/TV technician for help.

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Notes