AXB-232++ RS-232/422/485 Interface

Overview

The AXB-232++ (**FG5761-10**) can serve as a conventional RS-232/422 control port, it is also able to run its own Axcess application program – an exclusive AMX product feature. Source specific programming, such as video switchers, laserdisc players and video codecs, can be handled by the AXB-232++ to deliver a modular solution for system programming.

FIG. 1 AXB-232++

Specifications

The following table lists the specifications for the AXB-232++.

SPECIFICATIONS	
Power	12 VDC @ 160 mA
Processor	On board 32-bit processor and 384K (of non-volatile memory) run Axcess programs independent of the control system. This relieves the AxLink bus and controller for the processing time for controlling those devices. (Requires Axcess Version 3.0 or higher.)
Asynchronous data standards	• Baud rates - *300*, *600*, *1200*. *2400*, *4800*, *9600*, *19200* and *38400*. *56400* is supported via the BAUDMED Send Command . *115200* is supported via the BAUDHIGH Send Command (see the *AXB-232++ Operation/Reference Guide* for details). • Data bits - 7, 8, and 9 • Stop bits - 1 and 2 • Parity - *None*, *Odd*, *Even*, *Mark* and *Space*
Buffers	• 1KB input buffer • 1KB AxLink buffer
Front Panel	
AxLink LEDs	Green AxLink status indicator: • *Full-Off* indicates no power is being received or the controller is not functioning properly. • *One blink per second* power is active and AxLink communication is functioning. • *Full-On* indicates power is active and AxLink data communication is not functional.
RX LED (Red)	Blinks to indicate the AXB-232++ is receiving RS-232, RS-422, or RS-485 data. The RX LED blinks even if the data being received is incorrect.
TX LED (Red)	Blinks to indicate the AXB-232++ is sending RS-232, RS-422, or RS-485 data.
DEVICE DIP Switch	An 8-position DIP switch used to set the device number for the AXB-232++.
RS232/422 DIP Switch	An 8-position DIP switch used to set the communication parameters for the RS-232/422 device.
Rear Panel	
Hardware handshaking connector	An RTS/CTS data connector that can be wired for hardware handshaking if called for by the controlled device (4-pin male).
RS422/232 connector	A captive-wire connector wired for RS-422/232 data control (8-pin male).
AxLink connector	Receives power and data via the AxLink bus and AxLink system controller 4-pin male).
Internal Jumpers	Sets differential input termination and enables RS-485 output.
Supports	XON/XOFF software and hardware handshaking
Dimensions (HWD)	1.5" x 5.5" x 5.5" (3.81 cm x 13.97 cm x 13.97 cm)
Weight	1.1 lbs. (498.95 g)
Enclosure	Metal with black matte finish
Included Accessories	• AxLink connector (4-pin female) • Phoenix connector (8-pin male)
Other AMX Equipment	• CC-232 Control Cable • AC-RK Accessory Rack Kit

Installation and Wiring

The AXB-232++ can be used as an independent RS-232/422/485-controlled interface by setting the internal jumpers. Configure the communication parameters using the DIP switches on the front panel.

Setting the Internal Jumpers

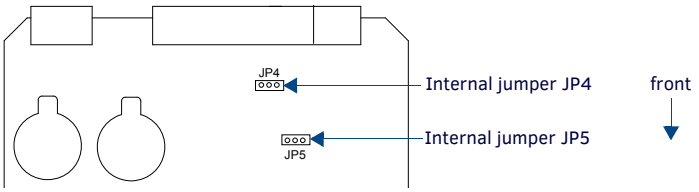

FIG. 2 LOCATION OF INTERNAL JUMPERS

Setting Jumper JP4 To Terminate RS-422 Input With 100 ohms

Terminating a device involves installing a 100 ohm line terminator, this is typically used to achieve better communication and signal integrity. You will want to terminate when the communication is at a high data rate or over a long distance.

Termination can be harmful because it increases the current in the line, and more radiation that could interfere with signals.

Jumper **JP4** places 100 Ohms termination across RS422 receive data pins 5 & 6:

1. Disconnect the RS-232/422/485 connectors.
2. Unscrew the two screws on the rear panel to remove the panel, and slide the circuit board out of the enclosure.
3. Locate the **JP4** jumper and install the jumper in the 'ON' position (default = OFF).
4. Slide the circuit board back into the enclosure and replace the rear panel.
5. Reconnect the RS-232/422/485 connectors.

Setting Jumper JP5 To Set The RS-422 Port for RS-485 Use

1. Disconnect the RS-232/422/485 connectors.
2. Unscrew the two screws on the rear panel to remove the panel, and slide the circuit board out of the enclosure.
3. Locate the **JP5** jumper and set jumper JP5 to the ON position (default setting is OFF).
4. Slide the circuit board back into the enclosure and replace the rear panel.
5. Reconnect the RS-232/422/485 connectors.

Setting the DIP Switches

Note: Use the DIPSwitch 2.0 application available for free download from AMX to quickly figure out DIP Switch settings for all types of DIP Switches.

Setting the DEVICE DIP switch

Set the device number on DEVICE DIP switch, located on the front of the AXB-232++. The device can be 1 of the 255 devices in an Axcess control system. The device number must match the device assignment in the Axcess program. Device numbers are assigned into the following three segments:

- **Cards** 1 through 95
- **Boxes** 96 through 127
- **Panels** 128 through 255

Set the device number by setting the device DIP switches. The device number is the total of all of the switches in the ON position, and take effect by cycling the power.

DEVICE DIP SWITCH SETTINGS								
Position	1	2	3	4	5	6	7	8
Value	1	2	4	8	16	32	64	128

Setting the RS-232/422 DIP switch

Set the stop bits, data bits, parity, and baud rate on the RS-232/422 DIP switch, located on the front panel. The AXB-232++ supports the following asynchronous data standards:

- **Stop bits** 1 and 2
- **Data bits** 7, 8, and 9
- **Parity** None, Odd, Even, Mark, and Space
- **Baud rates** 300, 600, 1,200, 2,400, 4,800, 9,600, 19,200 and 38,400.
  57,600 is achieved by setting the DIP switch to 300 baud, and using the 'BAUDMED' SEND_COMMAND (see the *AXB-232++ Operation/Reference Guide* for details).
  115,200 is achieved by setting the DIP switch to 300 baud, and using the 'BAUDHIGH' SEND_COMMAND (see the *AXB-232++ Operation/Reference Guide* for details).

The table below shows the RS-232/422 DIP switch numbers, functions, and their corresponding values.

RS-232/422 DIP SWITCH SETTINGS									
Switch	1	2	3	4	5	6	7	8
Function	Stop Bits	Data Bits	Parity			Baud Rates		
Setting	Off	Off	Off	Off	Off	Off	Off	Off
Value	2 bits	7 bits	Unused			300		
	On	On	On	Off	Off	On	Off	Off
	1 bit	8 bits	Unused			600		
			Off	On	Off	Off	On	Off
			Unused			1,200		
			On	On	Off	On	On	Off
			Unused			2,400		
			Off	Off	On	Off	Off	On
			Mark			4,800		
			On	Off	On	On	Off	On
			Even			9,600		
			Off	On	On	Off	On	On
			Odd			19,200		
			On	On	On	On	On	On
			None			38,400		

Wiring Devices to the AXB-232++

Preparing Captive Wires

To connect the wiring into a captive-wire connector:

1. Strip 1/4 inch off the wire insulation for all four wires and tin 2/3 of the exposed wire.
2. Insert each wire into the appropriate captive-wire connector up to the insulation.
3. Tighten the captive screws to secure the fit in the connector.

Note: If the device is using a separate power supply, do not connect the power wiring from the AXB-232++ to that device.

Wiring Guidelines

The interface requires a 12 VDC power to operate properly. The interface uses a PSN2.8 power supply. The Central Controller supplies power via the AxLink cable or external 12 VDC power supply.

The maximum wiring distance between the Central Controller and interface is determined by power consumption, supplied voltage, and the wire gauge used for the cable. The table below lists wire sizes and maximum lengths allowable between the AXB-RS232++ and Central Controller. The maximum wiring lengths for using AxLink power are based on a minimum of 13.5 volts available at the Central Controller's power supply.

WIRING GUIDELINES AT 160 MA	
Wire Size	**Maximum Wiring Length**
18 AWG	733.57 feet (223.59 m)
20 AWG	464.11 feet (141.46 m)
22 AWG	289.35 feet (88.19 m)
24 AWG	182.39 feet (55.59 m)

Using AxLink

Connect the AxLink wiring to the connector on the AXB-232++ as shown in FIG. 3. i

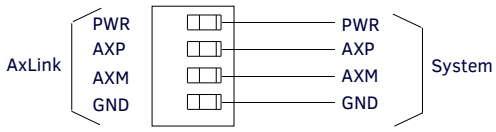

FIG. 3 AXLINK BUS AND +12 VDC POWER WIRING

Using AxLink and External Power Supply

Connect the AxLink and power wiring to the connector on the AXB-232++ as shown in FIG. 4.

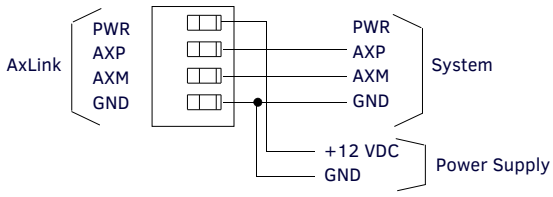

FIG. 4 AXLINK BUS AND +12 VDC POWER WIRING

Using RS-232

When communicating via RS-232, connect the wiring as shown in FIG. 5.

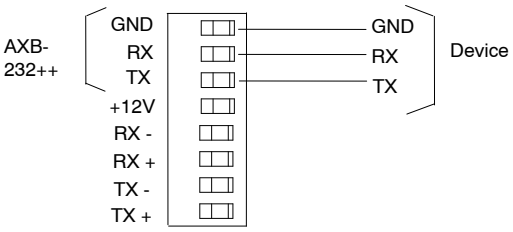

FIG. 5 RS-232 WIRING

Using Hardware Handshaking

When the controlled device requires hardware handshaking, connect the wiring as shown in FIG. 6.

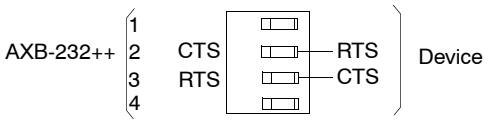

FIG. 6 HARDWARE HANDSHAKING WIRING

Using RS-422

When communicating via RS-422, connect the wiring as shown in FIG. 7.

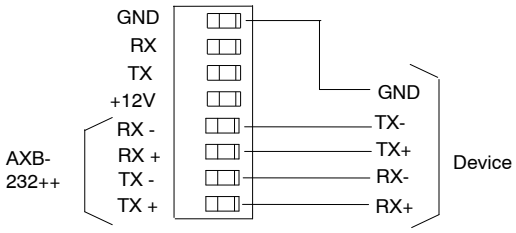

FIG. 7 RS-422 WIRING

Using RS-485

When communicating via RS-485, connect the wiring as shown in FIG. 8.

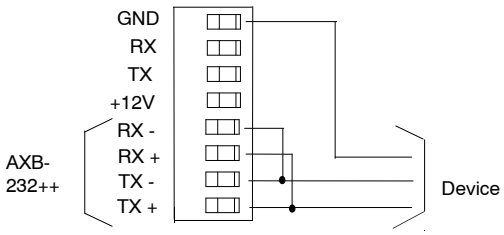

FIG. 8 RS-485 WIRING

Rack-mounting the AXB-232++ (optional)

1. Remove any connected power, and AxLink and RS-232 connectors from the rear panel.
2. Remove the 2 screws on the front panel, and remove the front panel and the space bracket behind the panel.
3. Place the unit in the appropriate opening in the AC-RK.
4. Place the front panel of the AXB-232++ on the front of the rack, over the unit.
5. Fasten the front panel to the rack and unit with the two screws you removed.

Replacing the Lithium Batteries

The AXB-232++'s lithium batteries have a life of approximately 5 years to protect its memory. When DC power is on, the batteries are not used. When you install the AXB-232++, record the date the batteries should be replaced.

Note: There is a danger of explosion if you replace the batteries incorrectly. Replace batteries with the same or equivalent type recommended by the manufacturer. Dispose of the used batteries according to the manufacturer's instructions. Never recharge, disassemble, or heat batteries above 212°F (100°C). Never solder directly to the batteries or expose the contents of the batteries to water.

Before removing the lithium batteries, contact your dealer and verify that they have a current copy of your program to avoid an inadvertent loss of data and prevent an unnecessary service outage.

1. Discharge the static electricity from your body.
2. Unplug the 2-pin power connector and any other connectors.
3. Remove the 2 screws on the front panel, remove the front panel, and slide the circuit board out of the enclosure.
4. Carefully slide each battery out of its socket, and insert the new battery.
5. Slide the circuit board back into place, replace the front panel and refasten the screws.
6. Reconnect any connectors that you removed.

Additional Documentation

Refer to the *AXB-232++ Instruction Manual* for programming information.

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