

## DM3 and Springware: T1/E1 Clock & Sync issues

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### Common causes for clock slip, loss of sync and alarms.

#### Symptom:

The Dialogic board experiences clock slips or loss of sync/alarms.

**Reason for the problem:** Correct configuration and setup is necessary for a stable telephony environment. Any incompatible configuration will be a direct result of clock slips or synchronization issues with the T1 / E1 (T-1 / E-1) line.

#### Fix / Solution:

The problem is an incompatible configuration with the Dialogic hardware vs. the network configuration. The solution is to properly configure this which is the responsibility of the user. The specific parameter is not always obvious or known so sometimes the trial-and-error method is needed to determine which change is necessary. This is a compiled list of common Dialogic parameter changes and other troubleshooting techniques that have proved useful in resolving these type of issues:

Note: the suggested solutions below are specific to Dialogic DM3 products. See the comment at the end for specific Springware details if it applies.

#### **Problem #1:** - Multiple carriers

**Solution:** - If more than one carrier is supplying clock (i.e. Multiple T1 lines into the Dialogic system are coming from different sources/TelCos), then the carriers must supply the same clock (which should be synchronized to the Stratum 1 Cesium clock), otherwise Dialogic will likely experience & report alarms. You should raise to your provider to determine if they can synchronize with other provider of digital lines. You can also attempt to add a CSU within 110 feet (cable length) of the Dialogic hardware so that signal comes to board from one source.

#### **Problem #2:** - Line length - what is the T1 line length from Dialogic hardware to other end (switch / CSU / etc...)?

**Solution:** The default line length configuration for Dialogic hardware is 0-110 feet. To change this you must modify the appropriate .config file and generate an updated .fcd file by running FCDGEN.exe. Let's take an example of a cable length of 300 feet using an E&M Wink Robbed-bit T1. Here is the procedure:

- 1) Stop the Dialogic System Service
- 2) Open config file.
- 3) Add 'SetParm=0x1606,18 ! Line Length: 16=0-110ft, 17=110-220, 18=220-330, 19=330-440' under the '[lineAdmin]' section, and save the file.
- 4) Run fcdgen with the filename.
- 5) Start the Dialogic System Service.

\*You can also put a CSU within 110 feet (cable length) of the DM3 board.

\*\* For springware, review the appropriate .prm file for the similar cable length parameter (0x0012) for editing.

#### **Problem #3:** - Framing / line encoding

**Solution:** The default configuration settings in the current releases for Dialogic DM3 products running CAS are ESF and B8ZS for T1 (or CRC and HDB3 for E-1). Note this is the only possible setting for T1 ISDN). For CAS, the user must configure the Dialogic hardware to match the configuration from the remote connection. If a switch is configured as D4/AMI, then the dialogic board must be configured accordingly. Possible configurations are ESF/B8ZS, D4/AMI, and D4/B8ZS. To change to D4/AMI, for example:

- 1) Stop the Dialogic System Service
- 2) Open config file.
- 3) Edit 'SetParm=0x1601,0 ! LineType (dsx1\_D4=0, dsx1\_ESF=1, dsx1\_E1\_CRC=3)' under each '[lineAdmin]' section.
- 4) Edit 'SetParm=0x1603,8 ! Coding (B8ZS=7, AMI=8, HDB3=9)' under each '[lineAdmin]' section, and save the file.
- 5) Run fcdgen with the filename.
- 6) Start the Dialogic System Service.

\*\* For springware, review the appropriate .prm file for the similar framing/line encoding parameters (0x0014 & 0x0020) for editing.

**Problem #4:** - CRC – the user may want to try opposite of current setting : enable or disable.

**Solution:** The default CRC configuration for DM3 T1 boards is Disabled. To Enable this you must modify the appropriate .config file and generate an updated .fcd file by running FCDGEN.exe. Here is the procedure:

- 1) Stop the Dialogic System Service
- 2) Open config file.
- 3) Add 'SetParm=0x1624,01 ! Disabled: 00, Enabled: 01' under the '[lineAdmin]' section, and save the file.
- 4) Run fcdgen with the filename.
- 5) Start the Dialogic System Service.

\*\* For springware, review the appropriate .prm file for the similar CRC parameter (0x000F) for editing (this can be found in the ctr4.prm file and may have to be added to other .prm files for use).

**Problem #5:** Network or User side? - How is Dialogic configured, and how should it be configured?

**Solution:** The default Network Mode configuration for ISDN on DM3 products is USER side. To change this to NETWORK side, the user must modify the appropriate .config file and generate an updated .fcd file by running FCDGEN.exe. Here is the procedure:

- 1) Stop the Dialogic System Service
- 2) Open config file.
- 3) Add 'Setparm=0x17,1 ! Network Mode. 1=NETWORK 0=USER' under the '[CCS]' section, and save the file.
- 4) Run fcdgen with the filename.
- 5) Start the Dialogic System Service.

\*\* For springware, use the appropriate .prm file for the Network side (for T1 only ... NT1.prm for most ISDN protocols, or QTN.prm for QSIG).

**Problem #6:** Correct protocol?

**Solution:** Verify the network side configuration .. Is it configured for CAS (example: T1 Robbed-bit, wink start) or ISDN? If ISDN, what protocol is it set up for?

**Problem #7:** Cable

**Solution:** Problem #7: Cable Solution: Try a different T-1 cable. Make sure it is a straight through cable. Or if a cross-over cable is required, verify the pins crossed are for Telephony and not Ethernet (Telephony cross-over: pin 1 crosses to pin 4, and pin 2 crosses to pin 5).

**Problem #8:** Clock Provider? Is it set to "Internal\_Oscillator" or "Netref\_1"?

**Solution:** By default, Dialogic expects the network to provide the clock so it is configured as "Netref\_1". If the network side expects Dialogic to provide the clock, then this can be changed in the DCM (Dialogic Configuration Manager) by configuring the TDM Bus 0 device and setting the "Derive Primary Clock From" to "Internal\_Oscillator", and restart the services.

**Workaround:**

Typically a PBX must be a slave to the Central Office and should be synched accordingly. This means it should not have a clock slip more than once every 16 days. The Dialogic hardware must be configured to meet the PBX specifications for a stable telephony environment.

The telephony environment will become unstable if there is poor synchronization. Typical errors manifested form an unstable environment can include:

- Degraded speech & audio
- Clicks on the line
- Degraded data signal throughput, which can lead to call control problems
- Fax transmission issues
- Partial or complete T1 / E1 line outages

Here is some useful information regarding the technical specifications for the Dialogic DM3 products:

The T1/E1 line must be configured to send the signal to the Dialogic hardware as follows:

- Network clock rate 2.048 Mb/s ±50 ppm (for E-1)

- Internal clock rate 2.048 Mb/s  $\pm$ 32 ppm (for E-1)
- Network clock rate 1.544 Mb/s  $\pm$ 32 ppm (for T-1)
- Internal clock rate 1.544 Mb/s  $\pm$ 32 ppm (for T-1)
  
- Level 2.37 V (nominal) for 75 Ohm lines
- 3.0 V (nominal) for 120 Ohm lines
- Pulse width 244 ns (nominal)
- Line impedance 75 Ohm, unbalanced
- 120 Ohm, balanced
- Other electrical characteristics Complies with CCITT Rec. G.703
- Framing CCITT G.704-1988 with CRC4
- Line coding HDB3
- Clock and data recovery Complies with CCITT Rec. G.823-1988
- Jitter tolerance Complies with CCITT Rec. G.823, G.737, G.739, G.742-1988
- Connectors BNC for 75 Ohm lines
- RJ-48C for 120 Ohm lines
- Telephony bus connector H.100-style 68-pin fine pitch card edge connector
- Loopback Supports switch-selectable local analog loopback and software selectable local digital loopback