

Barnsley Assistive Technology Team

# **The Challenges of Integrating Complex Electronic Assistive Technology**

10 year experience in a nutshell

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# Assistive Technology Team

- Barnsley Assistive Technology Team has provided an AT service for well over 10 years in South Yorkshire
- Current Staff:
  - 3 - Clinical Scientists
  - 1 - Speech Therapist (AT specialist)
  - 2 - Clinical Technologists – Electronic and Mechanical Engineers
  - 1 - Admin
  - 2 Trainees

# Assistive Technology Team

- Co-ordination: Oversee provision of AT
- Assessment: Specialised input to local service's assessments
  - Communication (AAC), Environmental Control, Computer Access and Powered Mobility – **i.e. well placed to specify integrated systems**
- Custom Made Devices: Design and manufacture
- Equipment Library/Loans: Access to large loan library of a range of devices.
- Training: Customised AT training for local teams
- Research and Development: Sheffield University links, large scale research projects, national conferences.

Barnsley Assistive Technology Team

# Integration Options

Overview of Integration Options  
the Barnsley AT team use.

# Integration Options

- Through multi-function devices
  - *e.g. EC on VOCA, computer access via EC*
- Main controller/control system
  - eg wheelchair DX G91S, P&G Omni, DXREM550 – EC /IR mouse control
- Specific 'integrator-controllers'
  - e.g. Click2Go, Genie
- Operating System level integration
  - E.g iOS access via iPortal and Android via Tecla
- Custom made external integrators, typically with one switch input and 2 to 3 outputs.
  - *Will focus on this and highlight variants of our integrators*

# Integration Options: Multi-function devices

- Communication aids - many have inbuilt IR transmitters for EC. Also have means of accessing eg desktop computer via VOCA
  - PC based. Eye gaze connected to client's own PC. Web browsing and gaming. Used to operate GEWA Prog with switch. Prog connected to PC and operating Sky TV by eye gaze with Tobii Communicator
  - Tellus Mobi – VOCA with Mind Express for communication and EC and mobile phone control
  - Grid 2/Other – communication, EC, computer access, phone control via Bluetooth etc...
- EC – some have output to enable access to other devices
  - eg switch out from Possum Primo and from GEWA Prog. Proteor Keo has option for mouse control

# Integration Options: Wheelchair Controllers

- Using a wheelchair controller to integrate – i.e. send the joystick/switch output to another device.
  - We have used this for example when person is able to control a joystick but unable to access standard touchscreen or standard keyboard. Control on screen keyboard or communication aid with joystick
- Using a wheelchair controller to carry out other functions
  - We have used R-Net Omni-IR, DX-IRIS, iPortal etc. R-Net mouse module etc available.



# Integration Options: Specific Integrator Controllers

- Specific 'integrator controllers' designed to allow full integration of switch signals
  - Also likely to have better switch scanning options for switch drivers.
  - E.g. Click 2 Go – switch accessible wheelchair driving and integration to enable same switches to access communication aid and computer

# Integration Options: Integration via OS

- Integration using the operating system accessibility
  - Windows options – e.g. EC via computer (Prog III etc), Smartbox 'Servus'
  - More recently via iOS/Android –
    - tying in with other integration options e.g. iPortal
    - also with EC/VOCA applications. E.g. Possum Android device – Qwayo – switch access to their EC app and other communication apps tbc

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# Custom Integrators

# Custom Integrators - Overview

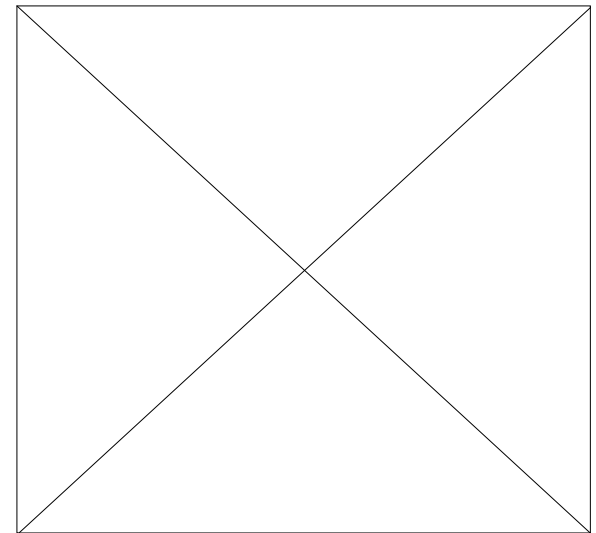
- Only use custom made integrator when commercially available options not best suited for client
- An external integrator allows multiple devices to be controlled using their normal input ports and an additional select switch

# Custom Integrators: Features

- Flexibility in select switch method
  - Can set timings, number of switches etc
- Options for 1 switch in – 2, 3, switches out
- Or 2 switches in – 3 switches out
- Pulse on release or switch follow – can be set in each mode
- Adjustable sleep time out
- Set wake up mode
- Full switch integration without time-outs
- Isolation between devices
- Fail safe

# Integrator: Case Study - S

- Had Possum Vivo with hand operated switch. MS resulted in S being unable to use hand operated switch
- Head worn sip and puff used for EC and computer mouse clicks
- Mouse control with Headmouse Extreme
- Uses custom made integrator to switch between EC and computer. Sips for a few seconds to change mode.
- Video: [www.youtube.com/watch?v=08C2-WdD6F0](http://www.youtube.com/watch?v=08C2-WdD6F0)



# Custom Integrators: Case Study - S

- Integrator, sip and puff switch, Joycable and connections contained in single housing



# Custom Integrators: Case Study - N

- Client with MND using Keo EC for phone, TV and lamps
- Touchscreen became too difficult. Success with switch attached to finger and activated with thumb
- Also required computer access for web browsing, reading online newspapers, books etc
- Can use Headmouse and switch for left clicks though tires with this method.
- As alternative has Grid 2 set for single switch access to favourite websites, control of Kindle PC software
- Integrator control with single thumb operated switch to choose between Keo, left click via Headmouse and Grid2 via Joycable



# Custom Integrators: Case Study - H

- Has MS with single hand operated switch. Initially used with GEWA Prog
- Avid reader. Just able to handle book. Eventually changed to ebooks with Kindle PC software
- Integrator with single switch and timed press to choose between Prog and Kindle software. Three output options
- Carer loads book then with one switch H can send key press for page forward or page back
- Again has safety feature of fail safe to Prog so if batteries fail can access EC phone if required

# Custom Integrators: Case Study - H

- Custom Integrator for Prog EC and Kindle for PC access with 1 switch input and 3 switch outputs



# Custom Integrators: Pros

- Battery powered standalone unit can be transferred between wheelchair, armchair, bed etc
- Adjust for anti tremor, method of transfer between one device and another eg set switch hold time required or with separate mode change switch
- Switch conditioning in one place
- Low battery warnings
- Failsafe as battery deteriorates eg gives audible tone and relay set to preferred device eg switch connection to EC

# Custom Integrator: Cons

- Single switch compromise between control of one device and hold down time to exit to another device.
- On exit from one device to another with single switch an unwanted scan or other action can be initiated
- Introduces more wires, connectors, batteries to charge/replace
- Potentially confusing for users/carers, though we take measures to alleviate this through assessment, clear labeling, printed instructions, training etc.

# Summary

- Many more integration options from commercially available software and hardware
- Still find that we have a justifiable reason to use our custom integrators

# Contact

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