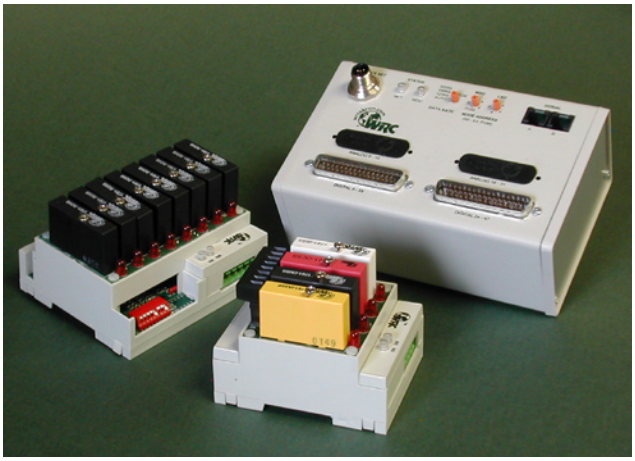


SmartMux— A Versatile Family of I/O Solutions

WRC's SmartMux family provides more options for connecting to distributed I/O than any other I/O component or systems manufacturer. The family consists of two styles with many choices within each style:

- SmartMux™ for low-cost, versatile I/O applications
- SmartMux-Lite™ for highly distributed, low-cost, low-point count DeviceNet solutions

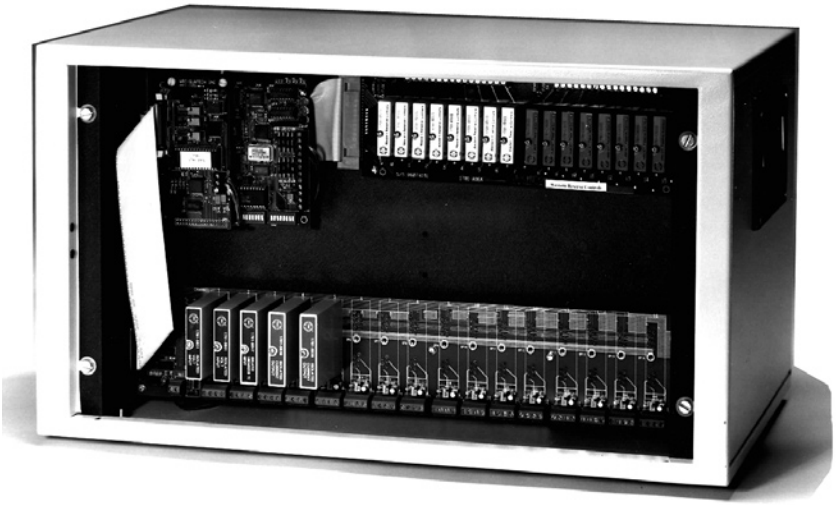
The Original SmartMux

SmartMux is viewed as a remote adapter to the host processor providing scanning of analog and digital values, data concentration, intelligent data processing, communications handling, error detection and protection against erroneous messages.

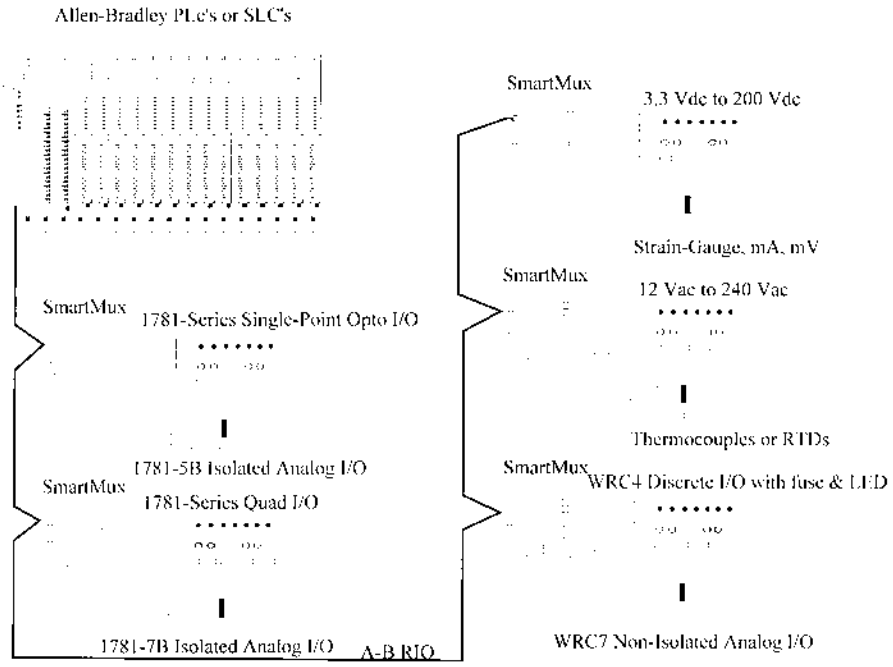
SmartMux supports the 1781-JAx protocol version for Allen-Bradley PLCs using Allen-Bradley's patented Remote I/O Link.

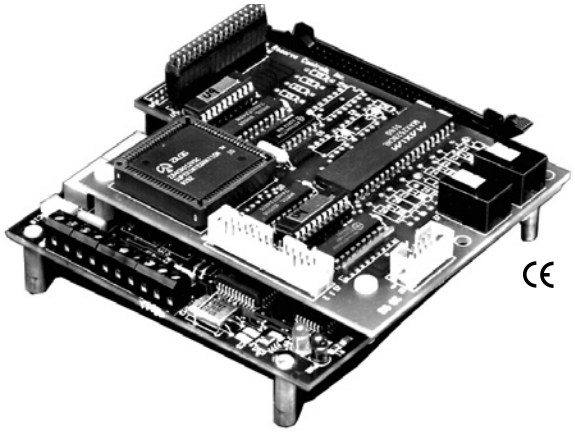
Features

- Integrates up to 32 analog and 24 digital single point I/O into one adapter
- Remote I/O: 10,000' (Allen-Bradley RIO) or 5,000' (RS422/485)



SmartMux linked to 1781-7B Series Input and Output Modules





The Original SmartMux 1781-JBxx

In 1991, when WRC acquired the Single Point I/O Line from Allen-Bradley, the acquisition included two networked I/O adapter products, i.e. 1771-JAB for Allen-Bradley's Remote I/O Link and 1771-JBB a proprietary RS422 network. Since that time, WRC has expanded our line of networked I/O adapters. In 1992, WRC's SmartMux series began to be introduced. The 1781-SmartMux Series had several common characteristics including:

- Open frame construction
- External regulated power supplies of multiple voltage levels required
- Ribbon cabling to I/O circuits
- Dual micro-processor architecture

The SmartMux family works with a variety of hosts over several different industrial I/O networks. Common hosts include:

- Allen-Bradley PLCs - where SmartMux connects directly via the Remote I/O link
- Allen-Bradley SLCs - where SmartMux connects either via a driver provided for the Basic module, or via a 1746-SN scanner module.
- Modicon PLCs - where SmartMux connects directly to the Modbus link

Benefits

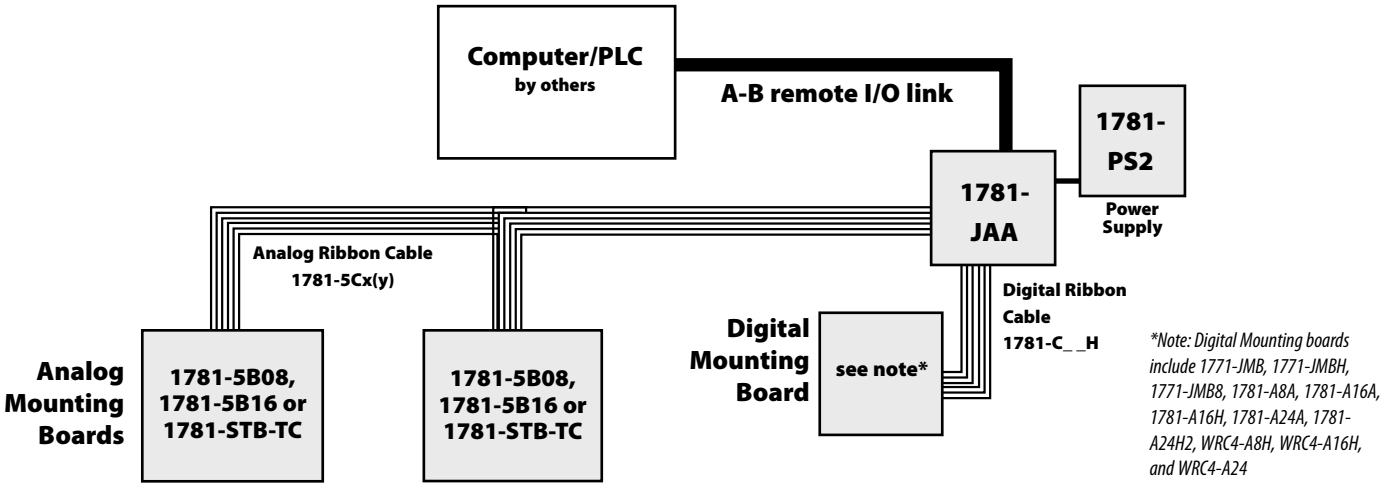
- Low Cost Per Point: more points on one adapter, as well as combining analog and digital functions on one adapter reduces costs
- Flexibility: compatibility with Allen-Bradley Remote I/O Link opens up a wide variety of third-party hardware and software to meet your specific application needs
- Space Savings: the slim size of digital modules and mounting boards allow smaller cabinets and the cost savings of smaller cabinets
- More Applications: enhanced analog and digital function made possible by the buffered memory on the enhanced analog version reduce your needs for limited, special purpose hardware
- Choice of Analog I/O Modules: All analog versions of the SmartMux are available to interface with either 1781-5B or 1781-7B and WRC7 analog signal conditioning modules. To use 1781-5B modules, select the 1781-JxA version of your protocol choice. To use 1781-7B or WRC7 modules, select the 1781-JxA7 version of your choice.

Model #	Network	Protocol	Discrete I/O	Analog I/O
1781-JAA	RIO	RIO	24	32 ~ 1781-5B
1781-JAA7	RIO	RIO	24	32 ~ 1781-7B/WRC7
1781-JAB	RIO	RIO	24	—

Spec	1781-JAB 1781-JAA 1781-JAA7
Ambient	0 to 70°C*
Power	0.5 A @ 5 V dc
Dimensions	5" x 4.6"
Analog Option	±12 V dc @ 0.1 A
Connections	
Digital I/O	50 pin header
Analog I/O	26 pin header
Power	Terminal Strip
Communication	Terminal Strip
Selections	
Address	Dip Switches
Communication	Dip Switches
Communications	Allen-Bradley RIO
Digital I/O	24
Analog I/O**	32 (1781-JAA & JAA7 version)
Protocol	1/4 rack w/block transfer
Speed	57.6, 115.2, 230.4 K baud
Distance	up to 10,000'
Address Range	0 to 15
Pulse Counting	up to 500 Hz
Timed I/O	1 ms resolution
Latching	NA
Pulse Width	NA
Spec	**1781-JAA 1781-JAA7**
Resolution	12-bit
Sample Rate	200 samples/point /sec
	(up to 6400 system samples/sec)
Alarms	NA
Peak/Minimum	NA
Waveforms	NA

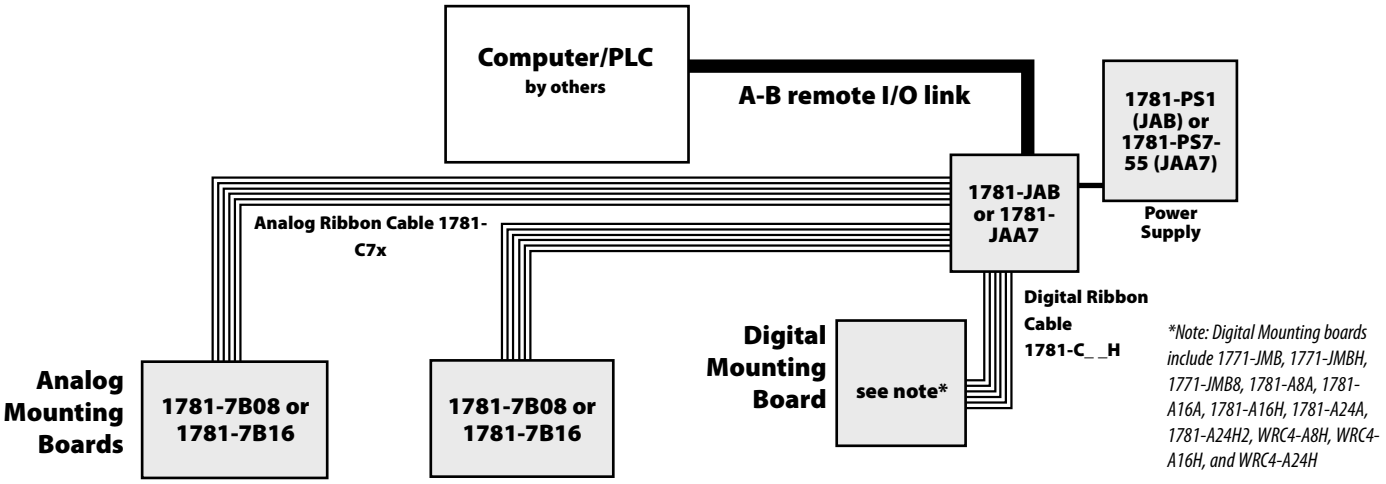
Each version of SmartMux has a different set of capabilities, capacities, specifications and cost. The table at left describes the major differences between each option.

** Contact the factory for extended temperature ranges.*
*** The 1781-JxA versions allow all points to be inputs or outputs. The 1781-JxA7 versions permit outputs in the first 8-channels only.*



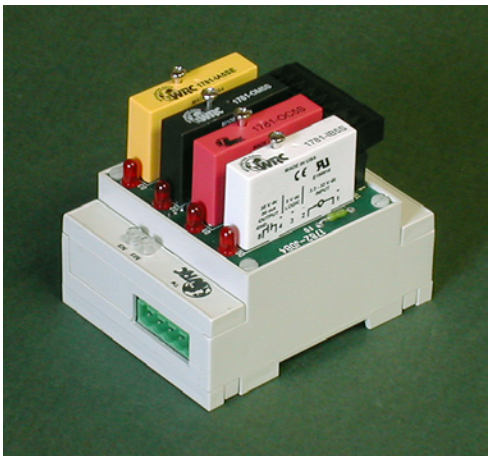
Analog module application:		**Points #1-32: Use 1781-5Bxx inputs or outputs, or 1781-STB-TC**			
Point #1		Point #12		Point #23	
Point #2		Point #13		Point #24	
Point #3		Point #14		Point #25	
Point #4		Point #15		Point #26	
Point #5		Point #16		Point #27	
Point #6		Point #17		Point #28	
Point #7		Point #18		Point #29	
Point #8		Point #19		Point #30	
Point #9		Point #20		Point #31	
Point #10		Point #21		Point #32	
Point #11		Point #22			

Digital module application:		**Points #1-24: Use 1781-_ _ 5S or WRC4- _ _ 5S inputs or outputs**			
Point #1		Point #9		Point #17	
Point #2		Point #10		Point #18	
Point #3		Point #11		Point #19	
Point #4		Point #12		Point #20	
Point #5		Point #13		Point #21	
Point #6		Point #14		Point #22	
Point #7		Point #15		Point #23	
Point #8		Point #16		Point #24	



Analog module application:		**Points #1-8: Use 1781-7Bxx or WRC7-xx inputs or outputs Points #9-32: Use 1781-7Bxx or WRC7-xx inputs only**			
Point #1		Point #12		Point #23	
Point #2		Point #13		Point #24	
Point #3		Point #14		Point #25	
Point #4		Point #15		Point #26	
Point #5		Point #16		Point #27	
Point #6		Point #17		Point #28	
Point #7		Point #18		Point #29	
Point #8		Point #19		Point #30	
Point #9		Point #20		Point #31	
Point #10		Point #21		Point #32	
Point #11		Point #22			

Digital module application:		**Points #1-24: Use 1781-_ _ 5S or WRC4- _ _ 5S inputs or outputs**			
Point #1		Point #9		Point #17	
Point #2		Point #10		Point #18	
Point #3		Point #11		Point #19	
Point #4		Point #12		Point #20	
Point #5		Point #13		Point #21	
Point #6		Point #14		Point #22	
Point #7		Point #15		Point #23	
Point #8		Point #16		Point #24	



1782-JDB4

1782-JDB8

SmartMux-Lite: Specifically designed for highly distributed applications

WRC has extended its line of SmartMux remote I/O adapters to provide fully self-contained, DeviceNet compliant analog and discrete I/O blocks, called SmartMux-Lite.

SmartMux-Lite discrete I/O blocks include 1782-JDB4 and 1782-JDB8, providing 4 or 8 points of discrete I/O respectively. SmartMux-Lite is powered by DeviceNet. Simply choose any combination of inputs and outputs from the wide range of 1781 series of WRC optically isolated modules for your application. All points are individually fused and have a status indication on the mounting board. Two LEDs are provided indicating status of DeviceNet and the status of the SmartMux-Lite block. Configuration is handled through software using WRC's convenient Electronic Data Sheets.

SmartMux-Lite analog I/O blocks include the 1782-JDA4 and 1782-JDA8.

These devices have in common:

- Use of the versatile and extensive line of 1781-7B or WRC7 series of analog signal conditioning modules.
- Fully self-contained
- Powered from DeviceNet
- Status LEDs for SmartMux-Lite status and DeviceNet status

SmartMux-Lite I/O adapters provide an economical, flexible, convenient, and reliable way to add discrete and analog I/O at your machine location with DeviceNet connections back to your controller.

1782-JDA4

WRC's 1782-JDA4 SmartMux-Lite I/O adapters provide 4 user-selectable analog input points operating on DeviceNet. SmartMux-Lite I/O adapters provide an economical, flexible, convenient, and reliable way to add analog inputs at your machine location with DeviceNet connections back to your controller.

Features include:

- User selection of individually isolated 1781-7B__ series of single point analog input modules or differential, low-cost WRC-7__ series of modules. One module required per point.
- Wide range of sensors and signals are supported, including thermocouples, RTDs, process currents, strain gauge, millivoltages, and voltages
- Polled I/O, cyclic I/O, and change-of-state services
- Mix inputs of any type by proper selection of analog modules
- Excitation current is provided for RTDs, potentiometers, strain gauges using the 1781-7B series of modules or WRC7 modules
- Isolated power for two-wire process transmitters is available using 1781-7B35 modules
- Low-cost, non-isolated WRC-7_ modules for 0-10 V and 4-20 mA inputs and outputs
- 10-bit resolution
- Small, compact size
- 1782-JDA4 - 4.17 " long x 3.56 " wide
- Fully self-contained
- Power sourced by DeviceNet
- Two diagnostic LEDs provided
- Easy setup
- Address setting and date rate configured via Electronic Data Sheets or DeviceNet Parameter Object (rotary switches available 1999)
- Convenient DIN-Rail mounting
- Removable screw terminations for DeviceNet connection
- Independent screw terminations for I/ O wiring
- Integral cold junction compensation for thermocouple applications

1782-JDA8

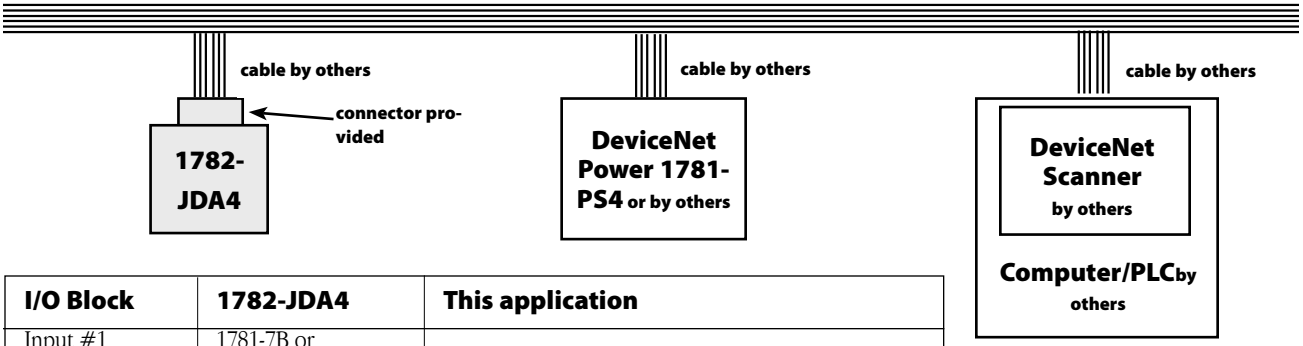
WRC's 1782-JDA8 SmartMux-Lite I/O adapters provide 8 user-selectable analog or discrete I/O points operating on DeviceNet. All points can be analog or discrete inputs. Of the 8 points, up to 4 may be chosen as analog outputs and up to 2 may be chosen as discrete outputs.

SmartMux-Lite I/O adapters provide an economical, flexible, convenient, and reliable way to add discrete and analog I/O at your machine location with DeviceNet connections back to your controller.

Features include:

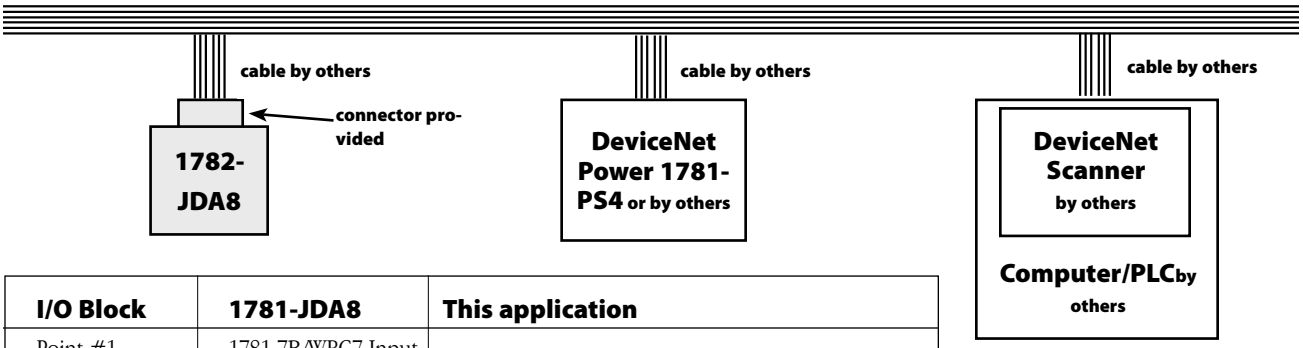
- User selection of individually isolated 1781-7B__ series of single point analog I/O modules or differential low-cost WRC-7__ series of modules. One module required per point.
- Wide selection of sensors and signals are supported, including thermocouples, RTDs, process currents, millivoltages, and voltages.
- Select your choice of 1781-__XS series of discrete I/O modules covering all ranges of ac and dc, discrete I/O applications
- 1781-7B__ modules are individually isolated
- Mix inputs of any type by proper selection of modules
- Excitation current is provided for RTDs, potentiometers, strain gauges using the 1781-7B series of modules or WRC7 modules
- Isolated power for two-wire process transmitters is available using 1781-7B35 modules
- Low-cost, non-isolated WRC-7_ modules for 0-10 V and 4-20 mA inputs and outputs
- 16-bit equivalent resolution - inputs and 12 bit resolution - outputs
- Isolated DeviceNet connection
- Fully self-contained
- Isolated power sourced from 24 Vdc supplied by DeviceNet
- 2 diagnostic LEDs provided
- Isolated DeviceNet communications interface
- 1782-JDA8 - 6.30 " long x 3.56" wide
- Easy setup
- Address setting via software (rotary switches available 1999)
- Data rate setting via software (rotary switches available 1999)
- Output selection uses a combination of a software configuration parameters selected using convenient Electronic Data Sheets, and appropriate module selection
- Convenient DIN-Rail mounting
- Removable screw terminations for DeviceNet connection
- Independent screw terminations for I/ O wiring
- Integral cold-junction compensation for thermocouple applications

DeviceNet cable by others

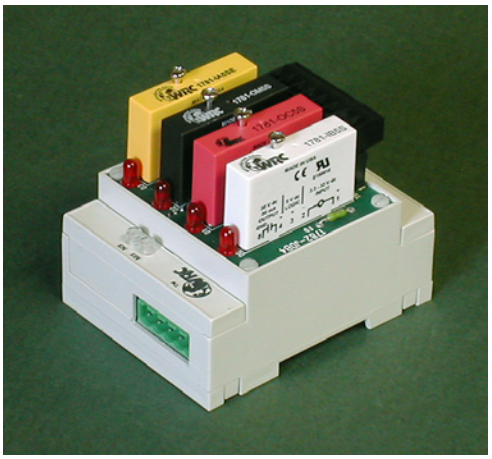


I/O Block	1782-JDA4	This application
Input #1	1781-7B or WRC7 Analog Input Modules	
Input #2	same	
Input #3	same	
Input #4	same	

DeviceNet cable by others



I/O Block	1781-JDA8	This application
Point #1	1781-7B/WRC7 Input or Output Modules or 1781-I_XS	
Point #2	same	
Point #3	same	
Point #4	same	
Point #5	1781-7B/WRC7 Input Modules or 1781-I_XS	
Point #6	same	
Point #7	1781-7B/WRC7 Input Modules or 1781-I_XS, or 1781-O_XS	
Point #8	same	



1782-JDB4

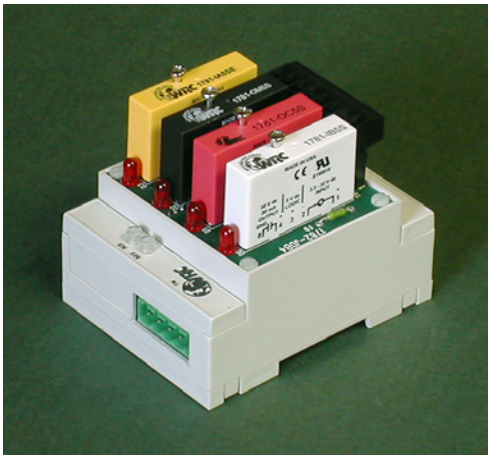
1782-JDB8

1782-JDB4 and 1782-JDB8

WRC's 1782-JDB4 and 1782-JDB8 SmartMux-Lite I/O adapters provide 4 or 8 user-selectable discrete I/O points operating on DeviceNet. SmartMux-Lite I/O adapters provide an economical, flexible, convenient, and reliable way to add discrete I/O at your machine location with DeviceNet connections back to your controller.

Features include:

- User selection of individually opto-isolated 1781-__5S series of single point discrete I/O modules. One module required per I/O point.
- Full range of ac and dc inputs and outputs selectable from 3 Vdc to 240 Vac
- Output ratings to 3 amps continuous (5 amp dc MOSFET output available)
- Individually fused
- Modules are fully isolated; 4000 V typical
- LED indication of operation
- Mix inputs and / or outputs at any voltage level
- Small, compact size
- 1782-JDB4 - 2.80 " long x 3.56 " wide
- 1782-JDB8 - 4.12 " long x 3.56" wide
- Fully self-contained
- Polled I/O, Cyclic I/O, Change-of-State services and Bit Strobe
- Powered from 24 Vdc supplied by DeviceNet
- 2.5 W power consumption
- Two diagnostic LEDs provided convenient setup
- Software configuration at host
- Default configuration is all inputs. Software selection of outputs.
- Configuration via Electronic Data sheet or DeviceNet Parameter Object (rotary switches available 1999)
- Non-volatile memory maintains configuration in the event power is lost
- Convenient DIN-Rail mounting
- Removable screw terminations for DeviceNet connection
- Independent, removable screw terminations for I/ O wiring
- Compliant to DeviceNet Specification 2.0. ODVA tested compliant to DeviceNet specification 1.3



1782-JDB4

1782-JDB8

1782-JDB4-HSC and 1782-JDB8-HSC

DeviceNet High Speed Counter Block

1782-JDB4-HSC and 1782-JDB8-HSC are special versions of WRC's 1782-JDB4 and 1782-JDB8 DeviceNet I/O Block. They are designed to accept rapid pulse inputs up to 10 KHz, for distributed industrial control applications over DeviceNet.

Typical applications could include:

- Turbine flowmeter
- Velocity measurement
- Material handling
- Motion control
- Process control

1782-JDB4-HSC Specifications

Inputs: 3 Outputs: 1
UP/Down Counter: 1 x 16 bit consisting of:

- Preload value: 16 bit
- Accumulator: 16 bit
- Accumulator adjust: 8 bit
- Time Base Counter: 16 bit
- Strobe Register: 16 bit
- On/Off Presets: 16 bit

1782-JDB8-HSC Specifications

Inputs: 6 Outputs: 2 *Choice of either:*
UP/Down Counter: 2 x 16 bit, each consisting of:

- Preload value: 16 bit
- Accumulator: 16 bit
- Accumulator adjust: 8 bit
- Time Base Counter: 16 bit
- Strobe Register: 16 bit
- On/Off Presets: 16 bit **or:**

Bi-directional Counter: 1 x 32 bit consisting of:

- Preload value: 32 bit
- Accumulator: 32 bit
- Accumulator adjust: 8 bit
- Time Base Counter: 16 bit
- Strobe Register: 2 x 32 bit
- On/Off Presets: 2 x 32 bit

1782-JDB4-HSC and 1782-JDB8-HSC

Common Specifications:

- Frequency Response: 10 KHz
- Input Circuit: via 1781-IT5S, 3.3Vdc to 24 Vdc 100μs response time or 1781-IB5S, 3.3Vdc to 24 Vdc 1000μs response time
- Output Circuit: via user selection of 1781-O_5S or R_5S modules to meet the application
- Termination: via removable plug-in terminal strips
- Configuration: via DeviceNet from host
- Powered off of DeviceNet

1782-JDB-HSC operation:

1782-JDB-HSC modules reside on DeviceNet as intelligent, "Group 2 Only" Server on the DeviceNet system and its I/O and registers are read by and written from a DeviceNet Master. 1782-JDB-HSC supports the Predefined Master/Slave Explicit Message Connection, Polled I/O, Cyclic I/O and Bit Strobe.

The device address, data rate, operating modes, selection of counter types, presets, accumulator adjusts, and On/Off presets are changed via software configuration from the host system. Each 1782-JDB-HSC has two green/red LEDs, one for module status and one for network status. Each I/O point is equipped with a status LED and is individually fused.

Up/Down Counters can be programmed to count either up or down. Each has three inputs: A Preload Input and a Strobe input. In addition, each counter has one output, with a Programmable on and off Output Preset.

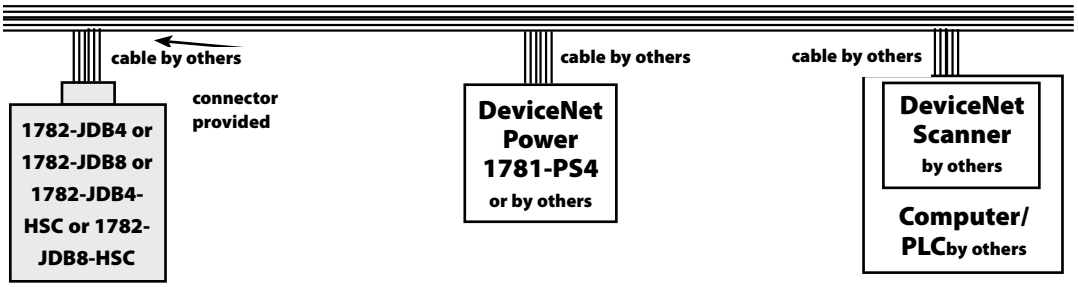
Bi-directional Counters have six inputs and two outputs, and may be separately configured for Up/Down, Pulse/Direction, or A Quad B operation. The Counter has two independent sets of Strobe Inputs and Strobe Registers. Each counter also has two outputs, with each output having programmable on/off Presets. A Disable input can be used to suspend counting.

Dimensions:

1782-JDB4-HSC: 2.75" x 3.5" x 2.5" tall (including modules) mounted on DIN rail

1782-JDB8-HSC: 4.25" x 3.5" x 2.5" tall (including modules) mounted on DIN rail

DeviceNet cable by others



I/O Block	1782-JDB4/8	This application:
Point #1	1781-I_5S, 1781-O_5S, 1781-W _5S or 1781-R_5S in any combination	
Point #2	same	
Point #3	same	
Point #4	same	
Point #5 JDB8 only	same	
Point #6 JDB8 only	same	
Point #7 JDB8 only	same	
Point #8 JDB8 only	same	

I/O Block	1782-JDB4-HSC	This application:
Point #1	1781-IB5S or 1781-IT5S	
Point #2	same	
Point #3	same	
Point #4	1781-0_5S or 1781-R_5S	

I/O Block	1782-JDB8-HSC	This application:
Point #1	1781-IB5S OR 1781-IT5S	
Point #2	same	
Point #3	same	
Point #4	same	
Point #5	same	
Point #6	same	
Point #7	1781-O_5S or 1781-R_5S	
Point #8	same	

W2 SmartMux is a family of fixed function, networked I/O adapters derived from the popular WRC1 SmartMux-Plus™ family.

Supported physical networks are: Ethernet, CAN and RS232.

Different protocols are available to assist OEMs in meeting user preferences.

Enclosure is extruded aluminum providing strength and electrical shielding. I/O Connectors are D-Sub for integrity and shielding. See Ziggy Overview pp 1-3 for field termination options. Flange panel mounting is standard. DIN-Rail mounting is available as an option— specify W2-DIN-KIT.

Three internal card positions are provided allowing the user selection of the optimal I/O mix for their application. One card position is dedicated to discrete I/O. Another is dedicated to analog I/O. And one is dedicated to future specialty I/O and expansion.

Specifications are found on the next page (page 12.)

Network Selection	
Part # Identifier	**Network**
D	DeviceNet™
E	Ethernet TCP/IP with HTML Web Server
M - preliminary	Modbus RTU/ASCII - RS232
C - preliminary	Ethernet/IP with CIP protocol
T - preliminary	Modbus TCP Ethernet
O - preliminary	CANopen
I/O Selection	
Part # Identifier	**I/O mix**
AI	32 Analog Inputs
S	11 ThermoCouple/mV inputs
T	23 Thermocouple/mV Inputs
AIO	32 Analog points - of which 8 can be outputs
blank square	No analog I/O
24	24 external Discrete I/O
48	48 external Discrete I/O
B	16 internal Discrete Inputs
C	16 internal Discrete Outputs
D	16 internal Discrete Inputs and 16 Outputs
blank square	No Discrete I/O
blank square	No Specialty I/O

To order, complete the part number using the identifiers listed in the above table:

W2	**- J**				
W2 Series	SmartMux	Network	Analog I/O	Discrete I/O	Specialty I/O

WRC is a Rockwell Automation Encompass Partner for Gateway, Bus Extender and signal conditioning products.

I/O:	Select up to 3 factory installed I/O cards
Internal Discrete I/O	2500 V isolation between system and I/O
	Inputs—24 Vdc nominal, sinking or sourcing
	Outputs—24 Vdc, .25 amp, internal current limiting, sourcing
	25-pin D-sub connectors
	Specify W2-FTB25 for Field Termination Block, DIN-Rail mounted
	Specify W2-CXDD for interconnecting cable where X = length in feet
Analog I/O	Inputs and outputs, 0-10 Vdc, single-ended, non-isolated, 12 bit resolution
	25-pin D-sub connectors
	Specify W2-FTB25 for Field Termination Block, DIN-Rail mounted
	Specify W2-CXDD for interconnecting cable where X = length in feet
	Compatible with 1781-7B and W7 external analog signal conditioners
	See WRC Catalog for 1781-7B and W7 mounting board options
	Specify 1781-7CX cable, where X = length in feet
External Discrete I/O	Industry-standard 50-pin D-Sub connector
	Factory default - all points set to outputs
	Each point can be configured as either input or output
	Opto-coupled I/O modules are purchased separately
	WRC's 1781 series or WRC4 series are fully compatible
	Isolation—4 Kv
	Specify 1781-CXHD where X = length in feet
Thermocouple/mV Inputs	User selectable mV or T/C Type B,C,E,J,K,N14,N28,R,S, or T
	Thermocouples must be the same type and must be isolated
	25-pin D-sub connectors
	External cold-junction compensation using termination panel W2-TCTERM
	Specify W2-CXDD for interconnecting cable where X = length in ft (5' max)
	14-bit resolution
	500 V Isolation
	Up-Scale Open-Circuit Detection
	Common-Mode Rejection > 80 dB
	Up to 10k samples per second