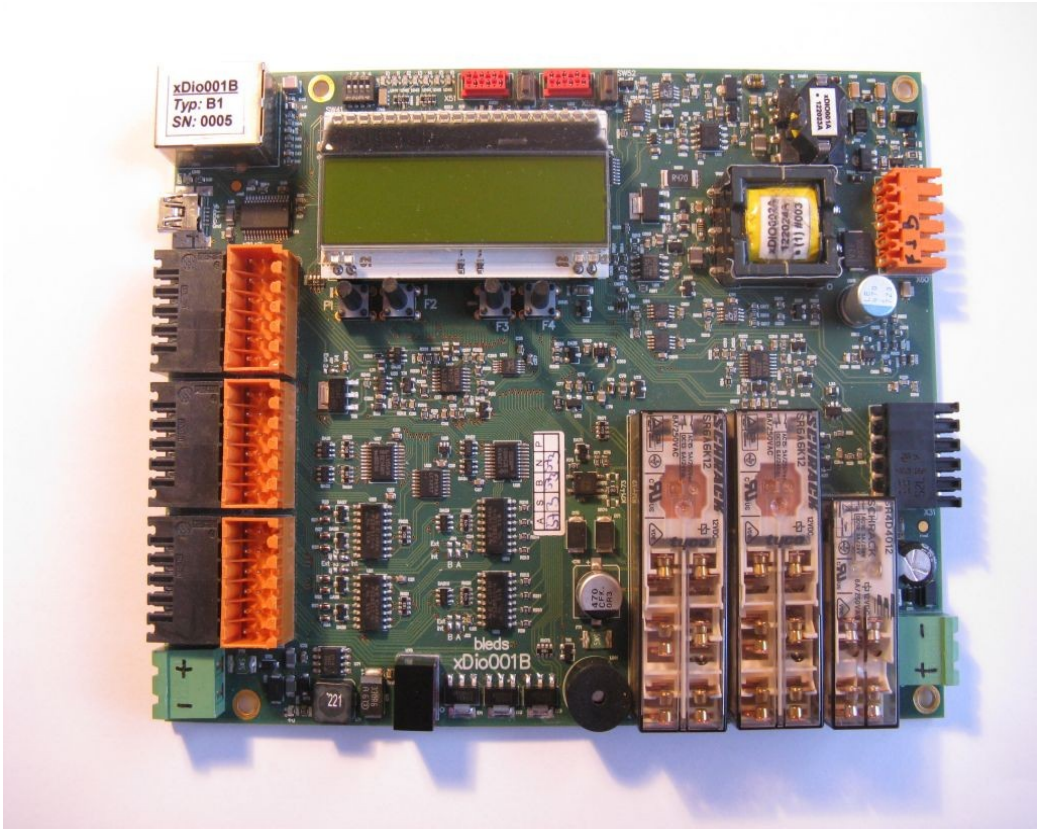

xDIO

Universal X-Ray System Interface

Revision History		
Rev.	*Date*	*changes*
v1.00	17.06.11	Initial Release

General

Universal X-Ray System Interface for operating X-Ray Source, HV-Generator and X-Ray Camera. Ethernet (TCP/IP) Interface for configuration and operation. Various digital and analog interface IO for supervising operation and synchronizing with external signals

Specifications	
Supply	**+24 Vdc** ± 5% Supply Input 0.1A (no external load) 1.1A self resettable PTC Fuse (Main Supply also used for kV-Generator Supply)
	+24Vdc Output for X-Ray Safety and optional Power Outputs 1A max (self resettable PTC Fuse)
	+6.5Vdc Output for Radicon Camera Supply 1A max
	+24Vdc Output for HV-Generator Supply 5A max (unfused) controlled via safety relay circuit over communication commands
	+3.3Vdc Reference Voltage (Ri = 1kΩ compensated, 10mA max)
X-Ray Safety	- safety relay circuit EN954-1 category 3(4) with forcibly guided contacts according to EN 50205 and selfcontrol - Interlock Switch - HV Indicator Lamp (disables HV-Generator if broken) - X-Ray Indicator Lamp
Interface	Ethernet 10BaseT , TCP/IP
	USB (Uart, Serial COM-Port) Option
Digital Outputs	- 8 x LVC Logic 3.3V (max. 24mA) - 8 x Optocoupler 24V (max. 25mA) (active high) (Local +24V or external Supply (+5-24Vdc) selectable via solderbridge) - 1 x Open Drain 24V (0.5A max)
Digital Inputs	- 8 x LVC Logic 3.3V (5V tolerant) (active high, Pulldown 10kΩ) - 8 x Optocoupler 24V (~10mA, 2.2kΩ) (active high) (Local or external GND selectable via solderbridge)
Analog Outputs	- 1 x 4 - 20mA (Local or external +24V Supply selectable via solderbridge) - 2 x 0 – 10V (Ri = 100Ω compensated)
Analog Inputs	- 1 x 0 – 10V (Ri = 10MΩ) - 2 x NTC 5kΩ (Ri = 4.7kΩ, Uref 3.3V) external / local Temperature Monitor
HV-Generator Interface	- kV-Enable Digital Output: (0V = kV ON , Open = kV OFF) Open Collector active low (Ri = 100Ω) , +15V max) - kV-Status Digital Input (Ri = 10kΩ) , +24V max) (active high) - kV-Reference Analog Output 0 – 10V (Ri = 100Ω compensated) - kV-Monitor Analog Input positive 0 – 10V (Ri = 10MΩ) - mA-Monitor Analog Input positive 0 – 10V (Ri = 10MΩ) - mA-Monitor Analog Input negative 0 – 10V (Ri = 31kΩ)

X-Ray Source Interface	- Filament Current Output (0 – 2.5A, 0 – 5V) constant current , voltage, digital PID controller (mA Reference) - Bias Voltage Output (negative, -20 to -400V) short circuit protected, < 1mA Load - X-Ray Source Temperatur Monitor (NTC 5kΩ (Ri = 4.7kΩ, Uref 3.3V)) - Hardware Limit Controller for Filament current / voltage and Bias Voltage (Setpoints with digital non volatile Potentionmeter) - Fast X-Ray ON / OFF Control via Bias Voltage (50ms minimum X-Ray Time)
Local User Interface Option	- 3 Line 16 Digit alphanumeric Lcd Display with Backlight (Intensity variable) - 4 Buttons for selection and setting of application Parameter and Status - 1 Beeper for acustic messages - 7 Status LEDs (TCP/IP Connection, kV/X-rayStatus, Error, TX/RX via Ethernet) - 4 x DIP-Switch for application options and enables
System Interface	- Application Parameter stored in non volatile EE-Prom - Programming Interfaces for application Main Microcontroller and Digital Controller DSP (includes Reset Button)
Standard Firmware Application	- X-Ray Control according Parameter and Status via communication interface - External Trigger for autotimed sequences (X-Ray ON / OFF, Trigger for X-Ray camera with variable duration and delay times) - Error and Warning processing for System and X-Ray status - Customer specific Firmware on request