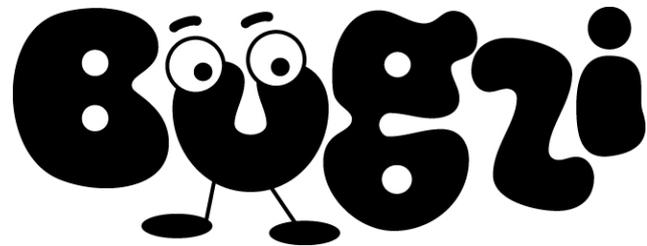


Introducing early years mobility with



A Supervisor's Guide

MERU

from disabilities to possibilities

Introducing Bugzi

Bugzi is all about discovery. It is about exploring and learning and growing as people. Mobility is a fundamental aspect of human nature. We start at an early age, typically six months, long before walking is mastered. We kick and wriggle, rock and roll and strive eventually to crawl or shuffle about. We investigate, examine, touch and taste everything we can get our hands on, interacting with other people, objects and the space around us. By the time we are able to walk we have already travelled many miles under our own steam, fallen over, bumped our heads, made friends and learned where to find our favourite toys.

These experiences provide much of the nourishment that our brains need at this stage in order to develop, because it is external stimuli that create neural pathways and connections. By the age of 2 our brains are 90% of their adult size, and shaped by millions of individual experiences of people, objects, space and motion.

Our ability to communicate as small children also depends very heavily on mobility. With few words at our disposal we must direct the attention of others in various physical ways. All our emotions as small children have active physical expressions – from running up and giving you a cuddle to throwing ourselves on the floor and having a tantrum.

Bugzi is designed to enable non-mobile children to have more of these vital formative experiences. It gives them independence, and places them at a level where they can play with other children, and the objects and spaces of the child's world. It is not a substitute for crawling or walking, but it goes a long way towards enabling children to share in the discovery and excitement of being mobile, and to help them enjoy the company of other children and adults in a more interactive way.



Safety first

Bugzi has been specifically designed to provide powered mobility to very young children. We have done our best to make it as safe as possible - the body shell surrounds the driver protecting from impacts and its soft curves help to prevent injury to the driver and people around them. The drive wheels are completely enclosed, and spoke-less, so it is almost impossible to trap fingers in them. Bugzi is low and stable and does not topple easily.

It has been rigorously tested against the requirements of the Medical Devices Directive (EU legislation governing the safety of this type of equipment). We are not aware of any incident in the years since the first trial Bugzies were issued where injury has been caused to a child.

However, there are *potential* dangers and any young child requires intensive supervision.

Summary of serious risk issues

These are the hazards most likely to cause serious injury to the occupant of Bugzi:

- Bugzi topples over when going down steps
- the child hits their head when driving forwards or reversing,
- impact of Bugzi against solid objects (walls etc.)
- electric shock if Bugzi is immersed in, or splashed with large quantities of liquid
- Bugzi topples over if children in addition to the driver attempt to climb onto it



**NEVER USE NEAR
UNGUARDED STEPS**

Authorised Usage

Bugzi is intended to be used in the following situations. It should not be used in any other situation:

- as a child's Class A electric wheelchair (indoor use only)
- only under adult supervision
- in dry conditions
- by a single child not exceeding 25 kg in weight

- indoors on flat floors with steps not exceeding 20mm in height, or outdoors on hard, flat surfaces, away from slopes and steps, with undulations not exceeding 20mm
- with the child wearing head protection if there are obstacles at head height (such as table tops) which the child may come into contact with.
- Supervisors must be trained in the correct set-up and operation of Bugzi and must familiarise themselves thoroughly with the contents of the *Instructions for Use*.

Modification and adaptation

The Bugzi may not be modified or adapted in any way without the written approval of MERU for each specific adaptation. The device must not be dismantled or modified in any way by any other person or organisation unless authorised by MERU.

Safety precautions

Failure to observe these precautions may result in injury

- Bugzi is for indoor use only
- Use only under adult supervision
- Use only a MiniCAPS seat correctly prescribed for each individual child
- Ensure child is appropriately harnessed in seat and all mountings and straps are properly fastened
- Ensure that the seat has an appropriate headrest
- Consider head protection for the child
- Ensure all obstacles are removed from the immediate environment, or suitably protected, particularly those at the child's head height, such as table tops, and small objects on the floor
- Ensure programming of controller is appropriate to the abilities of the child
- Ensure child and carer have appropriate levels of training and supervision to safely operate the Bugzi
- The controller must be individually prescribed to each child and set up by a competent person, and must not be used by any other child
- Seat must be installed correctly and checked prior to every session of use
- Ensure correct interface board is used for the seat, and that it is changed when the seat size is changed
- Ensure set-up of seat and controller is correct for each individual child when changing over from one to another
- Use only specified, approved accessories with Bugzi including seats and battery chargers supplied
- Use of inappropriate chargers may result in damage to batteries and controllers and possible leakage of acid or explosion

- Take care not to trap fingers when changing interface boards and installing seats
- Weight of child must not exceed 25kg
- Maintenance inspections of body shell to be carried out at regular intervals, particularly following collisions
- Unauthorised persons must not disassemble or modify Bugzi
- Do not place Bugzi in direct sunlight for extended periods as body shell may become hot and controller/batteries may overheat
- Liquids must not be spilt on Bugzi, particularly the battery cover
- Failure to clean Bugzi with a damp cloth and disinfectant when changeover occurs between children may result in cross-contamination
- A child with high susceptibility to infection must not share an Bugzi with another child
- Failure to observe lifting and handling instructions may result in injury
- Driving performance of Bugzi may be affected by electromagnetic fields such as emitted by portable telephones and other emitting devices
- Bugzi may disturb the performance of electromagnetic fields such as emitted by alarm systems of shops
- Dispose of leaking batteries with care – the fluid may cause acid burns
- Batteries should be disposed of at an approved recycling centre

Head protection

Because of the danger of the *Bugzi* pilot hitting their head on obstacles such as table tops, and the risk of *Bugzi* toppling over where steps or other obstacles may be present, it is recommended that operators wear protective headgear. MERU recommends a child's cycle helmet, or other purpose-made and certified protective headgear.

Lifting and handling Bugzi - refer to *Instructions for Use*

The “driving” environment

Children who have no previous experience of independent mobility have things to learn about space, movement, distance etc. which most of us take for granted.

They will discover and learn for themselves, with a little encouragement, if a safe environment is provided. This factor is crucial in ensuring the success of a child's introduction to the Bugzi, because any experience which unsettles the child, particularly in the early stages of discovery, may put a child off using Bugzi indefinitely.

Important preparations	Why?
<ul style="list-style-type: none"> Use only on hard, dry, flat surfaces 	Bugzi will not climb steps exceeding 20 mm (3/4") high, therefore its ability to negotiate rough surfaces, slopes and obstacles is very limited, and any attempt to do so may cause Bugzi to topple over, potentially causing serious injury or even death to the occupant. It may also cause damage to Bugzi.
<ul style="list-style-type: none"> Guard steps higher than 20 mm (3/4") 	Use a stair gate or similar. Any attempt to negotiate steps in Bugzi, whether intentional or accidental, may cause it to topple over, potentially causing serious injury or even death to the occupant. Young children can not be expected to know the danger of this, and must not be allowed to find out for themselves!!!
<ul style="list-style-type: none"> Remove other obstacles 	Furniture, toys, ornaments etc. should be removed to create as much space as possible, particularly when a child is first introduced to Bugzi. Table tops present a hazard because they are often at head height for Bugzi pilots. Try to prevent access to them until you are sure the child understands the risk and has mastered the controls, and ensure head protection is worn. Floor standing ornaments may be damaged by inexperienced pilots.
<ul style="list-style-type: none"> Maintain a calm, quiet atmosphere 	Over-excited children are more liable to lose control. Try to minimise the number of people present, at least during early sessions with Bugzi.

Seating

Correctly specified and adjusted seating is crucial to the successful operation of Bugzi. A child must be in a stable sitting position in a Bugzi in order to have maximum functional control. Driving requires considerable concentration and any discomfort or instability will distract the child's attention from the task in hand.

Bugzi accepts the MiniCAPS seating system from Active Design Ltd. The CAPS II Seating System must be finally set and adjusted by a qualified therapist and/or rehabilitation engineer. Please see [CAPS II Fitting Procedure](#) supplied with your MiniCAPS seat.

The most important considerations are to make sure:

- The child is sitting well back with a symmetrical pelvis (if possible)
- The seat width and length is correct
- Their feet are on the footplates (straps on if appropriate)
- Knee blocks are in place, if required
- The tray is fitted symmetrically in front of the child
- The headrest is in place and at the correct height

Controls

The most important feature of the Bugzi control system is adaptability. The Dynamic DX™ control unit allows a huge range of control options including individual push-buttons, switch panels, switch joysticks, proportional joysticks, sip & puff, head switches – almost any method of control available today.

The usual methods are push-buttons and switch joystick.

Push-buttons

Bugzi can be supplied with the widely available “Buddy” buttons (or Tash™ switches) (6.5cm across) or the giant 13cm type, but other buttons can also be used including small 2.5cm buttons and switch panels. As long as there is a meter or so of cable and 3.5mm jack plug on the end, any button can be used.

It is not usually necessary to have more than three buttons: - forwards, left and right. Reverse buttons tend to get in the way and in any event Bugzi can spin round to point in any direction. What can be useful is to have a reverse button behind the seat for the supervisor to operate in case the child gets stuck in a corner.

MERU supplies buttons in green, red and yellow with Velcro™ on the bottom. Position them consistently and try to remember:

Green	Go! (Forwards)
Red	Right
Yellow	Left

Stick to the same colour and position for each direction helps to avoid confusion. Imagine that every time you got into your car the steering wheel had swapped sides!

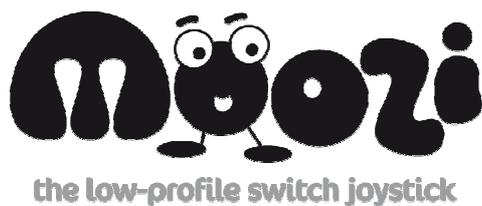
Joysticks

There are a number of joysticks that could be used with the Bugzi (or any other powered wheelchair). This includes the full range of proportional joysticks available from Dynamic Controls.

MERU makes a child-friendly one specifically designed for Bugzi called Moozi.

Moozi is a low profile switch joystick with a large flat base making it suitable for attachment to any flat surface with Velcro™. This means it can be positioned anywhere on the tray where the child can reach it easily. No screws or brackets are needed.

Moozi is available in a number of attractive colour combinations and with several different styles of knob.



Alternative switch mountings

Switches for operating Bugzi don't have to be flat on they tray in front of the child. They can be mounted in headrests and other locations, or even a combination of places. A Bugzi was recently set up for a boy using head switches for left and right and a tray mounted button for forwards. Do be creative about positioning controls, but also try to be consistent and don't keep changing things until the child has had a good go at it. They will surprise you with their abilities when the motivation is strong enough!



One device to help with switch positioning is Flexzi.

Flexzi is a simple positioning device that allows small and lightweight items (such as switches) to be easily placed in an accessible location for a person to operate. The Flexzi can be attached to any flat surface using Velcro, or can be fixed to a bar or surface edge with a clamp. The stem bends easily to position the device exactly where it's needed. Like Moozi no fiddly screws or brackets are required!

Driving

Now to the fun bit. In collaboration with experienced professionals in this field and from our own experience with Bugzi we have developed a pathway to wheelchair driving for young children. It is a process to help them develop from complete novices to competent wheelchair drivers who are able to move on to indoor/outdoor powered chairs.

Managing expectations

Some children are able to drive a Bugzi within minutes of getting into it. This is a wonderful experience for carers as well as children. We have seen parents break down in tears as their children make their first moves around with Bugzi. However it's important to realise that most children will take quite a long time to get the hang of it. Remember how long it takes children to learn to crawl and walk? It can take months, even years for children to master driving, especially if they have co-ordination difficulties. Some will never be able to drive it fully independently, so please be patient and don't be cross about what your child can't or won't do. Encourage and praise them and observe carefully and you may well be pleasantly surprised by what they can do.

Before you start...

- Try to set up the minicaps seat/tray and switches (so the child does not have to wait a long time to start driving!)
- Try and create a suitable environment:
 - ✓ a calm and familiar place
 - ✓ not too many people around
 - ✓ as much space as possible
 - ✓ remove unnecessary obstacles
- Allow the child to explore **Bugzi** – show them what it does, let them have a go before they get into it. On no account force them into it - this could put them off indefinitely. Some children are frightened or just don't feel like it. Try again another day.
- Once it is all set up, step back and let the child experiment - don't interfere too much or keep changing things
- Assume that their actions are intentional – circling continuously, being still for long periods and crashing are often deliberate
- Supervise carefully but discreetly – children don't always like to feel they are being watched

Pathway to driving

When children are new to Bugzi start them off with a single button allowing left or right turning. This could be a big button (5") or an ordinary buddy button (2 ½"). If possible place it centrally on the tray or a little towards one side to suggest the direction of turning. If the child can only reach it in a certain position place it there.

Set the speed control to about ½ speed. Too fast and some children will be alarmed, too slow and they may not get the connection between pressing the button and moving. With everything set up and ready to go allow the child to explore the tray and find the button. In some cases they may need a little help.

Press the button to demonstrate what happens, or place their hand on it. The Bugzi will spin around on the spot. Most children are delighted by this and will continue voluntarily to press the button, stopping and starting and spinning round and round.

Try not to interfere too much at this stage. Allow the child the time and space to explore and learn at their own pace. There's a lot for them to take in.

Caution: for most children it's not fast enough to make them dizzy but look out for signs of this as some children are very sensitive to motion and may even be sick.

As the child gets used to this sensation you can start to play games with them. Try hiding behind and getting them to spin round to face you ("Come and see mummy"). Let them take their favourite teddy for a ride. Try playing "trains" where they start and stop at different "stations" while going round in circles.

At some point, if all goes well, it's quite safe to introduce the second button to allow rotation in the other direction as well. This gives the child a further degree of control and more choices. Always place the second button on the left of the first one for anti-clockwise rotation or on the right for clockwise rotation.

Gradually the child will get used to the concept of self-controlled motion. They have to take in the "cause and effect" relationship and its consequences and also the physical co-ordination. At the same time they are dealing with a lot of excited adults dancing around them and exhortations to perform. Please be patient at this stage and give the child the time and space to explore and experiment.

The length of time the child will spend at this level varies from a few minutes to indefinitely. You must use your judgement to determine at what point, if at all, it is appropriate for them to move on. The next step is quite a big one – from spinning round on the spot to actually going places.

If they are not ready for it can dent their confidence because it almost always involves a lot of crashing and getting stuck. However this is an inevitable part of the learning process, just as toddlers fall over and bump into things.

A child who is using a power chair for the first time has probably never been allowed to experience the level of bumping and falling that able-bodied children rely on to learn the importance of skilled and careful manoeuvring.

- Site the buttons to left / right / centre of the child either on the tray on the Velcro or on an adapted headrest
- Decide on whether to use either two buttons which (in theory) allows the Bugzi to be driven in any direction (360° rotation + forwards)
- Or select three buttons which would allow good control (left, right + forwards)
- Or alternatively a switch joystick: would give the best control of the Bugzi and would allow the child to move in any direction.

Training & monitoring

- Keep monitoring the seating, as children grow and develop very fast and the seating system will need altering frequently
- Be patient – some children will never be able to control the chair, but they are still learning and having a great time

Some top tips

- Driving takes concentration - do offer praise and encouragement, but resist the temptation to chatter continuously – it can be distracting
- It doesn't matter if a child can't do it – he must not be made to feel a sense of failure. Try again another time
- Don't overdo it – look for signs of tiredness and stop then

In summary

- Children of 12 months and younger can learn to “drive” electric wheelchairs
- Bugzi makes a staged introduction to early mobility possible
- There's a lot more to it than just getting from A to B
- It requires commitment on the part of therapists and parents and due consideration of safety issues

But the potential rewards are tremendous –

- ✓ **Independence**
- ✓ **Social interaction**
- ✓ **Learning**
- ✓ **Self-esteem**

Further information

This document was written by Peter Swann, Product Development Manager (MERU) and Julia Hulme, Occupational Therapist. If you would like any further information, please contact us on 01372 725 203 or email info@meru.org.uk