

# TECHNICAL NOTE

## MP1776A

Obtaining Synchronization with MP1776A  
(STM-256/C-768)

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(STM-256/C-768)

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The note is to explain the causes and countermeasures to the extremely long time required to obtain synchronization with the MP1776A Error Detector when the STM-256 and OC-768 tests patterns are edited using the MX177601A SDH/SONET Pattern Editor.

### 1. MP1776A Error Detector Synchronization Method

The MP1776A has two synchronization methods (Normal, Frame); for details, see section 5-24 in the Operation Manual. Each of these synchronization methods has differences as explained below, but the Frame synchronization method is used when the pattern length is long as in the STM-256 frame (128 bits or more in the Independent Mode). This method is a method in which the specified PRGM pattern header pattern is monitored and synchronization is obtained.

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Normal: Pattern synchronization is performed by monitoring the pattern for each one cycle

Frame: Pattern synchronization is obtained using the specified frame bit. The frame bit is set from the PRGM pattern and the Zero-subst pattern headers.

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### 2. STM-256 Frame (ITU-T G.707)

Figure 1 shows the STM-256 frame specified by the ITU-T G.707. With STM-256, to keep the Non-Scramble part extremely small, only the 64 bytes before and after the boundary of the A1 and A2 bytes are left unscrambled. In other words, Scrambling is performed with a PRBS  $2^7-1$  signal on the other part (including 704 Byte from the header byte). On the other hand, only A1 and A2 in the first row of STM-256 are defined as A1:64 bytes and A2:64 bytes (Fig. 1). Other A1 and A2 bytes are undefined. However, with STM-64 frames or less, the entire first row of SOH are not scrambled and the SOH header byte is defined in A1="F6H", so there is no problem with obtaining synchronization.

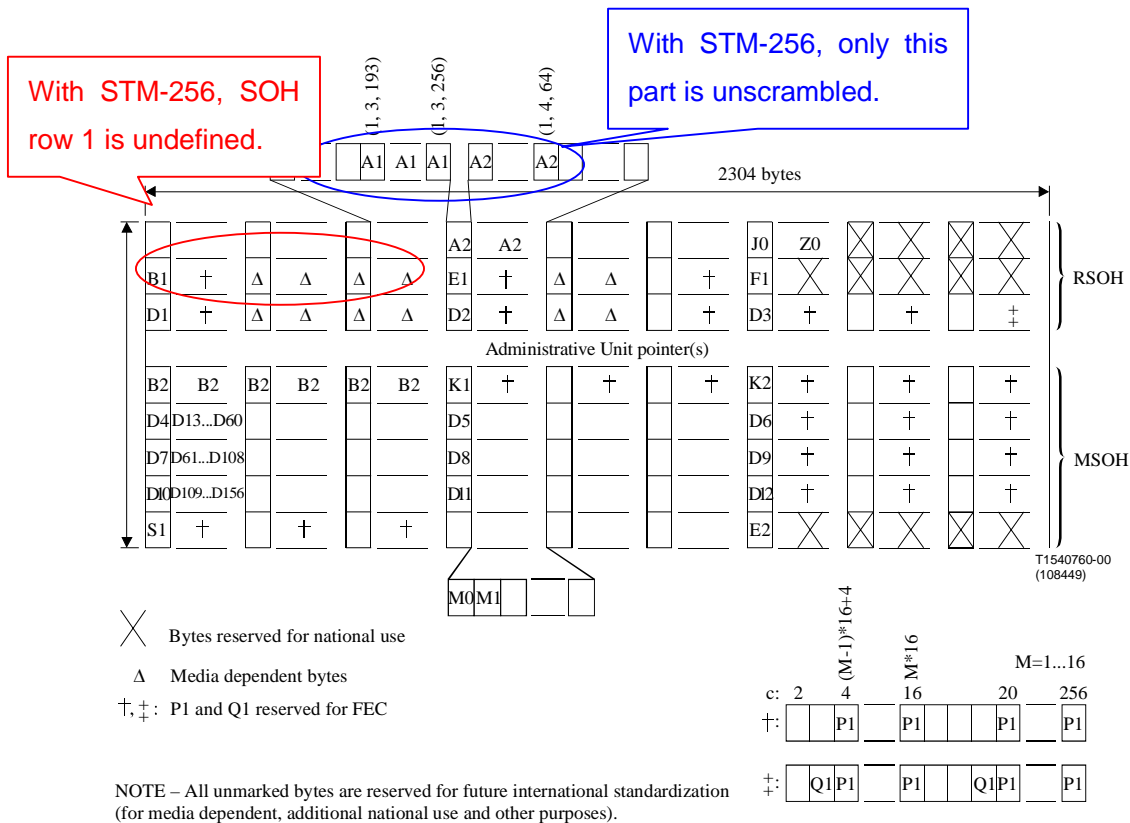


Fig. 1 Figure 9-7/G.707 STM-256 SOH

### 3. MX177601A SDH/SONET Pattern Editor Definition

With the MX177601A, when scrambling is performed with  $2^7-1$  (127 bit) PRBS to set these undefined bytes to "00H" (Fig. 2), the same pattern is found multiple times at every 127 bits. Synchronization becomes very difficult to obtain when the specified Frame Pattern and same pattern is found multiple times. Moreover, the same pattern number increases as the "Number of Frame" setting gets larger, so synchronization also become more difficult to obtain.

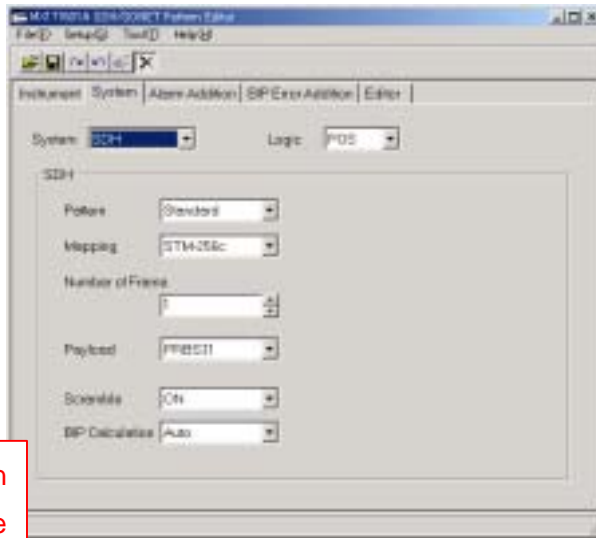


Fig. 2 MX177601A System Screen

With the MX177601A, when STM-256 is selected, the default setting for undefined bytes in SOH row 1 is "00H".

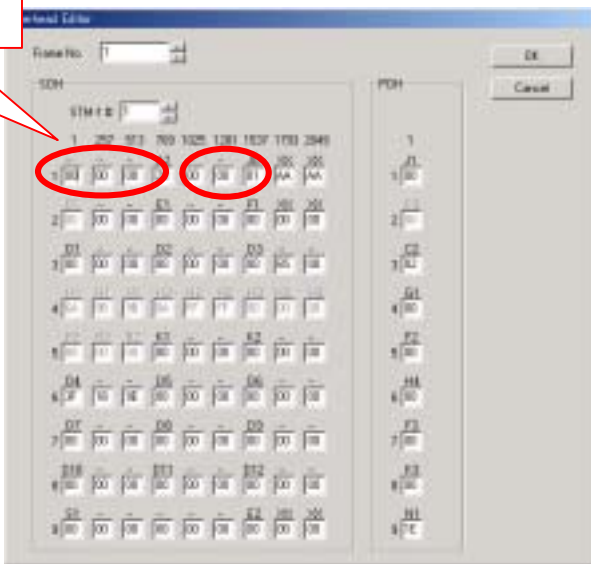


Fig. 3 Definition of Overhead

#### 4. Preventing Problem

Synchronization can be performed smoothly by ensuring that the specified Frame pattern and same pattern do not exist outside the header frame. As shown in Fig. 1, since the header bytes are undefined by the ITU-T G.707 standard, the MX177601A default setting is "00H". However, the MP1776A requires smooth synchronization to permit bit error evaluation. To this end, the synchronization problem can be avoided by using the MX177601A Overhead Editor screen (Fig. 4) to set a different pattern such as changing the header value from "00H" to "01H", etc. (Fig. 5). The STM-256 header byte is undefined in the ITU-T G.707 standard, so there is no effect on measurement and evaluation.

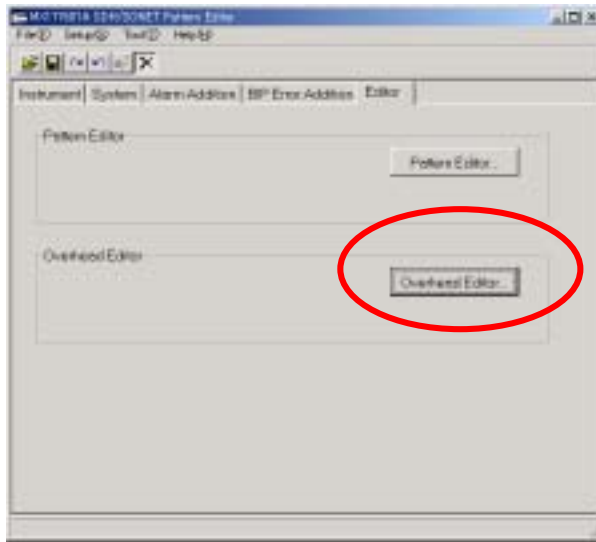


Fig. 4 MX177601A Editor Selection Screen

Set the first byte of SOH row 1 from "00H" to "01H".

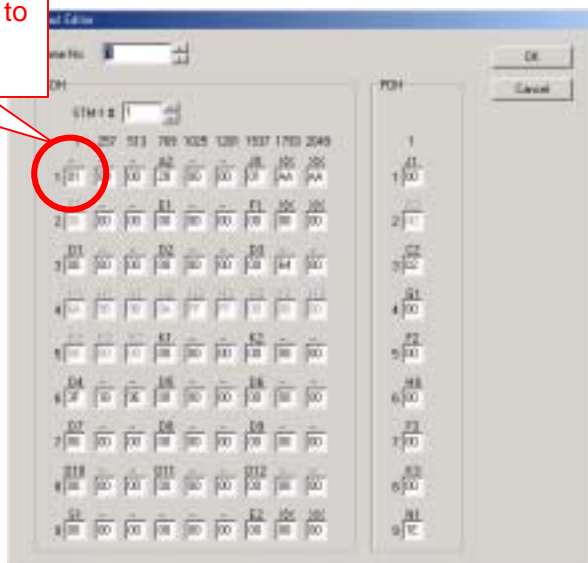


Fig. 5 MX177601A Overhead Editor Screen



Specifications are subject to change without notice.

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