

SLC Digital Status Facility

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Preliminary Document

Introduction

The SLC Digital Status (DSTS) facility controls, monitors, and generates status for single or multi bit digital devices. Typical DSTS devices include Machine Protection System (MPS) status, profile monitors, and vacuum valves. All DSTS devices in a micro are processed periodically (5 seconds) or on demand by a control system application. There is no provision for monitoring a subset of DSTS devices within a micro.

Principles of Operation

All of the control, monitoring, and status generation is done by the DSTS micro job. The observed states as well as the generated status are replicated in the Alpha database for use by control system applications.

A digital device consists of 1 or more components with each component consisting of 1 or more states. Each state of each component may have from 0 to 16 input bits and from 0 to 8 output bits. Each state of each component defines associated input and output bit masks and bit patterns that determine the requested or observed state.

Output bits may be latched or pulsed high or low from 25ms to over 6 seconds in duration. All of the output bits of each state must be latched or pulsed for the same duration and all output bits must reside in the same module. Input bits may reside in multiple modules within the same micro.

Various control system applications access DSTS devices primarily by specifying the device name and the 8-character component and state name. The observed state of a component can appear on a touch panel. A touch panel button can be pushed to request a specific state of a component. A control system application can request that a DSTS device component be set to a requested state, then check that the observed state has been seen.

The component and state names may consist of any 8 arbitrary characters, but leading or embedded spaces are administratively disallowed because of the difficulties they would present in user prompts.

Functions Provided

Module Types

Only 2 basic module types are supported: The Isolated Digital Input Module (IDIM) and the Isolated Digital Output Module (IDOM). All other implicitly supported module types must conform to the IDIM and IDOM CAMAC commands.

State Control and Monitoring

The DSTS micro job determines which output bits and what bit pattern to set based upon the requested state for the specified device and component. The requested state is recorded in the database for the specified device and component.

The DSTS micro job determines the observed output and input states for each component of each device. This information is recorded in the database for each device and component.

Status Generation

The DSTS micro job determines the state of each component of each device once the requested and observed states have been determined. Should the observed output or input bit pattern not match any specified state, then the state is recorded as "UNKNOWN". A list of currently bad devices is sent to the PARANOIA Alpha process for error message generation.

Functional Elements

Database

There are two common database structures and several DSTS device database structures that are used to manage the DSTS facility. The DODN and DODD database structures describe the components and states for a generic DSTS device type. The DIM and DOM database structures define specific input and output modules. The other DSTS database structures such as PROF and VACV describe a specific instance of a DSTS device.

The DODN database structure defines the DSTS device component, state, input, and output names that consist of 8 character strings. All instances of the DODN database structure reside in the Alpha database.

The DODD database structure defines the internal structure of the components and states of a class of similar DSTS devices. Information in this structure includes the number of define components, the number of defined states for each component, the input and output bit masks and states, and whether the state is latched or pulsed. All instances must reside in the micros that contain at least one instance of that DSTS device.

The DIM and DOM database structures define the CAMAC address and provide for storage of the input and output bit patterns.

There are several DSTS device database structures that define a specific instance of a DSTS device. Information in this structure includes the associated DODN and DODD database structure, the IDIM and IDOM database devices, and the specific input and output bit numbers to use for this device.

Micro

The DSTS micro job utilizes the DODD and the DSTS device database structures to determine the observed state of each component of the device and generate status. This information is replicated into the Alpha's database for use by control system applications.

Applications

Applications that run on the Alpha utilize the DB*_DSTAT family of utilities in the UTILSHR shareable image to access the current DSTS data. A message must be sent to the DSTS micro job to force an update of all DSTS devices in that micro.

Control System Services

NLC Specific Functions or Attributes