DOBLE PROTECTION TESTING

Digital Network Analyzer

DETECT AND ADDRESS ISSUES IN IEC 61850 NETWORK TRAFFIC



FEATURES AND BENEFITS

- Lightweight and compact for easy portability
- Multiple field and laboratory applications, inperson and remote use cases
- Software for detailed analysis of captured events and evaluation of network performance
- System event packet capture (PCAP) for analysis in a wide range of network analysis tools
- Numerous user-configurable views available for observing system status in real-time
- Fast setup and intuitive user experience

The Doble F6880 Digital Network Analyzer (DNA) reveals details that are essential to helping protection engineers and relay test technicians quickly resolve issues in IEC 61850 network traffic.

This compact and lightweight instrument is paired with powerful software that analyzes IED communications and provides diagnostic and analytical functionality in real time.

The DNA is a digital substation multimeter, capable of plotting IEC 61850 sampled values (SV) and GOOSE messages via real-time oscillography, phasor, and tabular data views.

It is also a system event recorder, capturing events via customizable triggers and producing analysis reports that allow the user to evaluate network performance and power system anomalies, like voltage sag, harmonic distortion, and underfrequency.

The F6880 compares SV and GOOSE information from SCL files with the present network traffic to identify system misconfiguration issues such as missing, duplicated, or unknown messages.

The DNA can even be left connected in the substation for extended periods, offering remote access and control.



CONNECT

Assign ports to process bus, station bus and control networks and save along with other setup configurations for sharing and future plug-andplay efficiency.



SUBSCRIBE

Import SCL files to find baseline IED parameters. Create up to 3 networks to filter SV and GOOSE from Process/Station buses. Synchronize with PTP grandmaster clocks to achieve sub-microsecond network time synchronization.

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Assign ports to isolated networks to monitor multiple subnetworks simultaneously.

MONITOR

Select individual GOOSE and SV control blocks to analyze. The DNA can sample and display 16 sampled values streams simultaneously.



The Dashboard combines a high-level aggregate view with quick navigation to present key information about the networks being monitored.



Set DNA triggers to record data prior to and following events. The captured data is scanned to produce an Event Analysis Report.

CAPTURE

Create custom event trigger configurations that combine any number of Boolean logic gates with comparators that measure SV quantities and data attribute values in GOOSE packets. Capture all network information for a set duration.



Configure the Live Data screen with oscillography, metering, and/or tabular UI elements to display live GOOSE and SV being polled from the network.

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DNA system logs provide timestamped evidence of configuration changes, system events, and general information such as PTP synchronization times.

ANALYZE

Observe network traffic and apply deep mathematical analysis of analog quantities and network performance. Quickly navigate to lists that isolate the information. See instances of corrupted GOOSE and SV streams.

MANAGE

Save work in sharable .dna project files. Export events in PCAP and/ or COMTRADE for sharing with other network/power-analysis tools. DNAs maintain security with encrypted PC communications, deny-by-default on all ports, and checksum validations on updates.

FUNCTIONAL SPECIFICATIONS

10	INCTIONAL SPE	CITICATIONS
IEC 61850	(all editions and an noted)	nendments, unless otherwise
	IEC 61850-6 IEC 61850-8-1 IEC 61850-9-2 IEC 61869-9	(SCL files) (GOOSE over Ethernet) (SV over Ethernet) (Digital interface for instrument transformers)
	IEC 61850-90-5	(Routable GOOSE)
Industry Guidelines		ideline for Digital Interface to ormers Using IEC 61850-9-2
Time Synchronization	Simple Network Tir	on Time Protocol), with support 9-3:2016 111
Dashboard	stream identificat SV lost packet(s) in GOOSE packets Ou	Jnknown GOOSE/R-GOOSE/SV tion
Live Data	16 SV streams 128 GOOSE messag	ges
Event Triggers	functionality, with t record up to — 3 SV streams, trig Symmetrica RMS/peak-t Phase Frequency ROCOF 10 GOOSE messa	l Components
Event Analysis	event information 1 PCAP file genera R-GOOSE stream COMTRADE file gen C37.111-2013 Packet Variation De SV stream	ted per each SV, GOOSE, and nerated according to IEEE elay (or "Jitter") Analysis of each lysis (requires SV streams with at
Data Visualization	SV Analog Scope SV Phasor Diagram Symmetrical Comp GOOSE Digital Scop GOOSE Tabular Gra	oonents De

GENERAL SPECIFICATIONS

Memory	240 GB Non-volatile memory (SSD)
Cyber Security	Access supervision and logging TLS Encrypted Control Bus Full Network Isolation
OLED Display	IP Address of Control Bus Firmware Version
Software	Windows PC application
Firmware	Package upgrade via PC application
Dimensions	Length: 8 in (20.32 cm) Width: 5.5 in (13.97 cm) Height: 3 in (7.62 cm) Weight: 3 lb (1.36 kg)
Power	12 V DC (back of device) 2 A
Power Connector	DC Barrel Jack, center pin positive Ø 2.5 × 5.5 × 9 mm Ø 0.098 × 0.217 × 0.35 in
Certifications	ROHS FCC Class A CE IEC 60529 IP2X CFR 47 FCC Part 15 Subpart B Class A (EMI Emissions) EN 61326-1:2013 (EMI Emissions) IEC 61010-1:2010 (EMI Emissions)
Operating Temperature	32° to 131° F (0° to 55° C)
Storage Temperature	-4° to 176° F (-20° to 80° C)
Includes	 1 x F6880 Digital Network Analyzer 1 x Power supply 1 x Power cable 1 x Cat6 cable 1 x USB flash drive [2 Gb] 1 x USB-A to USB-B cable 2 x SFP transceivers (1000BASE-T) 1 x Hard shell case with form cut foam interior padding 1 x F6880 User Manual (software based) 10 x Software user seats
The performance of	

The performance of the recording system is largely dependent on the simultaneous use and the combination of: the number and types of monitored signals; the number of signals used for online visualizations; the number and types of visualizations; and the number and types of recording triggers used. The numbers stated here are typical and should provide satisfactory performance. If these numbers are exceeded, possible degraded performance can be expected.



Specifications are subject to change without notice. Doble is an ISO 9001 & ISO/IEC 17025 & 17034 Certified Company. Doble is an ESCO Technologies Company. PUBLISHED: MAY, 2024



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