

MSXB 028 Accessory Board Manual

Simultaneous Sampling Board

Version 1.41

Microstar Laboratories, Inc.

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Part Number MSAMXB028-0900-01

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MSXB 028: Simultaneous Sampling Board

The Microstar Laboratories Simultaneous Sampling Board, part number MSXB 028, acquires up to 16 analog signals simultaneously, allowing a Data Acquisition Processor to acquire multi-input data without the time skew usually associated with multiplexed data acquisition systems.

Several models of Simultaneous Sampling Boards currently are available from Microstar Laboratories. There are MSXB 028 models for stand-alone use, for use in single-board external enclosures, and for use in industrial enclosures. Contact your Microstar Laboratories product supplier for more information about available options.

The number of input channels can be expanded to 256 by using multiple boards. The Simultaneous Sampling Board uses the same input expansion addressing scheme as the Analog Input Expansion Board. Simultaneous Sampling Boards may be used in conjunction with other accessory boards; however, there are addressing and input restrictions, as explained later in this documentation.

Hardware Configuration

The stand-alone models and single-board enclosure models of the MSXB 028 are connected to a Data Acquisition Processor using cable MSCBL 040-01 or MSCBL 041-01. These 68-line cables connect the analog connector of a Data Acquisition Processor to connector J2 of the Simultaneous Sampling Board.

The analog backplane models are connected to an Analog Backplane by plugging connector J2 of the Simultaneous Sampling Board into an empty slot.

Warning: Never connect or disconnect the Simultaneous Sampling Board from the Data Acquisition Processor or the analog backplane while power is applied to the any of them.

The following diagram shows the locations of the connectors and jumpers on the MSXB 028.

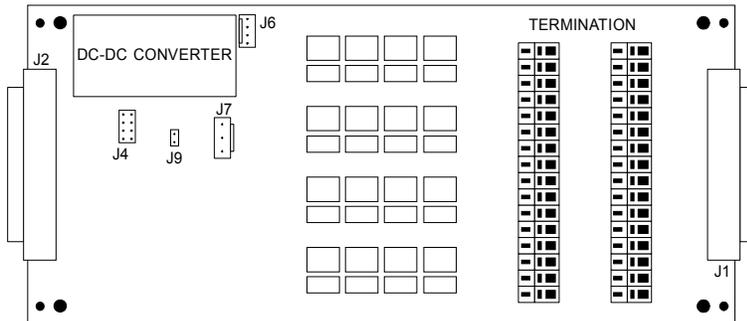


Figure 1. MSXB 028 Jumper and Connector Locations

Connecting Analog Input Signals

Analog signals are connected to the Simultaneous Sampling Board through either the 32-point quick-connect termination or through connector J1. Signals can be connected to the termination using discrete wires or connected to connector J1 using a 68-line cable.

Each quick-connect point is labeled with the signal name. The pinout of connector J1 is shown in the following diagram:

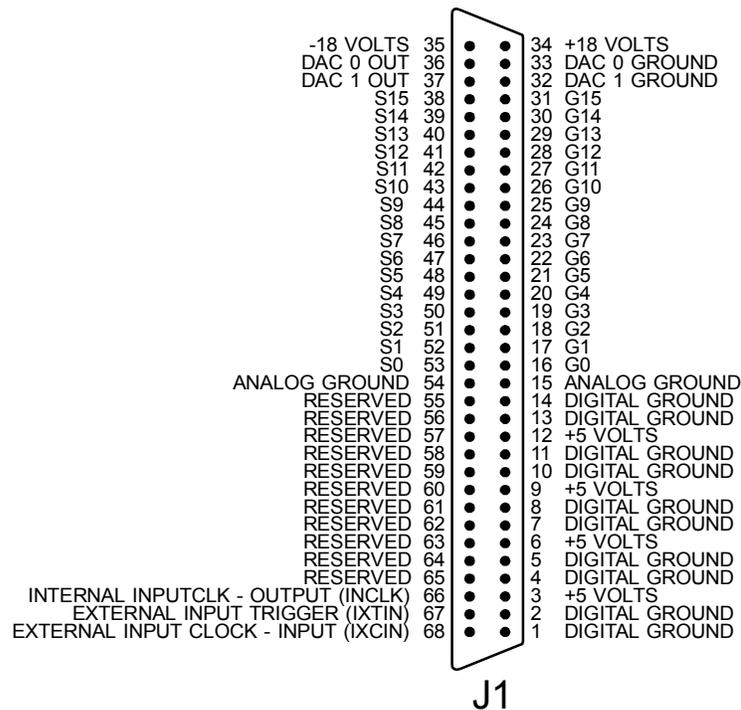


Figure 2. Pinout of Analog Connector J1

The analog inputs of the Simultaneous Sampling Board may have voltages applied when power is on or off. The maximum allowable input voltage is ± 15 volts.

Software Configuration

The signals from a Simultaneous Sampling Board appear to DAPL as either 16 single-ended input pins or eight differential input pins. Any combination of single-ended or differential inputs may be used. As shipped from Microstar Laboratories, a Simultaneous Sampling Board occupies the input pins S0-S15 (D0-D7).

Reading from any pin inside the address range of S256 to S511 places the sample and hold amplifiers on all of the Simultaneous Sampling Boards into track mode, which provides settling time between samples. This is a dummy reading and the value from this input channel pipe should be ignored. Reading from any pin in the lower address range of S0 to S255 gives a value corresponding to the input signal, as held on the last transition from track mode to hold mode.

An input procedure for acquiring signals simultaneously usually includes one SET command addressing an input pin in the upper address range, followed by several SET commands addressing the pins to be sampled.

The following is a typical input procedure definition. The input procedure A acquires the signals on S0 and S1 simultaneously. The FORMAT command sends the input data to the PC:

```
RESET
  IDEF A 3
  SET IPIPE0 S256
  SET IPIPE1 S0
  SET IPIPE2 S1
  TIME 1000
  END
PDEF B
  FORMAT(IPIPE1, IPIPE2)
  END
START A, B
```

Note that data from input channel pipe 0 are ignored. The only function of the SET IPIPE0 S256 command is to place the Simultaneous Sampling Board into track mode.

Notes:

- At a gain of 1 all signals must be converted within 10,000 μs of the transition from track to hold.
- At a gain of 10 all signals must be converted within 1,000 μs of the transition from track to hold.
- Simultaneous Sampling Boards should not be used at gains greater than 10.
- Readings in track mode show small offsets from the corresponding readings in hold mode. This is normal, as offset compensation is adjusted only for hold mode.
- The Simultaneous Sampling Board must be held in track mode for a minimum of 12 μs before switching to hold mode. This is to provide adequate settling time for large voltage swings.

More Than One Simultaneous Sampling Board

Several Simultaneous Sampling Boards can be connected together to provide simultaneous acquisition of more than 16 inputs. When more than one Simultaneous Sampling Board is used, the J2 connectors of all Simultaneous Sampling Boards are tied together using a daisy-chained cable or an Analog Backplane.

Note: External power is required when more than one Simultaneous Sampling Boards are used.

Two headers must be set when using more than two boards: J4 and J9.

Each Simultaneous Sampling Board must be configured to recognize a specific input pin range. The range is selected by J4, a header of two rows on .100 inch centers. Header J4 is located below the DC-to-DC converter and to the right of J2. Jumpers are placed horizontally, connecting like numbers.

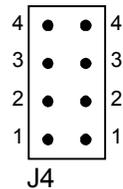


Figure 3. Input Pin Range Selection Header

The input pin ranges are specified in the following table:

Table 1. Input Pin Range Selection

Single-ended Hold mode	Differential Hold mode	Board Number	Jumpers
0–15	0–7	0	1, 2, 3, 4
16–31	8–15	1	1, 2, 3
32–47	16–23	2	1, 2, 4
48–63	4–31	3	1, 2
64–79	32–39	4	1, 3, 4
80–95	40–47	5	1, 3
96–111	48–55	6	1, 4
112–127	56–63	7	1
128–143	64–71	8	2, 3, 4
144–159	72–79	9	2, 3
160–175	80–87	10	2, 4
176–191	88–95	11	2
192–207	96–103	12	3, 4
208–223	104–111	13	3
224–239	112–119	14	4
240–255	120–127	15	none

Header J9 enables the address on J4. J9 is located to the right of J4. The J9 header on each board should have a jumper installed when several Simultaneous Sampling Boards are used. When J9 does not have a jumper, the Simultaneous Sampling Board is enabled independent of the address provided by the DAP.

Note: When a Simultaneous Sampling Board is used with other accessory boards, no boards can use inputs in the S256-S511 range. Also, make sure that all boards use different input pin ranges to avoid addressing conflicts.

External Trigger Connection

An external trigger signal can be connected to connector J6 to provide hardware triggering. J6 is a header of one row on .100-inch centers. The connector J6 is Molex part number 22-23-2041. J6 is located to the right of the DC-to-DC converter.

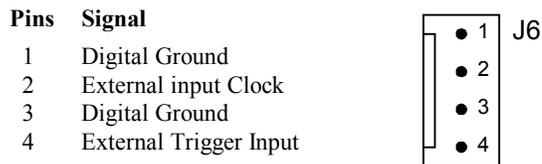


Figure 4. External Trigger Connector

External signals connected to J6 must be in the standard TTL range of 0 to +5 volts. The pins on J6 connect directly to the pins on a Data Acquisition Processor.

The external trigger input signal and external clock input signal can be connected to pins 67 and 68 of J1 if connector J6 is not in use.

External Power Option

On MSXB 028-02 and -04, connector J7 provides connection for external power. Connector J7 is a single row header on .156-inch centers and is located below the DC-to-DC converter. J7 is Molex part number 26-60-4030, which mates with Molex part number 09-50-3031. MSXB 028-02 and -04 each requires 1.8 Amp at +5 Volts DC.

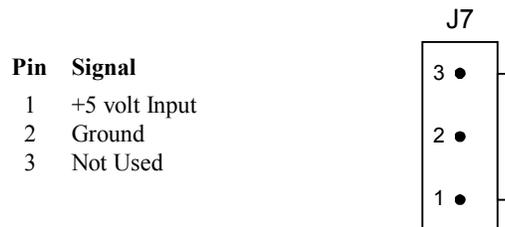


Figure 5. External Power Connector

Note: It is best to power the MSXB 028-02 and -04 from the host PC's power supply so that both the Simultaneous Sampling Board and the DAP are powered on and off at the same time. If this is not practical, then external power to the Simultaneous Sampling Board should be applied before powering on the DAP and should be disconnected after powering off the DAP.

External Enclosure Option

The MSXB 028 Simultaneous Sampling Board is available with a single-board external enclosure option. The external enclosure provides shielding and is compatible with the European Community directive 89/336/EEC.

The single-board external enclosure has three possible standard end panels: blank, 68-line cable connector, and BNC connectors. A blank end panel allows the user to create custom connection points. A 68-line cable connector end panel allows signals to be connected through a 68-line cable. A BNC end panel allows BNC connection points to the Simultaneous Sampling Board. Contact Microstar Laboratories for more information on available end panels for the MSXB 028.

Backplane Connector Option

A MSXB 028 Simultaneous Sampling Board is available with a backplane connector installed in J2 instead of a cable connector. This allows the MSXB 028 to be used with an Analog Backplane. Connector J2 of the Simultaneous Sampling Backplane Board plugs directly into an empty slot on the Analog Backplane. See the Analog Backplane manual for more information on how to install backplane boards into an Analog Backplane and how to connect the Analog Backplane to the Data Acquisition Processor.

The MSXB 028 Simultaneous Sampling Backplane Board has several possible front panels that allow for different connection points to the board. Contact Microstar Laboratories for more information on available front panels for the MSXB 028.

Note: Never connect or disconnect the Simultaneous Sampling Backplane Board while the Analog Backplane is powered.
