ADAM Alarm Definitions

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Hardware Description

The alarm component of the ADAM intercom consists of 8 on-board digital inputs and 8 open-collector outputs (darlington drivers). These are brought out to a DB-25 connector, J11 on the ADAM break-out panel.

The digital inputs are normally low. They are asserted by applying a positive voltage to the appropriate input pin.

The digital outputs are normally off. When asserted, they can sink several hundred milliamps of current. All digital outputs are de-asserted on processor reset. Since the digital outputs are simply paralleled on the DB-25 connector, a digital output will sink current when either processor asserts the corresponding output.

Digital Input Assignments

- The first digital input is an “alarm master clear” input. When asserted, it causes the master controller to clear all pending alarms, i.e. de-assert all digital outputs.
- Digital inputs 2 through 8 clear their corresponding digital outputs (alarms).

All digital inputs are edge-triggered. Hence, asserting the first digital input will clear all the alarms; but leaving it asserted will not prevent new alarms from being generated.

Digital Output Assignments

Each digital output is asserted based on a particular alarm condition. In most cases, it is the active processor which detects and generates alarm conditions.

Alarms are latched. Whenever an alarm condition is detected, the processor asserts the appropriate digital output. This output remains asserted until (a) the “alarm clear” digital input is asserted, or (b) the processor is reset.

The alarm conditions for each particular digital output are as follows:

Output Number	Alarm Description
1	Left Master Controller failure
2	Right Master Controller failure
3	Loss of backplane clock
4	Loss of communications with I/O card or trunk master
5	Loss of communications with keypanel, or excessive communication errors between an I/O card and a keypanel
6	Error writing configuration (CSedit setup) to flash
7	Excessive communications errors between Master Controller and an I/O card
8	Excessive communications errors between active and standby Master Controllers

Detailed Alarm Descriptions

- Controller Failure

A master controller can assert the “master controller failure” for itself in the following circumstances:

- An internal inconsistency is detected during initialization. (This would result from a programming error; if it is detected, it will occur every time the processor is reset.)
- During initialization (after a reset), the processor determines that there is no valid setup saved in the configuration flash. (This would happen if a new version of software is downloaded to the MC, and the saved setup is incompatible.) Since the processor will try to create a default setup and save it to flash, the alarm should not re-occur if the processor is reset again. However, a genuine failure of the flash might cause this alarm to re-occur.
- The processor cannot read its slot ID, either because of a hardware problem or because it is plugged into the wrong slot. In this case, “left MC” and “right MC” don’t apply; the MC just asserts alarm output #1.

A master controller can assert the “master controller failure” for the other controller in the following circumstances:

- The active controller determines that it has lost communications with the standby controller. This alarm will continue to be regenerated approximately every 15 seconds; it occurs even if there has never been any communications with the other MC.
- The standby controller determines that it has lost communications with the active controller. (In this circumstance, the standby will become active.)

- Loss of Backplane Clock

  In order for this alarm to be detected and generated, the Master Controller cards must have Altera Rev. 3.6 installed, and switch 5 of DIP switch S1 on the Master Controller cards must be turned on. (Do *not* turn on switch 5 of DIP switch S1 if an earlier version of Altera is installed.)

- Loss of communications (I/O card, keypanel, trunk master)

  These alarms are generated only when communications is lost with a device which was previously communicating. Hence, if the system is powered up, and there is no trunk master, no alarm is generated. However, if a trunk master is subsequently connected to the intercom, and then disconnected, the corresponding alarm is asserted.

- Excessive errors (I/O to keypanel; active/standby)

  These alarms are asserted whenever the processor detects that 5 errors to a particular device have occurred within the past minute.

- Excessive errors (MC to I/O card)

  This alarm is generated if more than 5 errors occur within a minute, when sending to a particular device. However, because there is a known hardware defect (in the CPU used in the I/O card) which causes errors, more errors are allowed before an alarm is generated, when many messages are being sent to an I/O card (e.g. when an I/O card is first plugged in and starts communicating with the Master Controller).

  Note that the typical quiescent error rate for messages to an I/O card which has any keypanels connected to it is a little less than one per minute. One error per minute is equivalent to a BER of 10, as displayed in CSedit.

- Error writing configuration to flash

  The intercom configuration (stored setup) is stored in a pair of flash EPROMs. This includes information such as keypanel key assignments; alpha names for ports, party lines, etc; party line permanent talkers and listeners; group definitions.

  The flash is rewritten any time that changes are made from CSedit. It is also rewritten automatically at other times, to record changes made from keypanels.

  The flash is only ever read once: when the processor comes out of reset.

  If the processor ever detects a failure when updating the configuration in flash, it asserts the appropriate alarm. If the update is occurring because of CSedit changes, CSedit will report an error writing to the flash.

  This alarm does not reflect a critical error. As long as the processor is not powered off or reset, it will not lose its configuration. If it is reset, and does lose its configuration, the configuration can be reloaded by sending a setup file from CSedit. Also, because of the way the flash is structured (it consists of 8 equal-sized sectors), if an error occurs when writing to a particular sector of flash, the processor will try to avoid using that sector (which can be done if there are other spare sectors which have not had failures) to nullify the effect of the failure.

Notes

In other ADAM systems, the on-board digital outputs were driven based on the status of the first 8 relays, avoiding the need for a UIO-256 in systems with few relays. This no longer holds. A UIO-256 is required if any relays are to be driven by the intercom.

Similarly, the on-board digital inputs do not parallel the first 8 UIO-256 digital inputs.

If a keypanel is being downloaded, it loses communications with the MC at the end of the download. However, this alarm is suppressed. Similarly, if an I/O card is being downloaded, the alarms for “loss of communications with I/O card” (for this I/O card) and for “loss of communications with keypanel” (for the keypanels connected to this I/O card) are suppressed.

If the (active) Master Controller is downloaded, when the download completes, the Master Controller isolates itself from the rest of the system while it reprograms itself. The standby controller (if present) will lose communications with the active controller, and will generate the appropriate “MC failure” alarm, and transfer control. This alarm is *not* suppressed.