



DARK WHEEL

DJ MIDI CONTROLLER FEATURING CDJ-2000/NXS, ENCODER, JOGWHEEL, HOTCUES

TECHNICAL SPECIFICATIONS

CHASSIS

- Full metal chassis
- CNC made panels, brushed and double black anodized 3mm aluminium, polished bare metal side surfaces
- Engraved logo, product name (no painting, no laser cut)
- Dimension: 207 x 65 x 38(52) mm
- Weight: 450 grams

CONTROL ELEMENTS

- CUE/PLAY: Original Pioneer CDJ-2000 (NXS) panel with low latency short-stroke tactile switches and original LED light pipe rings. Buttons available in black (optionally silver)
- JOGWHEEL: High quality magnetic hall encoder (10bit analog stepless, high TPR/resolution), ball bearing for multi spinning support. Full metal knob
- ENCODER: 2 original Panasonic encoder, soft click (low pressure) push rotate encoder, 20 TPR. Full metal knobs with concave top shape
- BUTTONS: 8 original MEC tactile switches (US made), bicolor illuminated LED's (3 red/green, 4 yellow/green, 1 blue unicolor)
- INDICATOR LED's: 2 LED's between encoder (unicolor: orange, blue), 2 Jogwheel LED's (bicolor: red/green)

PRINTED CIRCUIT BOARD

- Bottom layer PCB: Dark Board (CAD factory made pcb, dual layer, black glossy surface, immersion gold contacts). Mounted CPU: Teensy 3.2 (72 MHz 32 bit ARM processor)
- Top layer sandwich PCB: Dark Wheel control elements carrier PCB, smd components soldered in SMT (surface-mount technology), I2C bus connected to Dark Board

IN/OUTPUTS

- USB-B IN: Connects Dark Wheel to MIDI host
- USB-A OUT (optionally): Available if an active hub is mounted on board. Intended use: connect additional MIDI devices in daisy chain
- DC Power IN (5.5/2.5mm, center pin +5V): Only available if USB-A OUT and hub is mounted. DC Power IN is not needed for operation (USB bus powered, consumption ~ 100mA). Intended use: Optional power for USB-A OUT connected devices and Dark Wheel

FIRMWARE

- MIDI class compliant, no driver needed
- Multi-deck and multi-layer support. Built in 'Power-On Configuration Setup' to customize user settings/preferences
- Supporting: 1-4 channels, multiple layers, multiple devices

DARK WHEEL FEATURES

ENHANCED MIDI MAPPING CONCEPT

- Each control sends and/or receives unique MIDI messages for individual MIDI mapping. MIDI class compliant protocol, no drivers or additional software needed
- Additional firmware features: 3 buttons are highly customizable: DECK SELECT, SHIFT and BANK (via built in 'Power-On Configuration Setup'). These buttons can be customized as 'normal buttons/LED' with MIDI In/Outbound OR as full automated controls (the firmware covers all logic, the mapping keeps lean)
- Examples: DECK can toggle between decks (A/B, A/C, ABCD...), SHIFT can add an additional layer, BANK can add 2-4 bank layers
- Users can customize 'their' Dark Wheel to their needs - from a single 1 deck controller with a few control to a multi-layer multi-deck device
- This concept allows easy mappings with one mapping file, independent of the number of decks or connected Dark Wheels

DECK SELECT BUTTON

- Bicolor illuminated button (red/green), MIDI I/O mappable or firmware triggered
- Users can customize Deck Select Mode to define button behaviour (e.g. button only, 2 or 4 deck toggle, deck assignments etc.)
- Dark Wheel remembers selected user mode and last used deck/channel on next Power-On

CUE PLAY PANEL

- Original PIONEER CDJ-2000 (NXS) panel, the original short-stroke tactile switches support the typical immediate action response
- Illuminated LED rings with mappable MIDI inbound (CUE: magenta, PLAY: green)

JOGWHEEL

- Optimized for multiple purposes. The high resolution messages (~ 600 ticks/turn) results in smooth and sensitive response
- CUE/GRID adjustments & PITCH BENDING: The full metal knob (without a dedicated top platter and outer ring) supports Cue/grid movements and Pitchbend via mapping features
- BEAT SEARCHING with dynamic acceleration: The ball bearing architecture enables multiple self rotations at high speeds
- ENCODER SIMULATION: Additional messages (~20 ticks/turn) allow any encoder mappings, e.g. using jogwheel in Song Browsing or as FX parameter (e.g. in other BANK or SHIFT layer)

ENCODER

- Two Push/Rotate Encoder (20 TPR) with full metal knobs and top shapes. The low pressure and short-stroke encoder feels very pleasant
- Free for mapping, in Traktor typically mapped to Beat jump (left encoder) and Looping On/Off and size (right encoder)
- Two unicolor LED's (orange, blue) close encoder with MIDI receive inbound

HOTCUE BUTTONS

- Four bicolor illuminated buttons, typically used for hotcue 1-4 mapping. LED's (yellow/green) with MIDI receive inbound
- Additional layer supported for enhanced mappings (e.g. using SHIFT for hotcue 5-8 or BANK for FX pads etc)

SHIFT BUTTON

- Bicolor illuminated button (red/green), MIDI I/O mappable or firmware triggered
- Users can customize SHIFT button behaviour as 'normal button/LED' with MIDI In/outbound or a button which activates a 2nd SHIFT layer (modifying notes of other controls)
- SHIFT layer can be activated during hold [default], optionally also latching toggle mode possible (this allows the usage of SHIFT as an additional BANK button)

MID BOTTOM BUTTON

- Unicolor illuminated button (LED blue), free for user MIDI mapping
- MID Button offers layer specific notes (same as on all buttons) and a global note to simplify mappings of DJ application SHIFT notes

BANK LAYER BUTTON

- Bicolor illuminated button (red/green), MIDI I/O mappable or firmware triggered
- Users can customize BANK button behaviour as 'normal button/LED' with MIDI In/outbound or a button which activates 2 or 4 banks (modifying notes of other controls)
- BANK button can be customized similar to SHIFT (2nd bank on hold, kind of an additional SHIFT), or in latching mode [default]. Button walks thru all 4 banks in 4 bank mode
- Any combination with SHIFT supported, which results in max. 2x4=8 layer in total

POWER-ON CONFIGURATION SETUP

Holding a BUTTON during power on activates the 'Power-On Configuration Setup', allowing customizing user settings/preferences

All changes are stored permanently. Supported setting options (holding dedicated button, using Hotcue 1-4 to select favourite mode):

- 4 DECK MODES: normal button/LED - 2nd deck on hold - 2nd deck latching - 4 decks toggling
- 4 ABCD MODES for 2 decks: A/B - A/C - B/D - C/D
- 3 SHIFT MODES: normal button/LED - SHIFT layer on hold - SHIFT layer latching
- 4 BANK MODES: normal button/ LED - BANK 2 on hold - BANK 2 latching - 4 BANK's

Additional customizing, holding:

- SHIFT + BANK on power on: RESET to default settings
- RIGHT ENCODER used to calibrate JOGWHEEL rotation threshold (sensitivity for smallest movements)

DARK WHEEL MIDI CHART

FIRMWARE 2022-12-26 UPDATES IN MAGENTA

MIDI SEND									
CONTROL ELEMENT		NORMAL MODE				SHIFT MODE			
		BANK 1	BANK 2	BANK 3	BANK 4	BANK 1	BANK 2	BANK 3	BANK 4
MIDI Channel (top button)		01	02	03	04	61	62	63	64
Left Encoder	Push	VINYL	CC 11	CC 12	CC 13	CC 70	CC 71	CC 72	CC 73
	Rotate	CC 14	CC 15	CC 16	CC 17	CC 74	CC 75	CC 76	CC 77
Right Encoder	Push	CC 18	CC 19	CC 20	CC 21	CC 78	CC 79	CC 80	CC 81
	Rotate	CC 22	CC 23	CC 24	CC 25	CC 82	CC 83	CC 84	CC 85
Jogwheel Touch	CDJ mode	21	22	23	24	81	82	83	84
	VINYL mode	25	26	27	28	85	86	87	88
Jogwheel Rotate	JOG (CDJ)	CC 26	CC 27	CC 28	CC 29	CC 86	CC 87	CC 88	CC 89
	JOG (VINYL)	CC 34	CC 35	CC 36	CC 37	CC 94	CC 95	CC 96	CC 97
	as Encoder	CC 30	CC 31	CC 32	CC 33	CC 90	CC 91	CC 92	CC 93
Hot Cue 1		05	06	07	08	65	66	67	68
Hot Cue 2		09	10	11	12	69	70	71	72
Hot Cue 3		13	14	15	16	73	74	75	76
Hot Cue 4		17	18	19	20	77	78	79	80
CUE		41	42	43	44	101	102	103	104
PLAY		45	46	47	48	105	106	107	108
SHIFT (bottom left button)		49	50	51	52	49	50	51	52
Mid (bottom mid)		53	54	55	56	113	114	115	116
BANK (bottom right button)		57				117			

- Controls send Notes 01-125 (NoteOn 0x9 messages, value 127/0) or CC 10-93 (Control Change 0xB)
- 3 buttons (MIDI Channel, SHIFT, BANK) are highly customizable, layer 2-8 (BANK 2-4, SHIFT) are optional
- Jogwheel: High Resolution (approx. 600 ticks/turn) for DJ Jogwheel mapping, additional LoRes messages with approx. 20 ticks/turn allow encoder mappings (e.g. using jogwheel for song browsing)
- SEND Enhancements to address DJ application specific features:
 - Jogwheel touch: Left Encoder Push sends Note 121 (127/0) in BANK1, without 0 in SHIFT (latching)
 - Supporting DJ application SHIFT: Mid (bottom) control sends Note 123 (127/0) in ALL layers
 - Pad Mode Toggle: BANK or MIDI Channel change send Note 124 (127/0) in BANK1, Note 125 in BANK2
- NEW: Jogwheel now TOUCH sensitive. Jogwheel TOUCH notes added (Notes 21-28, 81-88)**
- NEW: Jogwheel sends new VINYL messages. Left Encoder toggles CDJ / VINYL mode (and sends CC 10)**

MIDI RECEIVE (LED)									
CONTROL ELEMENT color		NORMAL MODE				SHIFT MODE			
		BANK 1	BANK 2	BANK 3	BANK 4	BANK 1	BANK 2	BANK 3	BANK 4
MIDI Channel	green/red	01	02	03	04	61	62	63	64
Encoder (upper LED)	orange	CC 10	CC 11	CC 12	CC 13	CC 70	CC 71	CC 72	CC 73
Encoder (lower LED)	blue	CC 18	CC 19	CC 20	CC 21	CC 78	CC 79	CC 80	CC 81
Jogwheel (left)	green/red	firmware controlled (no MIDI input), LED indicates CDJ / VINYL mode GREEN: CDJ mode, RED: VINYL mode, OFF: TOUCH in VINYL							
Jogwheel (right)	green/red	firmware controlled (no MIDI input), LED indicates Jogwheel messages OFF: no CC's, GREEN: JOG (CDJ) CC's, RED: JOG (VINYL) CC's							
Hot Cue 1	green/yellow	05	06	07	08	65	66	67	68
Hot Cue 2	green/yellow	09	10	11	12	69	70	71	72
Hot Cue 3	green/yellow	13	14	15	16	73	74	75	76
Hot Cue 4	green/yellow	17	18	19	20	77	78	79	80
CUE	magenta	41	42	43	44	101	102	103	104
PLAY	green	45	46	47	48	105	106	107	108
SHIFT	green/red	49	50	51	52	N/A			
Mid (bottom mid)	blue	53	54	55	56	113	114	115	116
BANK	green/red	57	N/A			117	N/A		

- LED receive Notes 01-123 (NoteOn 0x9) or CC 10-81 (0xB), Note/CC=LED, value=color. Unicolor LED values 0=OFF, 1(or 127)=ON, 2=flashing. Bicolor LED: 0=OFF, 1(or 127)=1st Color, 2=2nd Color, 3=1st Color flash, 4=2nd Color flash, 5= 1st<->2nd flash. **Both jogwheel LED's are firmware controlled (no MIDI IN)**
- 3 LED's (MIDI Channel, SHIFT, BANK) receive MIDI messages only if related firmware triggering disabled
- RECEIVE Enhancements to address DJ application specific features:
 - Supporting DJ application SHIFT LED: Mid (bottom) LED receives Note 123 (127/0) in ALL layers

