53A-509 EVENT SENSE CARD

OPERATING MANUAL

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DESCRIPTION

The 53A-509 Event Sense Card is a printed circuit board assembly for use in a CDS 53/63 Series System. The 53A-509 Card is designed to continuously monitor 20 digital inputs (TTL levels or contact closures) for interrupts. Each digital input can cause an interrupt for either a positive or negative-going voltage transition (switch selectable).

Once a voltage transition of the proper direction is detected, a latch is set that can later be examined by the system controller. The tripping of the latch initiates a "vectored priority interrupt" to the system controller. This interrupt is only available in those systems which have 53A-171 Control Cards.

When the card is addressed, it sends the address of the interrupting digital inputs back to the system controller. The addresses are 1 through 20 and have a priority scheme of 20 through 1, with 20 having the highest priority. So an interrupt on digital input number seven would be returned to the system controller before an interrupt on digital input number four. Once an interrupt is read it is automatically cleared.

CONTROLS AND INDICATORS

The following controls and indicators are provided to select and display the functions of the 53A-509 Card's operating environment.

Address-Select Switch

The 53A-509 Card has a miniature 10-position switch which selects the 53A-509 Card's address (0-9) in the 53/63 Series System. Open the switch's cover and use a screwdriver with a narrow, flat blade to turn the cam-action wiper to the desired position.

Power LED

The Power LED provides a valuable diagnostic tool by giving the system programmer a visual indication of the action which the system is currently taking. Whenever the 53A-509 Card is addressed by the system controller, the Power LED goes out. The LED remains out until another function card is addressed. Since only one function card can be addressed at a time, an unlit Power LED indicates the function card with which the system controller is currently communicating. The Power LED being lit not only indicates that the 53A-509 Card is unaddressed, but that all required dc power (5V dc, ±15V dc) is being supplied.

Fuse

The fuse protects the system from overload conditions. If the fuse is blown, the Power LED does not light.

Function LEDS and Switches

Interrupt Address LEDs

The column of five LEDs visually indicates to the programmer the highest priority digital input that has interrupted. The LEDs are labeled from top to bottom: 1, 2, 4, 8, and 16. For example, if channels 4, 7, and 20 are latched as interrupts, LEDs 4 and 16 are lit; and if the "Interrupt Clear Switch" is pushed once, a "7" is displayed (LEDs 1, 2, and 4 lit).

Interrupt Clear Switch

Near the front edge connector is a momentary push-button switch. This switch clears the latch containing the interrupt that is currently displayed by the Interrupt Address LEDs.

Halt Switch

This two-position slide switch is located near the card's backplane edge connector. It selects the state of the 53A-509 Card after an @XH (Halt) or STOP command is received by the 53/63 Series System.

a. In position C2, all latches will be cleared and none of the Interrupt Address LEDs will be lit, the same as for power-up. The Power LED will be lit.

b. In position C1, all Interrupt Address LEDs will maintain their previous states. The power LED will be lit.

Interrupt Switch

This is a 1-rocker switch, labeled "INT", that enables and disables interrupts from the card back to the system controller. If the switch is in the ON position, the interrupt is enabled and occurs whenever any of the 20 latches are tripped.

Once one or more latches are tripped, assuming the interrupt switch is ON, the card continues to return an interrupt to the system controller until all tripped latches are cleared. The highest priority tripped latch is cleared each time the system controller requests input from the 53A-509 Card, or the Interrupt Clear switch is depressed. All tripped latches are cleared when an @XH (Halt) or STOP command is received by the 53/63 Series System if the Halt switch is in the C2 position, or when a C command is issued to the 53A-509 Card. See the 53A-171 Control Card Operating Manual for a detailed discussion on handling of interrupts by the 53A/63A System.

Transition Switches

These two 10-position rocker switches select the voltage transition, positive-going (0 to 5 volts) or negative-going (5 to 0 volts), that trip the latch on a given channel.

The top-most switch selects the voltage transition for channels 1 through 10. Switch position 1 corresponds to channel 1, position 2 to channel 2, etc. The lower 10-position switch selects the voltage transition for channels 11 through 20. Switch position 1 corresponds to channel 11, position 2 to channel 12, etc.

On either switch, an open rocker selects a positive-going voltage transition; a closed rocker selects a negative-going voltage transition.

SPECIFICATIONS

Inputs:	Capacity, 20 Interrupts. Logic levels, TTL or contact closure to ground.
Triggering:	Edge Triggered, positive- or negative-going transition (switch selectable).
Interrupt Type:	Vectored Priority.
Interrupt Speed:	Less than 1 μs.
Programmed By:	ASCII Characters.
Power Up:	When power is turned on, the card will go to the following known states: Card unaddressed (Power LED - lit). Interrupt Address LEDs - out.
Power Requirements:	5V dc power is provided by the internal Power Supply in the 53/63 Series Card Cage. Voltage: 4.75V to 5.25V DC. Current: 0.9A maximum, quiescent. 1.1A, peak.
Cooling:	Provided by the fan in the 53/63 Card Cage.
Temperature:	-10°C to +65°C, operating (assumes ambient temperature of 55° and airflow to assure less than 10°C temperature rise). -40°C to +85°C, storage.
Humidity:	Less than 95% R.H. noncondensing, -10°C to +30°C. Less than 75% R.H. non-condensing, +31°C to +40°C. Less than 45% R.H. non-condensing, +41°C to +55°C.
Dimensions:	197 mm High, 220 mm Deep, 13 mm Wide. (7.75" x 8.66" x 0.5")
Dimensions, Shipping:	When ordered with a 53/63 Card Cage, the card is installed in one of the card cage's function-card slots. When ordered alone the shipping dimensions are: 254 mm x 254 mm x 127 mm (10" x 10" x 5")
Weight:	0.23 kg. (0.5 lbs.)
Weight, Shipping:	When ordered with a 53/63 Card Cage, the card is installed in one of the card cage's function-card slots.

When ordered alone the shipping weight is:
0.64 kg. (1.4 lbs.)

Mounting Position: Any orientation.

Mounting Location: Installs in any function card slot of the 53/63 Card Cage.

Required Equipment: (Not supplied) A 53A-780 Hooded Connector is required with this card.

Equipment Supplied:
53A-509 Event Sense Card
Spare Fuse (Part #42202-52001)
Operating Manual (Part #00000-15090)
Service Manual (Part #00000-25090)

OPERATION

Overview

The Event Sense Card is programmed by ASCII characters issued from the system controller to the 53/63 System's communications card. The 53A-509 Card is interfaced to the communications card through the 53 Series or 63 Series Card Cage's backplane.

To address a function card for the first time, the system command @XY must be issued. X is the card cage address (0-9) selected on the 53A-171 Control Card in the addressed card cage; Y is the 53A-509 Card's address (0-9) within the addressed card cage. The 53A-509 Card's address is selected using the card's Address Select switch. Once a function card is addressed, it remains addressed until the system receives another @ character. Appendix A fully discusses the @XY command and the other 53/63 Series system commands. After the 53A-509 Card is addressed, the commands listed below may be issued until another function card is addressed.

Card Commands

Command	Description
C	This command Clears all interrupt latches on the 53A-509 Card and prepares the card to accept interrupts from external devices. The C in the command sequence clears the latches and all interrupts on the card. Example: The command @07C causes the card to clear all latches. In this example it was assumed that the 53A-509 Card had address 7 and was located in a card cage with address 0. Status: Power LED - out. Interrupt Address LEDs - all out.
DATA INPUT	Whenever the 53A-509 Card is addressed, the system controller can request input from it and receive back a 2-digit number followed by carriage-return/line-feed <CR><LF>. These numbers are 00 through 20. The numbers 01 through 20 are the addresses of the interrupting devices. A 00 returned to the system controller indicates that there are not any events which are causing interrupts. Once a number is returned to the system controller, its associated latch and interrupt are automatically cleared.

Examples:
Assume that the 53A-509 Card had received interrupts on channels 3, 8,and 17. The system controller now addresses the 53A-509 Card by sending @07 from the system controller to the 53A/63A System.

Status:
Power LED - out.
Interrupt Address LEDs - 1 and 16 lit, all others out.

The system controller requests input and receives: 17<CR><LF>

Status:
Power LED - out.
Interrupt Address LEDs - 8 lit, all others out.

The system controller requests input and receives: 08<CR><LF>

Status:
Power LED - out.
Interrupt Address LEDs - 1 and 2 lit, all others out.

The system controller requests input and receives: 03<CR><LF>

Status:
Power LED - out.
Interrupt Address LEDs - all out.

The system controller requests input and receives: 00<CR><LF>

Status:
Power LED - out.
Interrupt Address LEDs - all out.

NOTE: The interrupts were returned by priority with channel 17 having the highest priority and channel 03 having the lowest priority.

INSTALLATION

The 53A-509 Card is a function card; therefore, it may be plugged into any blue card slot. Setting the Address Select switch defines the card's programming address. To avoid confusion, it is recommended that the slot number and the programming address be the same.

CAUTION:

To avoid plugging the card in backwards, observe the following:

a. Match the keyed slot on the card to the key in the backplane connector. The component side should be to the right for a 53 Series Chassis and to the top for a 63 Series Chassis.

b. There are two ejectors on the card. Make sure the ejector marked "53A-509" is at the top for a 53 Series Chassis and to the left for a 63 Series Chassis.

CAUTION:

The 53A-509 Card is a piece of electronic equipment and therefore has some susceptibility to electrostatic damage (ESD). ESD precautions must be taken whenever the module is handled.

APPENDIX A

53/63 SERIES SYSTEM COMMANDS

Command	Description
@XY	The @XY (Address) command addresses a function card in the 53/63 Series System. @ is a delimiter used by the 53/63 Series System. X is a card cage address (0-9) defined by the Address Select switch on the 53A-171 Control Card in the addressed card cage. Y is a function-card address (0-9) defined by the Address Select switch on the function card. Once a card cage/function-card combination is addressed, it remains addressed until the 53/63 Series System detects a new @ character.
@XH	The @XH (Halt) command halts all function cards within the card cage defined by X. The command does not affect function cards in other card cages. How a function card reacts to the @XH command depends on the card. In all cases, an addressed function card (Power LED - out) becomes unaddressed (Power LED - lit). On the 53A-509 Card, the position of the Halt switch causes the @XH command to have the following effect: if the Halt switch is in position C2, the 53A-509 Card resets to its power-up state; if the Halt switch is in position C1, the 53A-509 Card is simply unaddressed.
STOP	The STOP command is not a string of ASCII characters. The command is hard-wired from the system controller (calculator or computer) to the 53A/63A System communications card in each card cage. When the system controller issues a STOP command, each function card, including the 53A-509 Card, reacts as if it received the @XH command described above. How the system controller executes the STOP command depends on the communications card used. With the 53A-128 IEEE-488 Card, for example, a STOP command is executed when the system controller asserts the IEEE-488 bus line IFC (Interface Clear) true.

APPENDIX B

INPUT/OUTPUT CONNECTIONS

Signals are input to the 53A-509 Card by a 53A-780 Hooded Connector. The signal assignments are listed below. All signals are TTL-compatible. Two 10-position rocker switches choose whether the input signal causes an interrupt on a positive- or negative-going voltage transition. A rocker is closed for a negative-going transition.

Front-Edge Connector Number	Channel	Signal
1	1	Input
2	2	Input
3	3	Input
4	4	Input
5	5	Input
6	6	Input
7	7	Input
8	8	Input
9	9	Input
10	10	Input
11	11	Input
12	12	Input
13	13	Input
14	14	Input
15	15	Input
Z		Low when this channel has an interrupt
16	16	Input
Y		Low when this channel has an interrupt
17	17	Input
X		Low when this channel has an interrupt
18	18	Input
23		Low when this channel has an interrupt
19	19	Input
22		Low when this channel has an interrupt
20	20	Input
21		Low when this channel has an interrupt
AA		Interrupt Line, low when any channel has an interrupt
A		Vcc +5 VDC
B through W and BB,24		Ground