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APPLICATIONS NOTE
Customer Test Checklist for STS 5800 List 5 Systems

This pertains to the STS 5800 List 5 timing system which uses DS1 input signals to back up GPS. These systems are described and specified in Larus Product Practices 80-100-246 (Volume 1). The system installation procedures are outlined in Larus Product Practices 80-600-246 (Volume 2). When all installation procedures are followed, the system is ready for use. This Applications Note is intended as a supplement to that process.

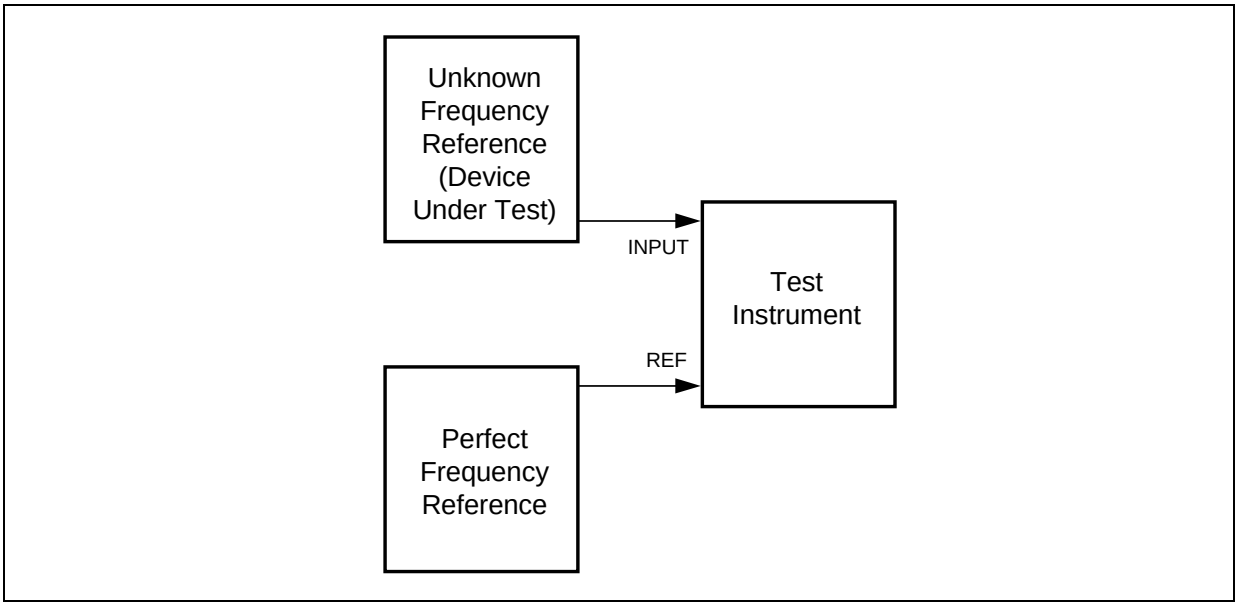

Figure 1

1. Refer to Figure 1. It is difficult to measure the absolute frequency accuracy or stability of a device unless you use a test reference of better frequency accuracy. Since the Larus STS 5800 may be configured for Stratum 1 level performance, a perfect reference of better than Stratum 1 is required. This is difficult to find outside of a metrology lab. Larus performs accuracy tests on these products at its factory.

The practical tests to be done in the field require a T-BERD instrument or the equivalent. The terrestrial reference DS1 inputs, MON jack signals, and part of the outputs are framed DS1 signals. Initial tests without GPS mode will verify the terrestrial DS1 input reference against the processed clock signal.

2. Refer to Figure 2. It is necessary to operate the system using the Menu interface to a terminal (or laptop computer with terminal emulator program). Either of the Local Access or Remote Access ports may be used. The connecting cable is a null modem. The default data settings are 9600 baud, No parity, Eight data bits, One stop bit. Once physically connected, press the Information Management Reset button (Mgmt RESET) to clear buffers. A couple of messages

will scroll across the terminal screen and show the login prompt. The operator can log on using the factory default User Name (SYSADMIN) and default Password (-VISTA-).

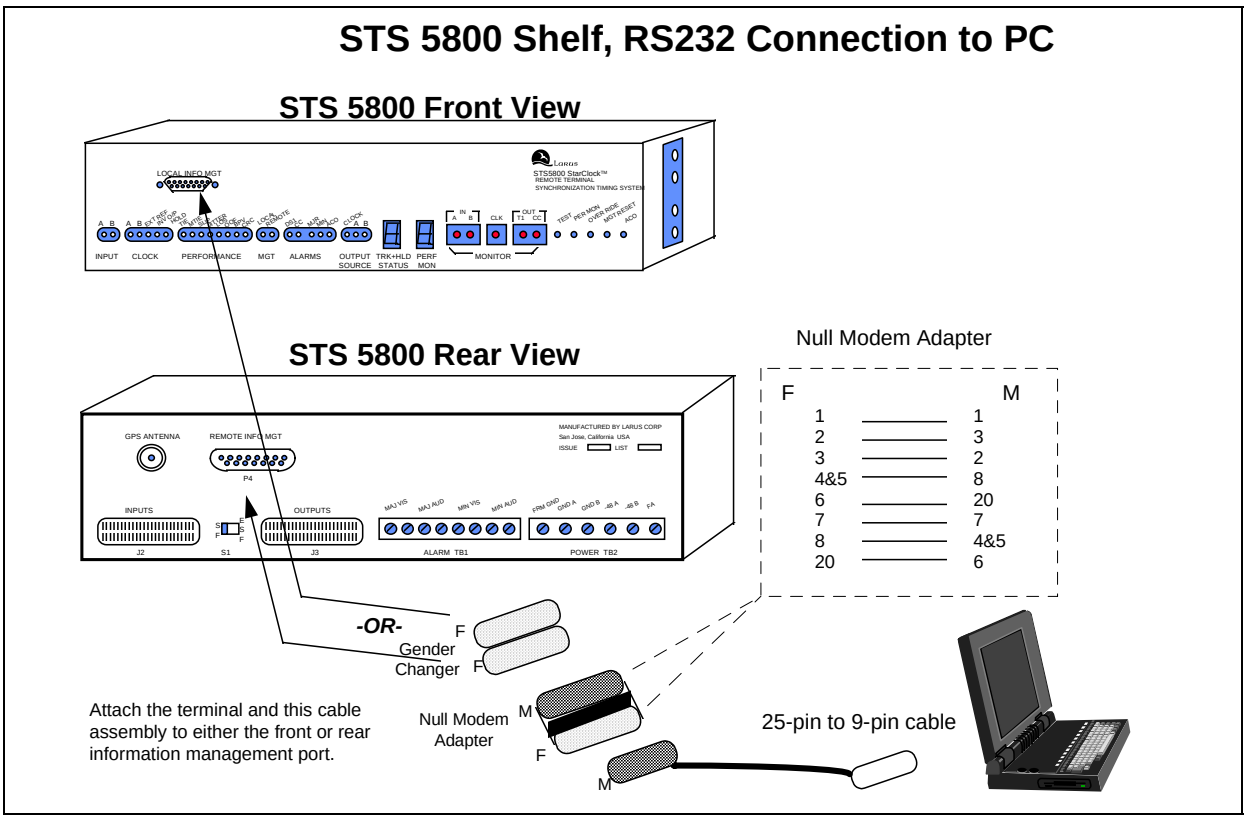

Figure 2.

First set the System Date/Time through the Menu interface as follows:

Main Menu, Service Parameters, Set Date/Time.

The operator should enter the date and approximate local time.

If prompted for Offset Time, enter a value for the number of quarter hours that local time is offset from Greenwich Mean Time. As an example, Eastern Standard Time = Offset -20. Pacific Standard Time = Offset -32. Now Menu Information Management responses will have that date and time in the header of the response.

Each night at midnight, if the system is in GPS mode, it can update its local time with precise Universal Time from the military satellites.

☐ Local time and date has been stored.

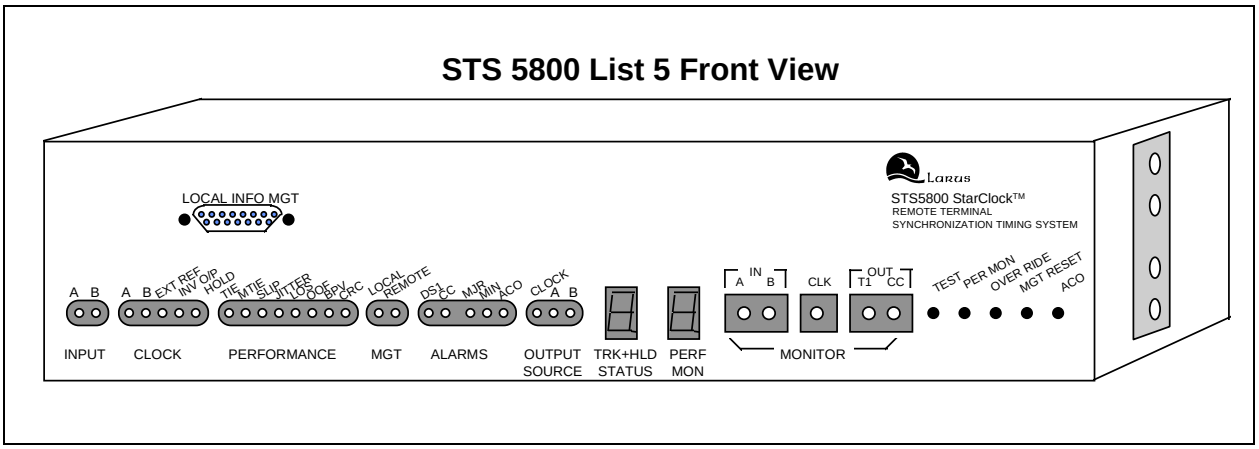

Figure 3a.

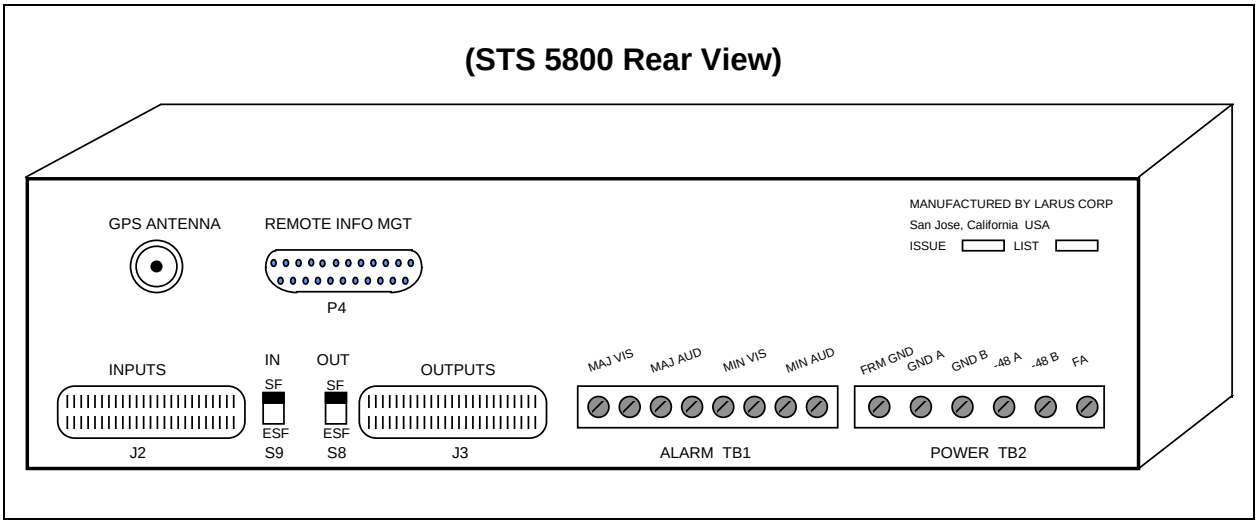

Figure 3b.

3. Refer to Figures 3a and 3b. Apply a nominal DS1 signal to the first DS1 input (rear panel, Input Connector J2) as explained in Volume 2, section 3.211. Note the differences between a terminating input and a bridging input. This signal can be easily generated from a calibrated T-BERD instrument or it can be a live traffic DS1 signal. If possible, test the following four input combinations for the first DS1 input and then again for the second DS1 input:

1. SF (D4) framing, AMI line code
2. SF (D4) framing, B8ZS line code
3. ESF framing, AMI line code
4. ESF framing, B8ZS line code

Examination of the existing 5800 input settings and then provisioning or changing those input settings may be done using the Menu interface as follows:
Main Menu, Service Parameters, View SMC. Main Menu, Service Parameters, Set SMC.

In each case, applying the DS1 signal to the correctly provisioned input port will result in the 5800 system beginning to acquire that signal. Within 15 minutes, the acquisition will complete

and the proper indicators will light up on the front panel: Input A or B, Clock A or B, Status " = " or else " || ".

☐ Push the hold TEST button on the front panel. Status displays "H" if successful, then returns to normal tracking after a few seconds. Note that this step cannot be performed if the system is already in GPS mode.

4. Intentionally disrupt the DS1 input signal, and the track & hold function should detect the missing signal within a few seconds and post an alarm message to the terminal screen.

☐ Did an LOS alarm message display on the terminal?

Restore the DS1 input signal and allow the re-acquisition to occur over several minutes.

☐ Did a CL LOS alarm clear message display on the terminal?

5. There is still a DS1 signal being applied to the DS1 input A on the rear. Again, this signal may be generated from a T-BERD or bridged in from live traffic. Using a second T-BERD or similar instrument with one T1 signal input jack and one T1 clock reference input jack, connect with patch cords to the 5800 front test jacks as follows:

5800 IN A jack -to- T-BERD T1 reference jack
5800 T1 OUT jack -to- T-BERD T1 input jack

☐ Are there any clock slips between these two signals? There should be none.

⌧ If only one T-BERD instrument is available, then attach its output signal to the 5800 DS1 input A, its T1 reference jack to the 5800 IN A jack, and its T1 input jack to the 5800 T1 OUT jack. There should be no clock slips.

6. So far these tests have verified terrestrial input reference signal tracking. This next step adds GPS Stratum 1 operation, if so equipped. Once GPS mode has been reached, it becomes difficult to go back and verify terrestrial input signal tracking. The GPS antenna is mounted near the building roof or somewhere with a clear view of the sky. Attach one end of the coaxial cable to it and the other end to the GPS ANT connector on the rear of the 5800 case. After the GPS antenna signal is connected, certain diagnostic tests can be performed using the Menu Information Management interface. The system will also submit autonomous messages as the various states of GPS mode initialization are reached. The following steps are done via the Menu Information Management interface. Begin with Main Menu, Miscellaneous Menu, GPS commands.

☐ Do the $BITS* command (Built In Test Summary). The correct response is 0000. The response is allowed to be 0010 on a temporary basis for the first 15 minutes of warm-up. The response must become 0000 within 15 minutes.

☐ Do the $DETF* command (Determine Frequency) and confirm. This is a service affecting command. The correct response is 10000000 which means 10 MHz exactly. After the warm-up has completed in 15 minutes, any other number response is not correct.

☐ Do the $SIGQ* command (Signal Quality). This is similar to a GPS signal strength measurement. At the first minute, there may be only one usable satellite signal present. After a few minutes, there may be more. Assuming that there is a normal view of the sky, within 20 minutes there will be a full complement of usable satellite signals (SIGQ=3 or higher). The perfect response will be five satellites of value 9, but this is not required. A minimum of four with minimum value 3 is the required response. This response will change over time. If there are errors with the GPS antenna or cable, then this step will fail.

☐ Do the $ESSN* command (Estimator Sample Number). The estimator sample number should be increasing over time, one per second. When allowed to run automatically for 30 minutes, the indicator for “GPS Mode” should turn on, displayed as “E”. If the ESSN number increase fails and the “E” goes out, then this is a likely sign of GPS signal interruption, so the antenna and/or cable problem must be diagnosed.

☐ Clear the log file. Manually create some event to see the entry in the log file. A good one is to disconnect the GPS antenna cable. That should show up in the log file. Restore the cable and see that the cleared alarm item shows up in the log file (this will take some time). Clear the log file again.

7. Using the T-BERD once more, measure the frequency accuracy of the 5800 (measured at the 5800 OUT T1 jack). The T-BERD is probably calibrated to be within a few parts per million accuracy, and the 5800 is much tighter than that.

☐ The T-BERD measures 1544000 +/-3.

(end of procedure)