BASIC OPERATION

The *BiSS* AN22 application note explains how to analyze an external *BiSS* communication with the Acute logic analyzer and the protocol analyzer.

The *BiSS* C sensor data (point-to-point) single cycle data (SCD) and *BiSS* C register access are analyzable.

The basic operation of the *BiSS* logic/protocol analyzer is based on:

- Acute USB logic and protocol analyzer hardware TravelBus (16 Channels)
- Acute USB logic analyzer hardware TravelLogic (36 channels)
- Acute USB digital storage oscilloscope hardware TravelScope (2 channels)

Figure 1: TravelBus

Figure 2: TravelLogic

Figure 3: TravelScope

The devices TravelScope and TravelLogic/TravelBus can be combined for a synchronized operation and incorporate other analog or digital signals with the *BiSS* communication signals.

Clock Rates
Full *BiSS* clock rates up to 10 MHz are possible.

BiSS analyzer modes
Position data:

- Serial Data/Position 9 - 32 bit (selectable)
- NERR (low active error flag)
- NWARN (low active warning flag)
- CRC 6 bit (based on 0x43 CRC polynomial)

Register communication:

- read access
- sequential read access
- write access (only without delay time)

SOFTWARE DOWNLOAD

The software is free to download from the following links:
See also:
→ http://www.acute.com.tw/eng/p4_download.php?did=1
http://www.acute.com.tw/Software/la/LA27819.zip (TravelLogic)
http://www.acute.com.tw/Software/TBA/TBA_InstallPack_20160330.rar (TravelBus)
http://www.acute.com.tw/Software/dso/DSO14101.zip (TravelScope)

See also:
→ http://www.BiSS-Interface.com/
AN22 Acute Analyzer Demo data package ZIP file including configuration, screenshots and data:
http://www.BiSS-Interface.com/files/BiSSDEMOAN22.zip

BiSS ANALYZER INSTALLATION

The analyzer hardware needs to be installed completely and all files and functions are needed to be accessible by the user's standard operation.

ELECTRICAL INTERFACE

BiSS Interface PHY standards
On embedded *BiSS* applications TTL signals are directly accessible.
On standard *BiSS* applications RS422 signals are directly accessible.
The typical electric interface of a *BiSS* communication is an unidirectional RS422 link between *BiSS* master (drive) and *BiSS* slave (sensor) and an unidirectional RS422 link between *BiSS* slave(sensor) and *BiSS* master(drive).

Electrical power supply and Ground connection
To run the analyzer, a GND Ground connection is mandatory and needs to be connected first.
To run the analyzer, a supply of optional interface adapters is mandatory.

Attention:
Please ensure the correct connection sequence and input voltage ranges of all devices.

Attention:
Please ensure the correct signal connection on positive signal of MA and SLO(SLO of sensor is connected with SL of master).

Attention:
Please ensure that there is no line delay compensation required for the analyzer.
This is uncritical on short cable lengths and standard MA clock frequencies or the capturing with the analyzer close to the *BiSS* sensor and not close to the *BiSS* master.

LOGIC ANALYZER SOFTWARE CONFIGURATION

TravelLogic Settings for BiSS
Settings for single cycle data communication The setting window opens and needs the following settings:

- Which channels capture the signals
  - MA: master clock output
  - SLO: slaves data output
- What type of data / communication to be analyzed
  - Single Cycle Data communication
- Serial data length

Settings for register data communication The setting window opens and needs the following settings:

- Which logic analyzer channels capture the signals
  - MA: master clock output
  - SLO: slaves data output
- What type of data / communication to be analyzed
  - Register Data communication

Labeling the channels The color of the *BiSS* related content is configurable:

- ACK/ADR
- START
- CDS/CTS
- Data/Cmd
- Flag/ID/IDL
- CRC
- STOP/EX
- Read/IDS
- Write/IDA

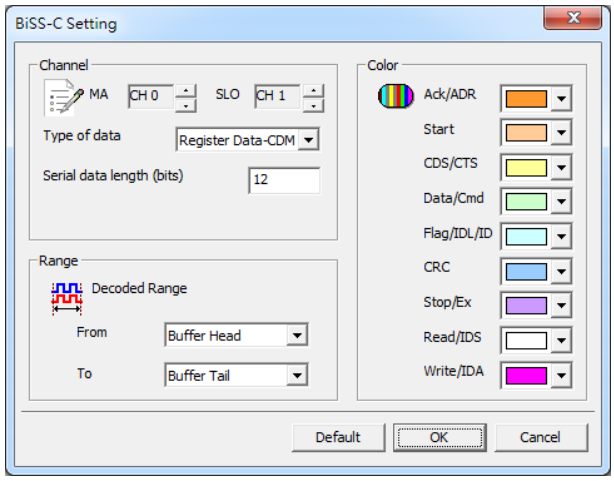

Figure 4: Configure the TravelLogic - *BiSS* protocol settings

BiSS SINGLE CYCLE DATA FRAME

Complete BiSS Single Cycle Data (SCD) frame

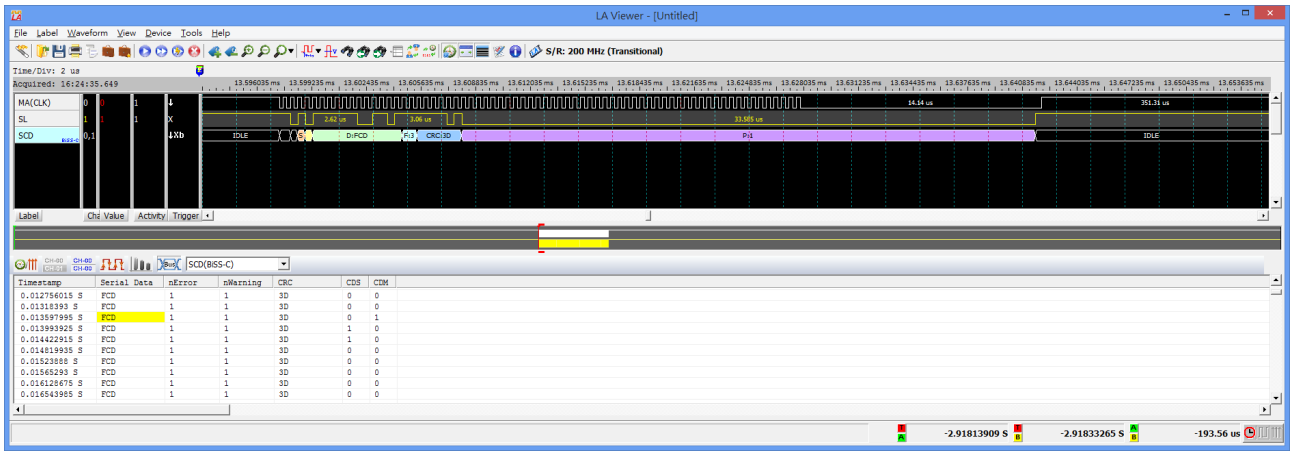

Figure 5: *BiSS* Single Cycle Data frame

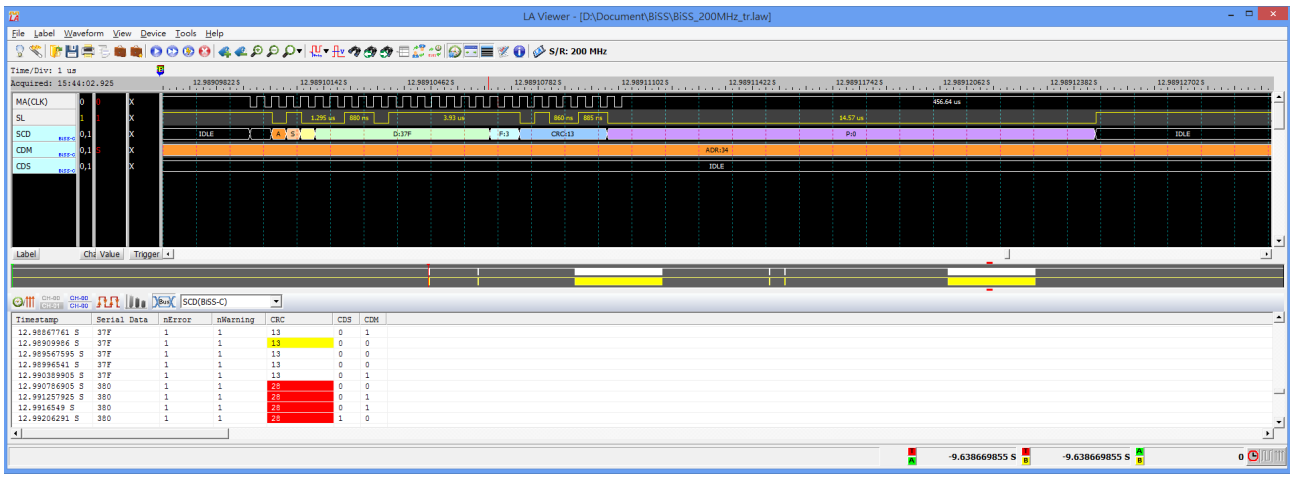

Figure 6: *BiSS* Single Cycle Data frame

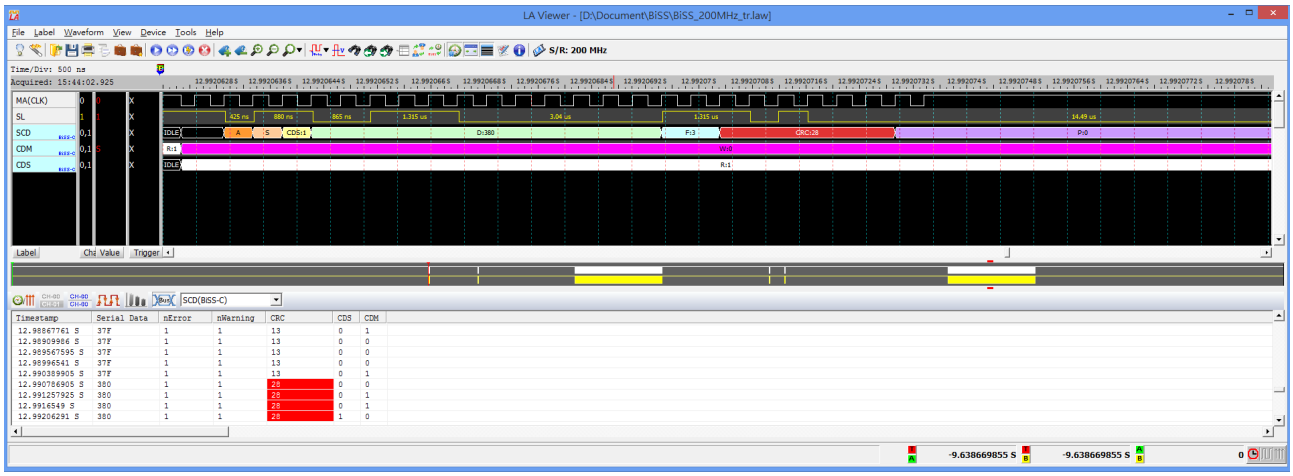

Figure 7: *BiSS* Single Cycle Data frame detecting a CRC error

BiSS REGISTER ACCESS

BiSS Register Access

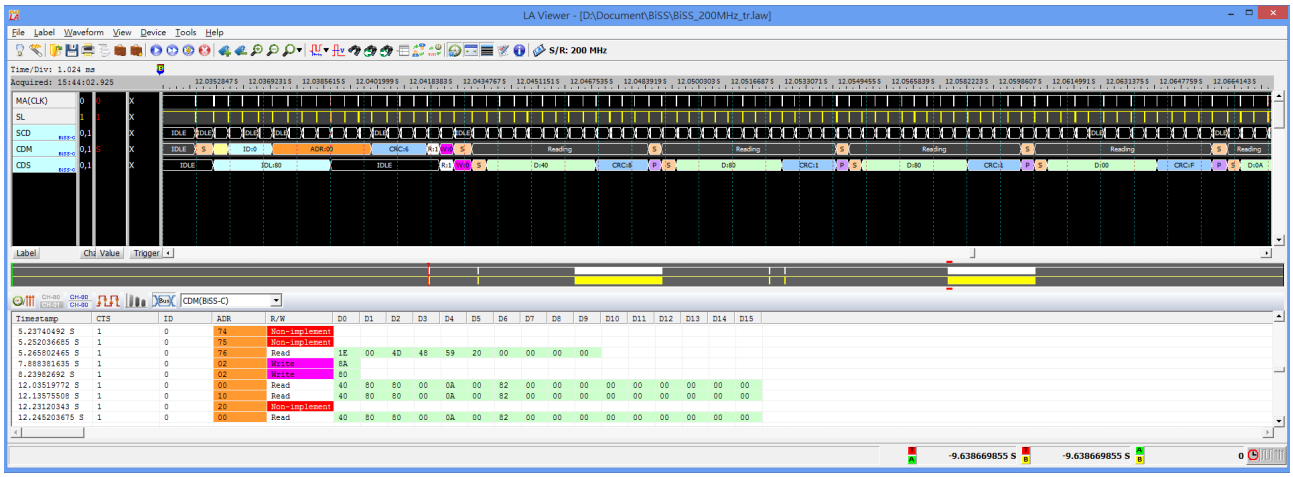

Figure 8: *BiSS* control communication

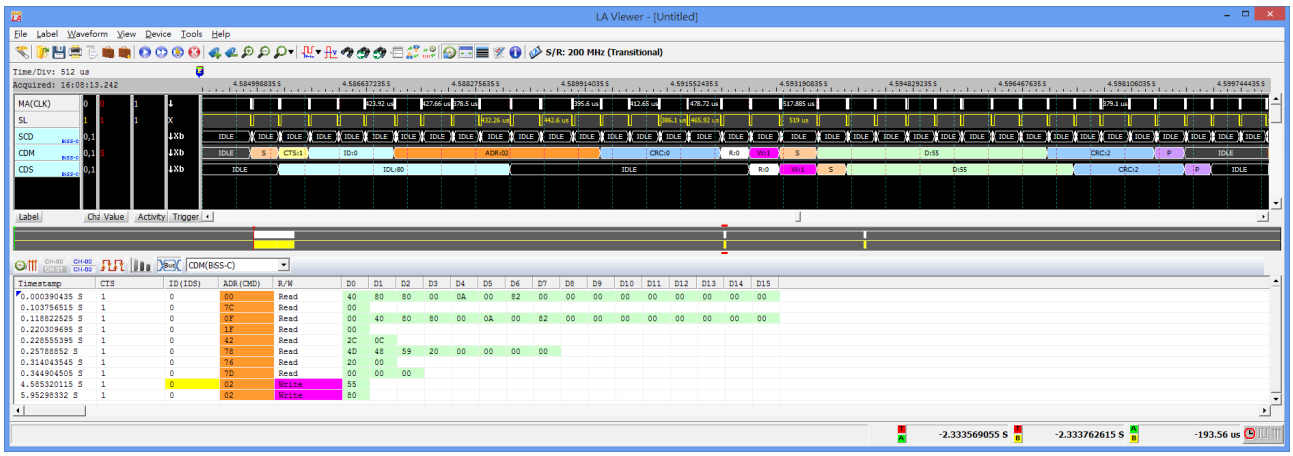

Figure 9: *BiSS* control communication for register access

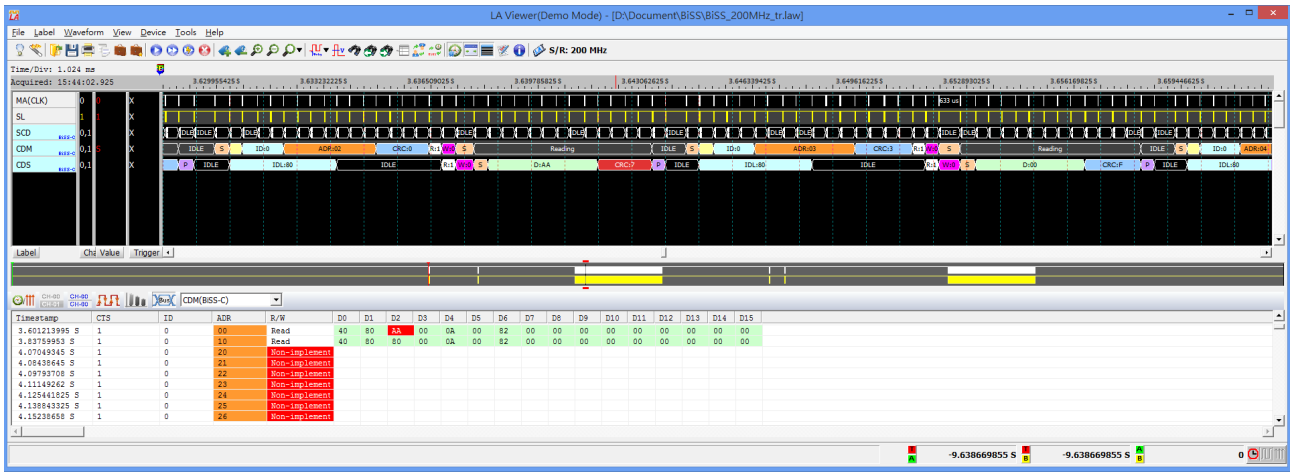

Figure 10: *BiSS* control communication for register access detecting a CRC error

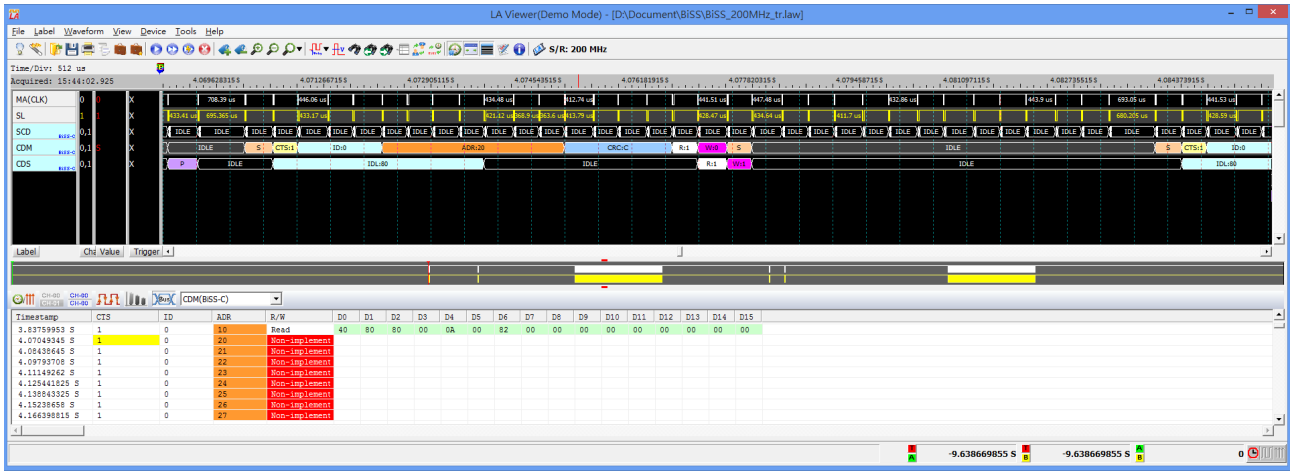

Figure 11: *BiSS* control communication for register access detecting unimplemented registers

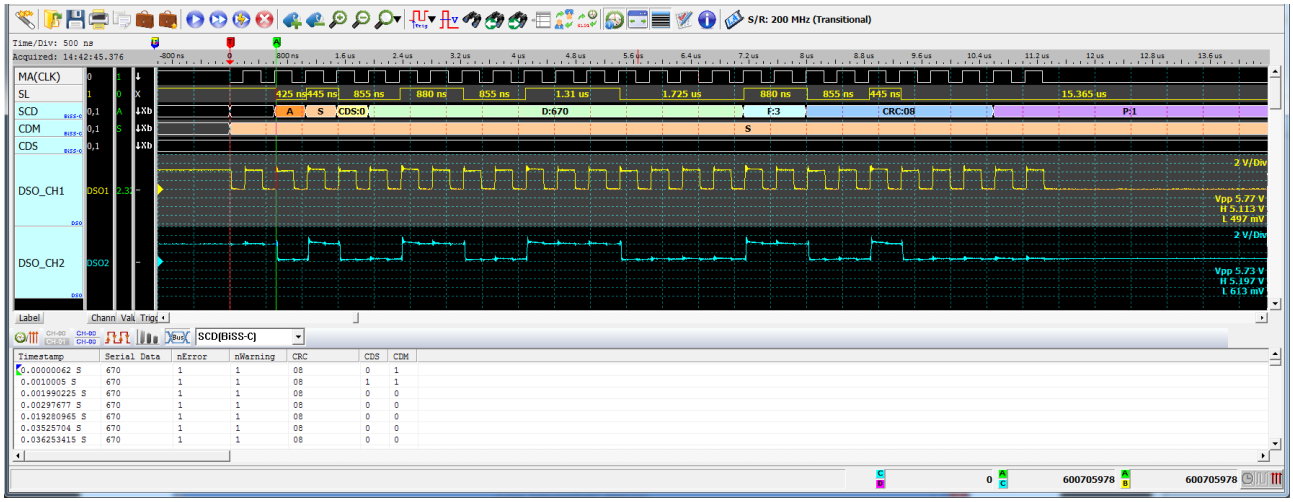

Figure 12: *BiSS* Single Cycle Data frame with TravelScope DSO waveform

PROTOCOL ANALYZER SOFTWARE CONFIGURATION

TravelBus Settings for BiSS protocol analyzer

The setting window opens and needs the following settings:

- Which channels capture the signals
  - MA: master clock output
  - SLO: slaves data output
- Serial data length
- Threshold

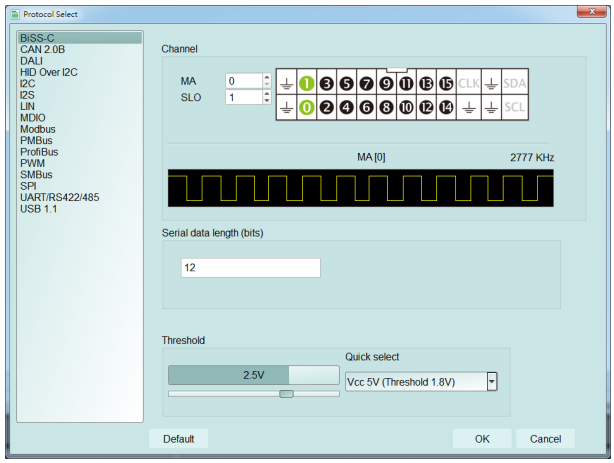

Figure 13: Configure the TravelBus - *BiSS* Protocol Analyzer

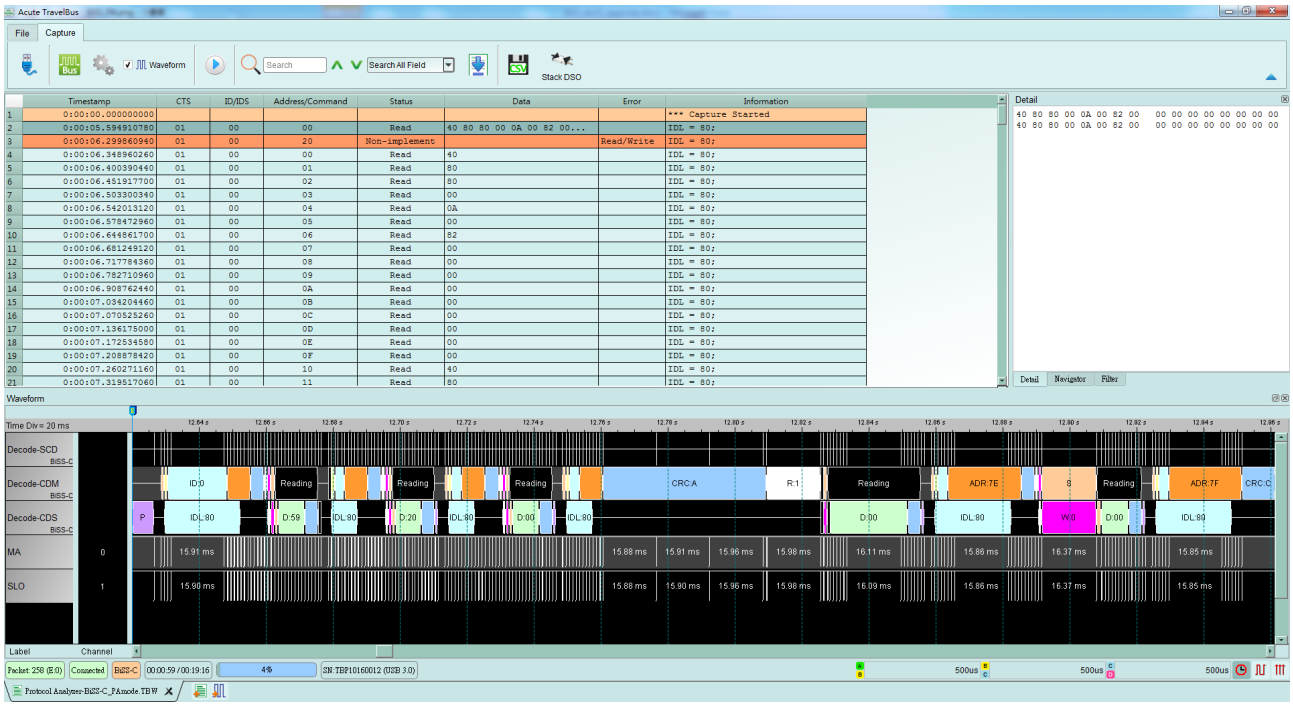

Figure 14: *BiSS* control communication - TravelBus *BiSS* Protocol Analyzer

TravelBus Settings for BiSS Logic analyzer
The setting window opens and needs the following settings:

- Which channels capture the signals
  - MA: master clock output
  - SLO: slaves data output
- What type of data / communication to be analyzed
  - Single Cycle Data communication
  - Register Data communication
- Serial data length

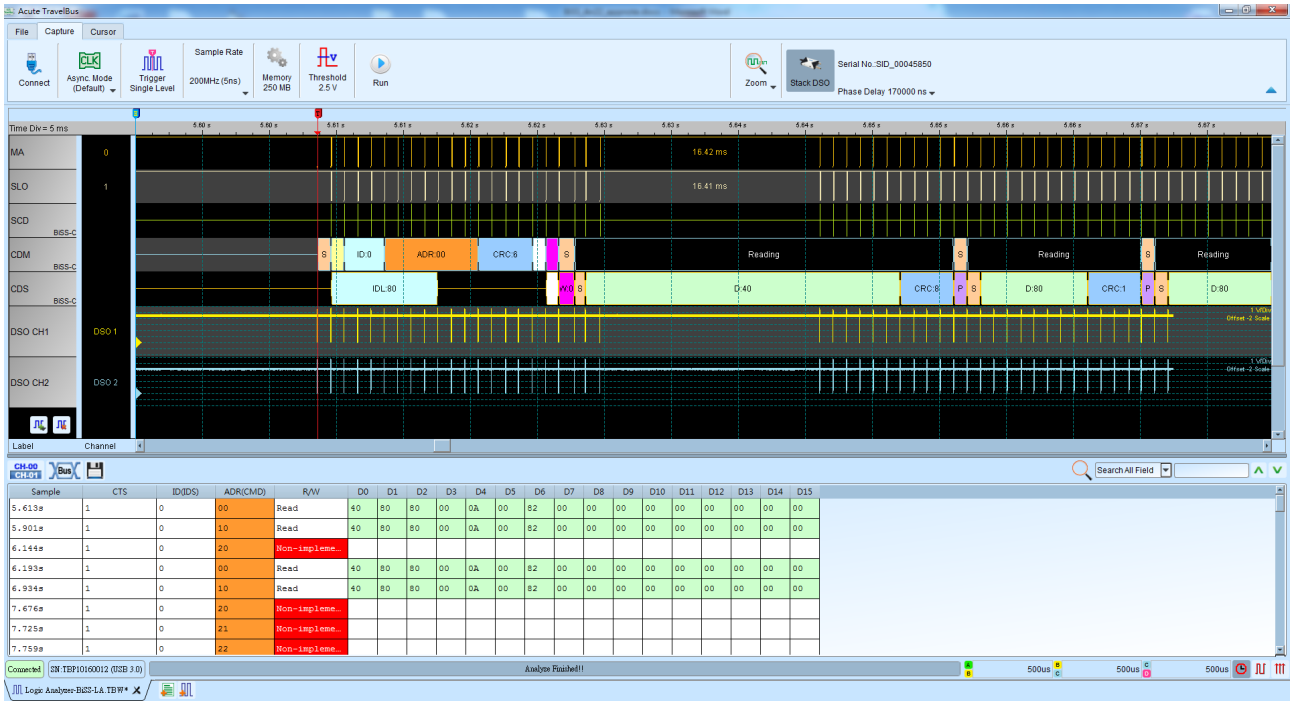

Figure 15: *BiSS* control communication - TravelBus Logic Analyzer with TravelScope DSO

REVISION HISTORY

Rel.	Rel. Date*	Chapter	Modification	Page
A1	2016-04-26		Initial release	all

* Release Date format: *YYYY-MM-DD*