

# PROPOSED SMPTE RECOMMENDED PRACTICE Routing Switcher Type-Specific Messages for Remote Control of Broadcast Equipment

RP 191

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## Introduction

This clause contains a general explanation of some of the concepts used in the formulation of the routing switcher type-specific message set. It constitutes tutorial information and is intended to assist in the understanding of the specifications in clause 6 of this practice. A working knowledge of the following ESBUS topics is assumed:

- ESBUS system overview;
- control message architecture;
- supervisory protocol;
- tributary interconnection;
- electrical and mechanical characteristics;
- system service and common messages.

Conventions: Acronyms and abbreviations are shown in uppercase characters; e.g., information field - I/F.

Message keywords and names of information fields are shown in uppercase characters; e.g., CONNECT CROSSPOINT; SOURCE POINTER.

These command keywords and information field names are used within the text of this practice to imply requested action, information field identity, and, in turn, the information field contents of the virtual machine. To assist in readability of this practice, these terms are used in the context of the presentation material; e.g., "if this I/F is PRESET, ..." (PRESET in this context refers to a command contained within the type-specific message set.)

Terms with special meaning to this or related documents are shown with leading uppercase characters; e.g., Virtual Machine; Common Messages.

## 1 Scope of the dialect

This dialect is intended to be used for the external control of routing switcher systems.

## 2 Multidimensional information fields

The controlled elements in a routing switcher are in the crosspoints. The crosspoints are arranged in a multidimensional way, i.e., to identify an individual crosspoint, it is usually necessary to specify the following characteristics of its location:

- its row (1.dimension);
- its column (2.dimension);
- its level (3.dimension);
- its matrix (4.dimension).

(The latter applies only to a switcher consisting of several matrices.)

In ESBUS dialects, all kinds of status data are maintained in Information Fields (I/Fs). Each type of information has its corresponding I/F associated with a unique I/F Name. In routing switcher systems, nearly all status data are related to crosspoints. Because crosspoints are arranged in a multidimensional way, and each crosspoint is the carrier of status data, the I/Fs describing routing switcher data must also be multidimensional. The particular item of information belonging to one crosspoint is just an element of the whole Information Field of a certain type. This requires additional descriptors which point to the location of this element within the field; i.e., to the row, column, level, and matrix.

When such an element of an I/F is tallied, these descriptors are simply carried as parameters in the format. When such an element is accessed, however,

a different mechanism is required due to the fact that the Common commands which access I/Fs (e.g., READ, UPDATE, CYCLE) allow only for specifying the I/F name. No additional descriptor information is permitted in the format. Such additional information must, therefore, be transmitted in advance by pre-setting one or more pointers which predefine the parameters necessary for multidimensional access.

The pointers themselves also reside in Information Fields of their own and thus can be PRESET as any other pre-settable I/F. This gives the advantage that the pointer information need only be transmitted when it really changes, not in advance of every I/F access.

The names of the relevant points are:

- MATRIX POINTER;
- LEVEL POINTER;
- SOURCE POINTER;
- DESTINATION POINTER.

NOTE - In order to PRESET a multidimensional I/F, no pointers are required since the whole format of an I/F appears within the PRESET command, including the descriptors.

Because of special requirements of routing switchers, one of these dimensions may not be specified; e.g., the I/F DESTINATIONS-TO-SOURCE does not use the DESTINATION POINTER because it shows all connections between a specified source and any destination in the form of a list.

## 3 Wildcard characters

In order to facilitate access to a whole array (row, column, level, matrix) of one type of a multidimensional status information, a wildcard character is introduced (FFh to FFFFh, respectively).

A pointer, preset to the wildcard, indicates (when an I/F access requiring this pointer is made) that the information corresponding to the full available range of the pointer is desired. For example, if the LEVEL POINTER is preset to FFh, a subsequent READ of the I/F CROSSPOINT STATUS will result in a multiple I/F RESPONSE message (either in many single messages or in one message using the BEGIN/END construct or in combination) tallying the crosspoint status of all existing levels.

A second application of the wildcard concerns certain commands (e.g., CONNECT CROSSPOINT), where it can be used as a normal parameter with the same effect.

The description of the commands and information fields in clause 6 contains detailed instructions as to when and how wildcards can be used.

## 4 Procedures and events

As with all Dialects, the complete Routing Switcher Dialect, by definition, consists of both Common Messages and the Routing Switcher Type-Specific Dialect described in this practice.

The elements of the Common Messages prove very useful for switcher applications and are, therefore, recommended. The concept of Procedures provided by the common messages can be used to predefine a lengthy set of commands (by the DEFINE PROCEDURE command) pending the arrival of the EXECUTIVE PROCEDURE command, which causes the entire Procedure to be performed.

The concept of Events provided by the Common Messages can be used to predefine a command (by the DEFINE EVENT command) to be executed at a certain point in time. As the time scale (usually the Timeline) is used, an individual software clock running in each controlled Virtual Machine is preset by the bus controller (by the System Service command REQUEST TIME TRANSMISSION).

Both concepts can easily be combined by first defining a procedure, then defining an event with EXECUTE PROCEDURE as the command to be carried out on the timeline.

Details about these facilities are described in the documents about System Service and Common Messages mentioned above.

## 5 Sample command sequences

The following message sequences show the application of the dialect (including the Common Messages). The commands are also shown encoded into their hexadecimal codes.

The PRESET commands signed with a "\*" sign may be omitted if the corresponding I/F has already been preset by a preceding PRESET command.

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