# *Intelligent MIDI interface for two-manual organ systems*

BERIO DUO

Description, installation instructions and user manual.

Berio MIDI are microcomputer systems, which are able to connect your keyboard or another musical instrument with musical electronic system equipped with MIDI interface. Keyboard (or another instrument) performance may be e.g. recorded by PC, merged with performance of other "MIDI signal source" (e.g. MIDI sequencer, duplicate keyboard, foot-keyboard), etc.
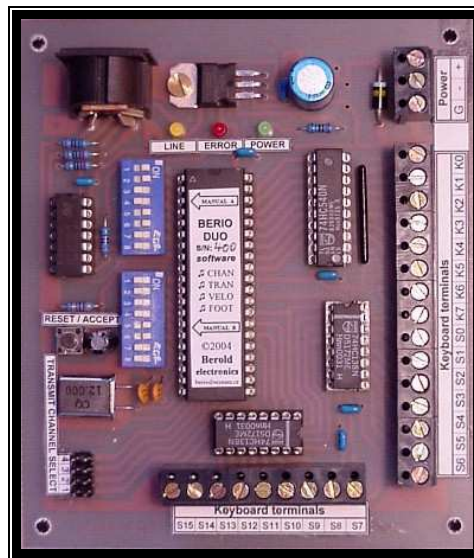
Technical characteristics:

♦ *Input data* - input data for Berio MIDI modules are signal from contacts of keyboard keys or whatever keypad providing contact of your choice. Berio DUO system is able to serve up to 2 x 64 keypad contacts in two manuals. Keyboard state is scanned in time multiplex way. This means that keyboard with both manuals (128 switches) may be connected to Berio DUO via 24 wires only. But it's necessary to connect one cheap small diode under each keypad. Diode and keypad wiring is described on diode matrices diagram below (see supplement). All wires on Berio DUO board are terminated by screw-connector.

♦ *Output data* - as output data standard MIDI signal is generated. System board is equipped with standard 5-pin DIN connector MIDI OUT, which may be connected via standard MIDI cable to a personal computer or electronic keyboard with MIDI IN input. Standard MIDI cable schematic is drawn below (see supplement).

♦ *MIDI channel setting* - system is able to transmit MIDI data on two independent MIDI channels. One of selected channels is used for first manual and other channel is used for second manual. MIDI channel select is provided through miniature DIP switches located on system board.

Change in DIP setting is accepted every time when all keypads and both Sustain pedals are released. Meaning of DIP settings is described in table (see supplement).

- ◆ **Transposition setting** - system is able to transpose generated MIDI data over eight entire octaves, lowest keypad sound is always "C" note. Transposition feature is possible for each manual independently. Transposition value is selected by miniature DIP switches located on system board. Change in DIP's setting is accepted by system every time when all keypads and both Sustain pedals are released. Meaning of DIP settings is described in table (see supplement).

- ◆ **Velocity setting** - Berio DUO system is intended to use in organ systems where velocity is not sensed, therefore velocity level in transmitted MIDI data is fixed (in compliance with MMA recommendations).

- ◆ **Indication LEDs** - system is equipped with three LED diodes:

  - • Green LED *Power* indicates that power supply of proper polarity is present.

  - • Red LED *Error* indicates any critical error due to which the system can't generate MIDI data. When system action is proper, this LED flashes for a short time only after power up. Exception to this rule is "Demo mode", which is described in detail in relevant paragraph.

  - • Yellow LED *Line* - indicates data flow on MIDI line. It's useful when some communication problems are being located, esp. during system installation and testing. LED Line shortly flashes after system reset or power up.

- ◆ **Power supply** - system board is powered by DC voltage between 8 and 25 Volts. Supply current is approx. 25 mA, voltage polarity must be respected. Regular power supply adapter for 230V/50Hz may be used (no special requirements).

- ◆ **Input digital filtering** - for better performance, the Input digital filtering unit is implemented in the system. This unit should eliminate the surges on keypad contacts. Keyboard state is read periodically in approx. one-millisecond intervals. State of every keypad must be repeatedly read as unchanged. Only then a MIDI message can be sent on MIDI line.

- ◆ **Absolute polyphony** - Berio MIDI system does not restrict polyphony in any way. It means that if, in theory, all keys on keyboard are pressed simultaneously, all corresponding data will be sent on MIDI line.

- ◆ **Demonstration song** - if three lowest keypads on manual A are pressed during system start up, Berio module plays short demonstration song. While it plays, red LED *Error* comes on. When demo song has finished, LED Error is goes off and system begins normal operation.

- ◆ **Diode matrix** - diode matrix should be implemented near keyboard contacts. Matrix wiring is shown in schematic (see supplement).

- *Damper / Sustain pedal (foot switch)* - two pedals (foot switches) may be connected to system Berio DUO, interpreted as Damper / Sustain. This two pedals are connected via keyboard diode matrix as the highest keypad in each manual (alternative function of highest keypad).

- *ESD protection* - system is based on high speed CMOS technology. Protection against damages due to electrostatic discharges is assured by clamp diodes on all terminals for keyboard.

- *Generated code compatibility* - MIDI code generated by Berio DUO system is compatible with any device made by the following manufacturers:

360 Systems, Ad Lib, ADA, Adams-Smith, ADB, Akai, AKG Acoustics, Alesis, Allen & Heath Brenell, Allen Organ Co., AMEK Systems & Controls, Aphex, Apple Computer, ART, Artisyn, Audio Architecture, Audio Veritrieb, Audiomatica, Avab Electronik, Axxes, Baldwin, Berold electronics, Blue Sky Logic, Bontempi/Farfisa, Breakaway Technologies, Broderbund Software, BSS Audio, CAE, Cannon Research Corporation, Casio, Clarity, Clavia Digital Instruments, CTI Audio, DDA, Digidesign, Digigram, Digital Music Corporation, DOD Electronics, Dr.Bohm/Musician International, Dream, Dynacord, Elka, E-mu Systems, Encore Electronics, Ensoniq, ETA Lighting, Euphonix, Eventide, F.B.T. Electronica, Fender, Forefront Technology, Fostex, Fujitsu Electric, Gallien Krueger, Garfield Electronics, Grey Matter, GT Electronics/Groove Tubes, Gulbransen, Harmony Systems, Hinton Instruments, Hohner, Hoshino Gakki, Hotz Instruments Technologies, IBM, IDP, InterMIDI, Intone, Inventronics, IOTA Systems, IVL Technologies, J L Cooper, Japan Victor, Jellinghaus, JEN, Jim Marshall Products, Kamiya, KAT, Kawai, Kenton Electronics, Key Concepts, KMX, Korg, KTI, Kurzweil, Lake Butler Sound Company, Larking Audio, Lexicon, Lone Wolf, Lowrey, Marquis Musi, Matsushita Communication Industrial, Matsushita Electric, Meisosha, Micon Audio Electronics, Microsoft, MIDITEMP, Midori Electronics, Moog Music, Moridaira, Music Quest, Musonix, New England Digital, Nishin Onpa, NSI Corporation, Oberheim, Opcode, Orban, Palm Tree Instruments, Passac, Passport Designs, Peavey Electronics, Perfect Fretworks, PianoDisc, PPG, Quasimidi, Rane Corporation, Real World Design, Richmond Sound Design, RJMG/Niche, Rocktron Corp., Rogers Instrument Corp., Roland, S&S Research, Sequential Circuits, SIEL, Solid State Logic, Solton, Sony, Soundcraft Electronics, Soundtracs, Southern Music Systems, Southworth, Spatial Sound/Anadi Inc, Spectrum Design & Development, Stepp, Strand Lighting, Studer-Editech, Suzuki Musical Instrument Mfg., Synthaxe, TC Electronic, TEAC, The Software Toolworks, Trident, Twister, Uptown, Voce, Voyce Music, Voyetra/Octave Plateau, Waldorf Electronics, Warner New Media, Waveframe, Wersi, Yamaha, Yes Technology, Zero 88 Lighting, Zeta Systems a Zoom.

MIDI systems of other manufacturers are probably compatible too, but this compatibility is not guaranteed.

- *Installation recommendations* - wire length between keypad contact and Berio DUO system board should be as short as possible. The wires must not be grounded, connected to power supply or connected to each other. In case, when number of connected keypads is smaller than nominal Berio module keypad number, keypad contacts should be connected in order from lowest keypad to higher keypads. Some highest keypad positions then remains unconnected. Berio DUO module detects automatically, which keypads are connected and which are not.

- *Mechanical data*
  - Dimensions: 107 mm x 125 mm x 25 mm (4.22" x 4.93" x 1")
  - Weight: 120 g (4.29 ounce)

- *Guarantee:* 2 years (24 months)

Berold electronics

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Orders are accepted by

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Technical questions and order via e-mail at berio@akordeoncentrum.cz.

Business identification number: 125 27 921.

Commissions may be sent via post too.

There are two octuple DIP switches on the Berio DUO board. Due this two switches MIDI channel and transpose may be set. By first octuple DIP switch may be controlled MIDI channel and transpose position of manual A, by second DIP switch may, be in the same way, controlled manual B.

MIDI channel select

Channel number	Jumper presence:			
	No. 1	No. 2	No. 3	No. 4
1	OFF	OFF	OFF	OFF
2	ON	OFF	OFF	OFF
3	OFF	ON	OFF	OFF
4	ON	ON	OFF	OFF
5	OFF	OFF	ON	OFF
6	ON	OFF	ON	OFF
7	OFF	ON	ON	OFF
8	ON	ON	ON	OFF
9	OFF	OFF	OFF	ON
10	ON	OFF	OFF	ON
11	OFF	ON	OFF	ON
12	ON	ON	OFF	ON
13	OFF	OFF	ON	ON
14	ON	OFF	ON	ON
15	OFF	ON	ON	ON
16	ON	ON	ON	ON

Example:

If you want to transmit MIDI data generated by manual A on channel No. 9, set appropriate (to manual A) DIP switches Nos. 1, 2 and 3 into "OFF" position and switches No. 4 into "ON" position.

If you want to transmit MIDI data generated by manual B on channel No. 9, set appropriate (to manual B) DIP switches Nos. 1 and 2 into "ON" position and switches Nos. 3 and 4 into "OFF" position.

Transposition of manual settings

Chosen transposition	DIP switch positions:		
	No. 5	No. 6	No. 7
C_3	OFF	OFF	OFF
C_2	ON	OFF	OFF
C_1	OFF	ON	OFF
C	ON	ON	OFF
c	OFF	OFF	ON
c^1	ON	OFF	ON
c^2	OFF	ON	ON
c^3	ON	ON	ON

Transposition = tone of the lowest key on keyboard.

Example of transposition setting: If the lowest key (on one of two manuals) should be C_2, set appropriate DIP´s Nos. 6 and 7 OFF and DIP´s No. 5 ON.

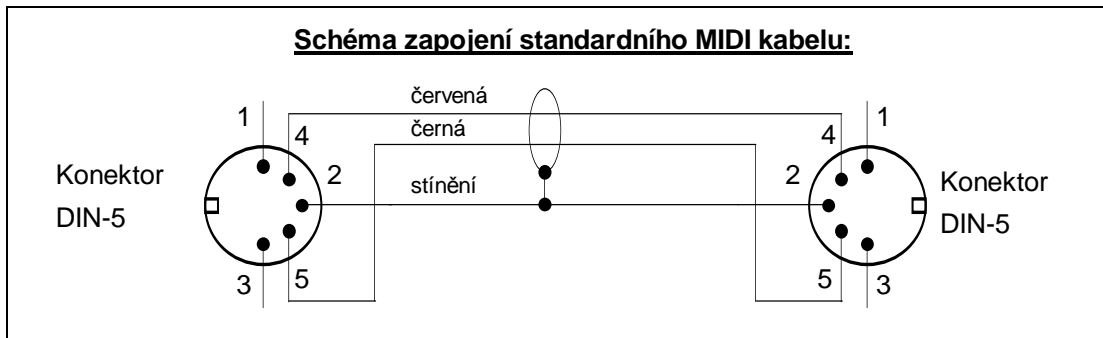DIP switch No. 8 in each octuple DIP is not wired and its setting does not have any effect.

Notes:

c^1 = "middle C" in MIDI terminology

Should a tone corresponding with pressed keypad (depending on transposition used) be higher than g^6, it will be interpreted as C_3, C_3#, D_3 etc.

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Standard MIDI cable wiring:

č:ervená = red; černá = black; stínění = shielding, konektor = connector

BERIO MIDI [Intelligent MIDI interface]   Date: 15-Jan-2004
MODEL: BERIO MIDI DUO   Version: 1.0

MIDI Implementation Chart

Function...		Transmitted		Recognized	Remarks
Basic Default		1 - 16		x	determined by DIPs
Channel : Changed		1 - 16		x	
Demo		1		x	
Note Number		0 - 127		x	
Velocity : Note ON		64		x	fixed
Note OFF		64		x	fixed
After Key's		x		x	
Touch Ch's		x		x	
Pitch Bender		x		x	
1		o	*1	x	Modulation Wheel (MSB)
2		o	*1	x	Breath controller (MSB)
7		o	*1	x	Volume (MSB)
11		o	*1	x	Expression (MSB)
64		o	2	x	Damper/Sustain pedal
65		o	*2	x	Portamento
Control 66		o	*2	x	Sustenuto pedal
67		o	*2	x	Soft pedal
68		o	*2	x	Legato pedal
Change 69		o	*2	x	Soft 2 pedal
120		x		x	All sounds off
121		x		x	Reset all controllers
123		x		x	All notes off
Program Change		x		x	
System Exclusive		x		x	
Song pos.		x		x	
Common : Song sel.		x		x	
Tune req.		x		x	
System : Clock		x		x	
Real time : Reset		x		x	
Active sense		x		x	

Note:
*1 - Berio WIND in certain implementation only.   x : No
*2 - Version with pedal enhancement only.   o : Yes