Application Note DT-AN-2115B-GPSSYNC

Ensuring GPS-Synchronized Output on the DTA-2115B

1. Introduction

In GPS-synchronized applications, precise timing alignment is essential. Under certain conditions, the output of the DekTec DTA-2115B may lose synchronization with the external GPS clock reference. This application note explains the root cause and provides a reliable software workaround to ensure continued synchronization.

2. Problem Description

The issue arises when a GPS-synchronized output stream is stopped and later restarted without resetting the SFN (Single Frequency Network) logic. In this scenario, the SFN circuit may remain in an undefined internal state. If the output is restarted while in this state, it may not be properly synchronized with the external GPS signals (10MHz and 1PPS).

Be aware that this loss of synchronization occurs silently:

- The SFN status flags do not indicate any error.
- The device appears operational but produces unsynchronized output.

Note: This issue does **not** occur during the initial startup after calling `AttachToPort()`. It only affects subsequent restarts of the output stream.

3. Recommended Workaround

To guarantee proper GPS synchronization after stopping and restarting the output, follow this procedure:

- **Reset the SFN logic**.
  Call `DTAPI::Reset(DTAPI_SFN_RESET)` to reinitialize the SFN circuit.
- **Wait for GPS lock**.
  Wait until both the 10 MHz and 1PPS signals have relocked to the GPS reference. You can verify this using the SFN lock status indicators.
- **Start the output stream**.
  Once GPS lock is confirmed, initiate and start the GPS-synchronized output stream.

This guarantees the SFN circuit is re-initialised and locked before modulation or packet generation resumes.

4. Code Example

The snippet below illustrates the sequence. In production code add a timeout and error handling as appropriate for your application.

```
// Preconditions:
// - Device is attached to DTA-2115B
// - Output is attached and is in IDLE state
// - External clock reference (10MHz and 1PPS) is selected

// Step 1: Reset SFN logic
Output.Reset(DTAPI_SFN_RESET);

// Step 2: Wait for both 10MHz and 1PPS GPS sync to be established again
int GpsStatus = 0, GpsError = 0;
Device.GetGpsStatus(GpsStatus, GpsError);
while (    (GpsStatus & DTAPI_GPS_10MHZ_SYNC)== 0
        || (GpsStatus & DTAPI_GPS_1PPS_SYNC) == 0)
{
    Sleep(10);  // Wait 10 ms before re-checking
    Device.GetGpsStatus(GpsStatus, GpsError);
}

// Step 3: Initiate and start GPS-synchronized output (not shown)
```