

New power wheelchair electronics Comparison matrix

	Invacare MK 6i	PG Drive Technology R-net	Quantum Q-Logic	Quickie iQ
Power Wheelchair Bases supported	TDX series (SP, SR, SC, SI, Spree) Storm RWD Series Power Tiger, M91R, M94, all chairs w/power seating	All Permobil bases Some Quickie (option) Redman, other manufacturers	All Quantum Some Jazzy	Rhythm, Groove and Z-bot
Tracking technology	True Track: (GB Motors) G-Trac™ (Gyro Technology)	Works with Permobil: ESP	Accu-Trac Technology- Q3 2008	IntelliDrive: can retrofit, can turn on and off with programmer Utilizes standard 4 pole motors
Electronics upgrades	Insert upgraded Professional (SD) Memory card into driver control – follow prompts. (Software upgrades available from web)	‘Future Proofing’ feature (new modules can be added without programming). Some modules are ‘flash’ upgradeable	Yes, software download by computer	Yes, software download by computer
Initial system set-up	Factory settings. Programmer or SD card to modify for user needs.	Plug and Play, modules recognized and programmed automatically	Plug and Play, modules recognized and programmed automatically	Modules recognized, need to be enabled by programmer
Programming				
Separate hand held programmer	Yes Help/Info key provides assistance. MK6 programmer works on MK5 and MK6. MK5 programmers works on MKIV, MK5 and MK6	Yes DTT – includes USB memory stick option for transferring files, mini-USB port for connection to PC.	Yes 3 Bookmark buttons to jump between chosen menus	Yes
HHP revision independent	Yes	Yes	No	Yes
Program through display (manual buttons)	Yes, with SD card, can see all 4 drives at once on display	Yes	Limited	Yes, if access level is set appropriately
Program through joystick display	Yes, with SD card on all expandable (4 drive) systems	Yes. On Board Programming Can see 4 Profiles at once	Limited	No
Consumer can program through access method	Yes, with Professional SD card	Yes Two access methods – keycode or ‘dongle’. OEM sets which.	Limited- 24 hour time clock, language, trip odometer reset, reminders	Yes, can adjust level of access to features
Can program through computer	Yes, via Professional SD card	Yes PC Programming Tool	Yes PC Programming Station	Yes PC Set up Station (PCSS)
Memory backup	Yes, onto Basic or Pro SD Card. Card can use USB card reader to view settings on Computer.	Yes Through computer	Yes Through computer	Yes Through computer
Can do “real time” programming	No. Programmer can remain plugged in, but turned off when driving	Yes	Yes	Yes

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Diagnostics	Fault log on programmer. Error Code Help Screens .(Def. & action required for resolution) Separate diagnostics for actuators and driver controls in programmer	Each module has its own error log. Faults recorded sequentially for ease of use when diagnosing intermittent faults	Through computer, includes descriptions. Time and Date Stamp on fault codes.	Each module has its own fault log. PCSS includes descriptions and instructions
Monitoring	Actuator Amp draw & Angle Position with Smart Actuators	Can monitor system voltage, currents, inhibits etc. with both PC and DTT	Through computer: motor current, voltage, resistance, RPM, actuators	Can monitor system parameters, including voltage and currents
Specific Programming Parameters				
Number of Drives/Profiles	4	8	5 (5 for each drive control device) Profile 1 is Drive Only, can eliminate any unneeded drives	4
Preset programs	Up to 13 Standard programs, each can be modified	Single program of factory settings	Single program of factory settings	Single program of factory settings 11 standard programs templates available through PCSS
Simple vs. Advanced programming options	Can change Overall Speed and Performance or go to Advanced Programming under Performance Adjust	All levels of Programming accessibility are accommodated (Dealer/User/Therapist, Engineering/OEM and custom)	Quick-set up: can change overall Speed and Response on a scale of 1-5	
Torque	Yes, programmable	Yes, programmable	Intuitive torque built-in (higher torque at lower speeds)	Intuitive torque built-in (higher torque at lower speeds) Can program High and Low Torque separately
Sensitivity (how quickly the chair responds to joystick movement)	Tremor dampening & Traction parameters for each drive. Also, separate acceleration parameters for Forward, Reverse and Turns Traction reduces speed when going into or coming out of a turn.	Tremor dampening Also separate Acceleration parameters for Forward, Reverse and Turn at minimum and maximum speeds in each profile	Turn Sensitivity is the same as tremor dampening (per Drive) Tremor Suppression is global Speed Turn Rate added in 2008	Parameter is called Sensitivity Acts as Tremor dampening (global)
Initial travel (distance) of the joystick is ignored	No	Deadband, programmable	Deadband, programmable	Neutral Zone, programmable in each direction

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No Drive Mode (allows Driver to enter a Mode or Drive in which the chair will not drive)	Yes	Sleep Mode	No	Sleep Mode
Program which drive to start in at Power On	Yes Program last drive used or a specific drive profile	Goes to last Profile used Power-up 'Mode' programmable on some JSMs	No Program to last drive used or profile #1	No Goes to last profile used
Display				
Color display	No	Yes. Two contrast options – indoor or outdoor	Yes, sun visor for outdoor use Index Matching added in Q2 2008	No
Backlit display	Yes Auto adjusts to ambient light	Yes	Yes, programmable dimming time	Yes, programmable on or off
Languages supported	English	All text is programmable meaning all 'European' languages can be supported	English, German, Spanish, Italian, French	English, Spanish, German, French, Italian, Portuguese, Dutch, Swedish, Norwegian
Customize text wording	Yes, with MK6i Programmer or Professional SD Card	Yes, through computer	Yes, through computer	Yes, through computer on Driver Menu only
Change font size	Enhanced View Mode enlarges Icons. Enhanced & Sequential Scanning Modes with enlarged icons	Programmable option of large 'momentary' screens when changing speed or profile. Highlighted "User Menu" items are enlarged	No	No
Icons/Graphics	Yes, some combined with text	Yes, some with programmable text, e.g. mode names. Custom Icons are available to OEM's	Many, not designed to replace text	Yes Not on all levels of the hierarchy now.
Display required for alternative access method	No, can use 4-drive joystick required (Expandable Electronics only)	No, can use Input/Output Module (IOM) instead	Yes	No, can use SCM
Buttons on Display	Info (help), Save, Select, Directional arrows	Profiles, Mode, Power, Speed Up, Speed Down, Horn	Power	Power

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Switch Jacks on Display	Two: 1 = Remote power on/off, 2 = mode port with up to 2 available functions using splitter or stereo switch	Two: Power and Profile / Mode	Two: 1 = Remote power on/off, 2 = mode port Mode- simple and advanced programming <i>Simple: cycles through modes</i> <i>Advanced: short command cycles through Drive Profiles</i> <i>long command toggles between Drive Profiles and Aux. & Seat functions</i> Power- Smart switch feature If enabled, long switch command turns system off, short switch command turns on and each subsequent short command cycles through Profiles.	No
Access to functions: consumer level of control	Full access with Professional SD card or programmer	Consumer cannot program unless they have access to OBP Can disable speed buttons on joystick or display through programming	Consumer can only change clock, trip odometer, profiles and speed. These can be restricted, as well.	Can restrict or enable access for consumer and attendant separately and by level
Shortcut Menu on Display	No	Mode Selection in Standby. Any Mode or Profile can be entered via the joystick from Standby	Can program a "Quick Access List" of desired shortcuts that are shown when chair goes into Standby.	Driver's Menu: list of desired shortcuts to take consumer directly to that function. Programmable by computer
Locking feature to prevent any external access to chair	No	Yes: Either button sequence or key or both or neither – fully programmable	System Lock - can be turned on or off	Keylock – can be turned on or off
Other		Clock, speed display on color version Mode name and profile name text programmable	Can download digital photos to display or hand control Clock, MPH, Battery %, Trip Odometer, Odometer	
Access method specifics				
Joystick: hand rest	Multiple Joystick Styles	No	No	Yes
Joystick: display	Yes, monochrome, all Rehab jysks	Yes, monochrome or color	Yes, color, index matching	No

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Joystick: buttons or toggle switches	Various options including buttons, toggle and dials on some joysticks	Buttons, Toggles and / or speed pot optional	Buttons, side mounted dial (speed) and toggle (on/off, profile)	Buttons Toggle an option for speed
Joystick: switch jacks	2: remote power on/off and mode. Mode can be programmed to Mode select, Drive Select, or Single actuator operation up, down up/down. May program 2 of these choices using Y splitter with 2 switches or using stereo switch	2: power and profile / mode	Two: 1 = Remote power on/off, 2 = mode port Mode- simple and advanced programming <i>Simple: cycles through modes</i> <i>Advanced:</i> <i>short command cycles through Drive Profiles</i> <i>long command toggles between Drive Profiles and Aux. & Seat functions</i>	2: power and mode. Mode is assignable to another single feature. Mode switch can be assigned into 2 functions
Joystick: speed dial	Yes, option	Yes, option	Yes- can be programmed for: <i>Limited: high and low limits</i> <i>Continuous: no limits</i> <i>Continuous forward: only forward movement of dial is required to change speed, will cycle through</i> <i>Continuous rearward: only reverse movement of dial is required to change speed, will cycle through</i>	Yes, option
Joystick: shortcut buttons	No	Profile button can be reassigned to provide access to both profiles and modes	2 programmable Programmed by computer Labeled I and II Menu button displays Menu of shortcuts on display	QR7 has 5 programmable buttons (each button can have up to 2 functions. Short hit for Function 1 and Long hit for Function 2). Can be programmed by HHP or computer QR3 horn button has a 2 nd level that can be assigned a function. Decals available for buttons to represent programmable features
Joystick: Can program the same joystick to be proportional or switched	No-Except if using latched driving. (latched mode with joystick operates in digital mode)	No (Step latched drive operates in digital manner)	Yes, if joystick is deflected more than 50% will act as switched joystick when programmed	Yes

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Joystick: can use with only 3 directions	Yes, activate RIM Mode Enter “Reversing” mode either w/ mode switch or through “Standby Select”	Training Mode allows one or more drive directions to be inhibited	Yes, 3-Direction Profile, using Left, Right and Reverse Forward/Reverse toggle accomplished by quick movement in Reverse	
Joystick: compact/remote joystick	Yes, no buttons	Yes, JC200 for use with Omni	Stand Alone joystick Power and Mode buttons 3 Drive & Actuator Functions	Power and mode buttons and 1 switch jack (pending, stereo, for power or power and 1 assignable with splitter)
Component required for alternative access connection	Digital Interface for Sip n Puff & some digital driver controls or dedicated ASL Digital Interface. No Interface required for Alternative Proportional Controls (available with Mk6i connector).	Omni Display (2 9 pin ports) or IOM (9 pin port)	Display (9 pin) and Sip and Puff Interface	Specialty Control Interface Module: SCM Includes 2 programmable switch jacks that default to Power and Mode. These can be expanded to 4 jacks with splitters.
Number of alt. input devices that can be connected	Up to 4 Driver Controls and attendant control.	2 (on each Omni) 1 (IOM) System can support up to 14 Omnis with 2 access methods each	Up to 4 driver controls- 1 Joystick, 1 Stand Alone, 1 Attendant Control, and 1 Specialty Control	2 (requires 2 SCMs), remote joystick and attendant joystick
Transfer of control between alternative input devices	Choose Drive number (Profile)with desired driver control selected/assigned	Choose Profile programmed with that access method	Turn on the input device using power button for that device (i.e. on display)	Choose Profile programmed with that access method or activate that access method within 15 seconds of power on
Head Array	Access to Reverse options: 2 options: 1. Mode switch: 1 st activation chooses Reverse Programming: enable Rim Control 2. Bypass mode switch by programming “Standby Select”. Once in Standby, left driver command activates Reverse driving. Forward command activates Forward driving.	Access to Reverse options: <i>Mode switch</i> : single operation toggles direction Or <i>Rear Pad</i> : first activation toggles direction, second activation drives ‘Switch Medium’ time for easy access to user menu 2 axis option for seating actuator control	Access to Reverse options: <i>Mode switch</i> : 2 nd activation chooses Reverse Or <i>Rear Pad</i> : first activation toggles direction, second activation drives	Access to Reverse options: <i>Manual Toggle</i> : quick hit on rear pad chooses Reverse (visual feedback on display) <i>Direction Toggle Time</i> : if no activity occurs after a programmed time, the display will provide visual feedback that toggles between Forward and Reverse. When the rear pad is activated, the chair will move in the direction indicated on the display. <i>Mode switch</i> : 1 st activation chooses Reverse – enable RIM option

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Sip 'n puff	4 pressure Digital Interface Pressure programmable in all 4 quadrants	4 pressure Built into Omni display Programmable deadband and 'ramp up', 'ramp down' time	2 or 4 pressure option Separate module required Can adjust Sampling Delay to allow consumer to "ramp up" to command	2 pressure or 4 pressure option Can adjust Command Time to allow consumer to "ramp up" to command
Switch Access	Supports single, 3, 4 and 5 switch access	Supports single, 3, 4 and 5 switch access	Supports single, 2, 3, 4 and 5 switch access <u>2 switch:</u> 1 st switch – double click and hold is Forward, single activation is Left. Double click and release is Mode. 2 nd switch – double click and hold is Reverse, single activation is Right	Supports single, 2, 3, 4 and 5 switch access <u>2 switch:</u> 1 st switch – double click and hold is Forward, single activation is Right 2 nd switch – double click and hold is Reverse, single activation is Left
Single switch scanning	Requires external scanner	4 directions on display Can scan all chair functions	4 or 8 direction, on display Can customize scan pattern Can scan Mode option	4 or 8 direction on display 5 Step Sequencing: Forward, Right, Reverse, Left, Mode 7 Step Sequencing: Forward, Left, Right, Reverse, Left, Right, Mode
Access to other functions (i.e. reverse, speeds, actuators, interfaced items) from joystick				
Power button/toggle on joystick	Yes	Yes	Yes, push toggle forward for on or rearward for off, each subsequent push forward goes through profiles	QR2, QR3 and QR7 joysticks Button
Power switch jack on joystick	Yes	Yes	Yes	QR3 and QR7 joysticks (option)
Mode button/toggle on joystick	Yes	Yes	Yes (same toggle as power)	QR2, QR3 and QR7 joysticks Button
Mode switch jack on joystick	Yes, can add splitter for 2 functions Program for Mode & Emergency, Stop, Drive Select, Single Actuator Operation. (May also use stereo switch).	Yes, can also access profiles Used as emergency stop in latched drive or switch to standby option	Yes, simple and advanced programming <i>Simple: cycles through modes</i> <i>Advanced:</i> <i>short command cycles through Drive Profiles</i> <i>long command toggles between Drive Profiles and Aux. & Seat functions</i>	QR3 and QR7 joysticks

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Mode switch sequence: joystick	Reverse, Automatic Positioning, Powered Seating Actuators, Drive Select, Aux1/2, Aux3/4	Profiles, Actuators, Aux., Drive. Sequence programmable	Drive, Actuators, Aux. Profile 1 always Drive, Profiles 2-5 individually programmable for Drive, Seat, Aux. or disabled	Profiles, Actuators, ECM, Drive
Standby option: joystick	Standby Select: (programmable time) allows driver control to select next operating mode after chair enters Stand By using directional command (Driving, Actuators, ECU, Remote Drive Select). Standby can be disabled in ECU mode.	Yes, adjustable time or via mode jack socket switch Can enter all modes and profiles from Standby, programmable direction commands	Standby Select: go to Menu of Profiles Can individually enable for drive, seat, aux. (global) Scroll time programmable	Auto Mode provides access to Drive, Profiles, Actuators and ECM by using directional commands
Sleep Mode: joystick	Sleep: programmable time (previously called Standby Mode) Mode switch required to awaken	Yes, programmable	Yes, programmable	Suspend: long mode activation, programmable
Shortcut buttons: joystick	No	Profile button can be reassigned to provide access to both profiles and modes	2 programmable plus menu buttons	QC4 directly to 1-2 actuators, button QR7 5 shortcut buttons to that can be programmed to jump to other features
Separate switch for actuators: with joystick	Yes	Yes, 2008 possibility	Yes	Yes, plugs into controller or QMAC
Access to other functions from alternative access method				
Power (Alt. Access)	Switch port for remote on/off Toggle on display	Switch jack on Omni Display Switch jack on IOM	Switch jack on Display	Switch jack on SCM
Mode (Alt. Access)	Switch jack on Display, mode button on Display	Switch jack on Omni Display	Switch jack on Display	Switch jack on SCM
Mode switch functioning (Alt. Access)	Mode switch activation enters next available activated function (Reverse, Aux, Powered seating, etc.), and also acts as an emergency stop switch.	Mode switch activation takes consumer to Driver's Menu on display or can activate sequence	Mode switch activation sequence: Reverse, Profiles, Actuators, Aux. Mode switch can also be programmed to execute a function.	Mode switch activation takes consumer to Driver's Menu on display from Drive. If RIM is on, Mode switch goes to Reverse, then Driver's Menu In a few instances, it is necessary to hit this twice from within the Driver's Menu

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Standby option (Alt. Access)	Standby Select Mode occurs after a programmable time elapses. Directional command chooses next function / active mode. Standby in ECU Mode can be disabled	Yes, adjustable time or switch to standby via mode jack plug Directional command chooses function.	Standby Select takes consumer to Quick Access Menu on display after a programmable time elapses. Can be enabled for drive, seat, aux. individually. Directional command chooses next function.	Escape Mode takes consumer to Driver's Menu on display after a programmed time elapses.
Display function navigation: manual (Alt. Access)	Manual scroll: directional switches move through displayed choices Driver Control: right command can scroll through drives 1-4, mode switch selects available modes in each drive. Driver Control operates highlighted Mode. Drive Control Navigation (no switches) programmable.	Manual scroll: Forward command moves up displayed list, Reverse moves down, Right selects, Left moves back a level. Order of menu programmable.	Manual scroll: Forward command moves up displayed list, Reverse moves down, Right selects, Left moves back a level Holding down the Forward or Reverse command will continue to scan after a programmed amount of time	Manual scroll: Forward command moves up displayed list, Reverse moves down, Right selects, Left moves back a level Holding down the Forward or Reverse command will continue to scan after a programmed amount of time
Display function navigation: scanning (Alt. Access)	3 scanning types: modified row column, sequential, enhanced. All with adjustable speed, adjustable initiation time.	Auto scroll: adjustable speed. Right selects and Left moves back a level.	Auto scroll: adjustable speed. Right selects and Left moves back a level.	Auto scroll: adjustable speed. Right selects and Left moves back a level.
Display function navigation: auditory scanning (speech) (Alt. Access)	No Auditory feedback available for screen/mode changes whether through manual operation or in scanning modes. Different beeps used for different modes.	No Auditory feedback to indicate Profile, operating Mode or selection on User Menu	No Different tones for each drive profile, seat, and auxiliary. Auditory feedback available for screen/mode changes whether through manual operation or in scanning modes	No
Other built-in features:				
IR signal output	IR Module Planned for 8/08 Can interface external EADL with IR capabilities through Aux. modules	Yes, 2008 Can also interface external EADL or send IR through a computer accessed through the wheelchair.	Yes Back of Display, multidirectional	Yes Back of Display
Preset codes	IR Module Planned for 8/08	Yes, 2008	No	Yes
Learning	IR Module Planned for 8/08	Yes, 2008	Up to 288 (depending on size of code), macros (up to 3 commands)	Yes, 22

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X-10 control	IR Module w/ X-10 capabilities Planned for 8/08	No. Can interface external EADL or send IR through a computer accessed through the wheelchair.	Yes, through IR/X10 converter (not included) Requires modules (not included) 4 devices per converter, 256 max	Yes, through IR/X10 converter (not included) Requires modules (not included) 4 devices per converter, 10 max.
Telephone	IR Module w/ phone access Planned for 8/08 External EADL or can interface external switch operated phone	No. Can interface external switch operated phone or send IR through a computer accessed through the wheelchair.	Yes IR phone (not included)	Yes Preprogrammed for the GEWA (not included)
Mouse emulation (built-in)	IR Module w/ RF Mouse Emulation planned for 8/08 Currently can interface external mouse emulator w/ AUX	Yes Blue Tooth	Yes Blue Tooth or IR	Yes Requires Interlink VP 4000 remote IR mouse and USB adaptor (not included, if consumer does not have a Serial port) Pending – Sunrise IR receiver to replace the Interlink VP 4000 as it is being discontinued by Interlink.
Auxiliary function templates	N/A	No	Yes, can customize	Yes
Interfacing external AT devices (i.e. SGD)				
Component required for interfacing	Aux1/2 or Aux3/4 (can use both) Aux1/2 = 2 outputs, 4 switch closures each Aux3/4 = 2 outputs, 5 switch closures each IR Module Planned for 8/08	IOM: Input/Output Module	ECU Module, 8 switch outputs	ECM: External Control Module Can use two ECMs for 4 ports Includes single switch output
Attendant Control				
Attendant control features	Power control, doesn't use up a profile Programmable Performance for both Proportional & Digital choice. If attendant control is on, Driver access method will not operate.	Uses Profile 8 as standard Can be programmed to any profile(s) Programmable 'grab' option to allow either the caregiver or the user to regain control. Can access all user modes or programmable to specific modes	Power mode button Doesn't use up a profile If attendant control is on, access method will not operate. Profiles individually programmable. Profiles 2-3 can be turned off	Power and mode buttons, 1 switch jack (stereo, power and 1 assignable with splitter, pending), own drive profile Can access 4 profiles with attendant control. Attendant over-ride default.

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Actuators				
General comments	Smart actuator: can execute Automatic Positioning (from only 1 or up to 6 steps each sequence), up to 4 pre-set positions (1 per Drive). Automatic Positioning with tilt, recline, and center mount legs. Actuator Speeds programmable. Drive lock out programmable on / off	Up to 12 axes of seat motion can be defined using up to 6 actuators, either singly or in multiple combinations. Inhibits can be used to slow or stop chair or any actuator motion depending on position of an actuator. Programmable actuator speed	Up to 12 axes of seat motion can be defined using up to 6 actuators, either singly or in multiple combinations. Inhibits can be used to slow or stop chair or any actuator motion depending on position of an actuator. Programmable actuator speed, start and stop angles	Up to 5 actuators. Enhanced recline: return to upright is preceded by a partial tilt back Able to drive in full elevation, tilt Q-Mac - can program creep drive profile: speeds, accelerations, creep angle and drive lock out angle
Pressure Relief Signal	Series of beeps and a visual prompt to perform pressure relief. Chair will not drive until the mode switch is hit. Frequency is programmable.		Can program individualized reminder for pressure relief. Can program for set time or as an interval. Will repeat to programmable frequency until confirmed. Optional audible alert.	
Other				
Other comments	Memory card works on Expandable level electronics only (4 Drive Systems). Can store/archive multiple systems or individual drives in a library for downloading to other systems. MK6 Laptop IVS (7/08) can view / change / print programmed settings	3 rd party additional modules available from HMC, others pending	User Reminder feature-programmable time or interval with customized wording programmed in PC programmer. Maintenance Reminder feature-programmed by days or miles. Can be individualized with PC programmer to input company name / number or other text.	