



Applied Systems Engineering, Inc.

Technical Note #30
PG&E Read Time

About the PG&E Read Time Request

The PG&E Read Time request requires that at least 25 milliseconds of delay be inserted between the first five bytes of the Read Time Response and the remaining 11 bytes. The problem is that the GPT time mechanism is accurate to a user defined tick which in the sample code is about 250 milliseconds. Therefore the GPT can insert the delay into the Read Time Response. The delay must be managed by the user application. The remainder of this document will describe the changes inserted into the AseWriteComm routine to help manage the clock sync delay.

```
if ( ( lsd->Control & LSDU_SYNC_DELAY ) &&
      ( lsd->SyncDelay != 0 ) ;
      Sleep( lsd->SyncDelay ) ;

/* If protocol request sepeartion between fragments of a message */
if ( lsd->Control & LSDU_SYNC_DELAY ) Sleep( lsd->SyncDelay ) ;

/* If multi-fragment message and carrier is switched restore carrier */
if ( lsd->Control & LSDU_SYNC_DELAY )
{
  if ( (! ( lsd->Control & LSDU_FIRST_MESSAGE_FRAGMENT ) ) &&
        ( ! port->TxCarrier ) )
  {
    if ( port->PostXmtDelay ) Sleep( port->PostXmtDelay ) ;
    SetConstantRTS( port, port->TxCarrier ) ;
  }
}
```

Normally responses are transmitted to the remote station by the GPT as a single write. If the link service data unit control field is examined on a normal write it will indication that the write is transmitting the first and last piece of the response.

```
Lsd->Control == (LSDU_FIRST_MESSAGE_FRAGMENT |
                 LSDU_FIRST_MESSAGE_FRAGMENT
```

In synchronized writes such as the PG&E Read Time Response the actual response may be broken by the GPT into several pieces. That is each transmission of a PG&E synchronized write will have a different combination of LSDU_FIRST_MESSAGE_FRAGMENT and LSDU_LAST_MESSAGE_FRAGMENT. These attributes are processed in WriteComm (AseWriteComm) as follows:

The first check is made prior to the actual transmission of data bytes. If the GPT is performing a clock synchronization write and this is the first piece of that transmission we switch to constant RTS. This ensures that the CD signal stay high for all pieces of the sync write (1 response multiple fragments). When the last piece of the write is detected the RTS signal will be dropped.

```
if ( ( lsd->Control & LSDU_SYNC_DELAY ) &&
      ( lsd->Control & LSDU_FIRST_MESSAGE_FRAGMENT ) )
  SetConstantRTS( port, TRUE ) ;
```

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With the carrier up the request transmission of bytes is performed

```
result = WriteBitStream( primary, p, len, writeTimeout );
```

Two checks need to be made after the write completes. The first is to insert the sync delay. The other is to drop the carrier after the last fragment has been transmitted.

First a check for a SyncDelay. This could occur on any fragment, but for PG&E it will be on the first fragment. The delay is the number of milliseconds to delay before transmitting the next fragment. For PG&E it is after this delay expires that the DAC clock is read and the time inserted into the response.

```
if ( ( lsd->Control & LSDU_SYNC_DELAY ) &&  
    ( lsd->SyncDelay != 0 ) )  
    Sleep( lsd->SyncDelay );
```

The final check determines if this is the last piece. If this is the last piece the carrier must be dropped to indicate end of response. The post transmission delay is introduced to ensure that the last characters of the response are not corrupted by the carrier drop.

```
if ( lsd->Control & LSDU_SYNC_DELAY )  
{  
    if ( lsd->Control & LSDU_FIRST_MESSAGE_FRAGMENT )  
    {  
        if ( port->PostXmtDelay ) Sleep( port->PostXmtDelay );  
        SetConstantRTS( port, port->TxCarrier );  
    }  
}
```