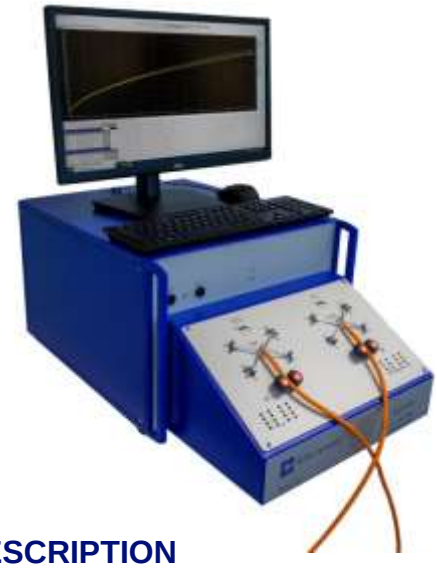
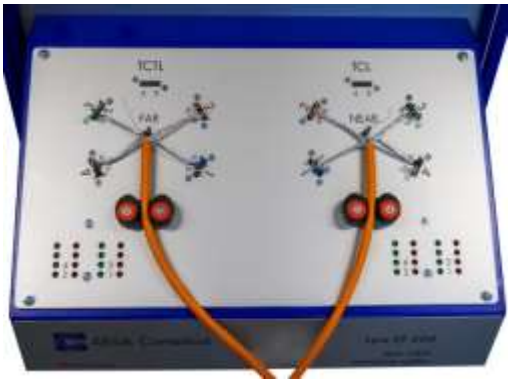
Lyra DT 604

Desktop fully integrated automatic measuring system for data cables up to CAT7



Indicative picture



Self-cutting knives connection
No preparation of the cable required!

DESCRIPTION

This automatic testing equipment (ATE) has been developed to offer an effective solution for large volume production testing of LAN Category cables. It allows for high frequency measurement of parameters up to 600 MHz covering Cat 5e, Cat 6, Cat 6a and Cat 7 cables as well as low frequency measurement of pairs and quads (RCKE) as an option.

Lyra DT 604 uses fast and easy time-saving self-cutting knives to connect pairs to the test fixture. This highly reliable operation providing excellent contact can easily be performed and repeated by any operator.

Different measurement options are available such as Mode Conversion (TCL, ELTCTL) or EMC (TI, AS, AC) parameters, thus allowing full characterization of a cable, including shielding.

KEY FEATURES

- **Performant**
  - Easy to operate
  - Fast and easy connection of cable using self-cutting knives, no preparation required
  - Fastest measuring system available on the market
  - Performs all electric tests on cables responding to major standards
  - Checked against traceable calibration standards according to ISO/IEC 17025
- **Integrated solution for multiple use cases**
  - Embedded VNA (Vector Network Analyser), integrated computer and software
  - For data cable mass production and laboratory usage
  - For quality inspection, with very high accuracy
  - Designed to measure all type of cables such as U/UTP, F/UTP, F/FTP or S/FTP
- **High-Tech**
  - HF switches using MIL-grade certified relays (min 2'000'000 cycles)
- **Add-on**
  - Low frequency RCKE option (Resistance, Capacitance…) on same connection frame
  - Mode conversion parameters (TCL, ELTCTL, etc…)
  - EMC parameters (Transfer Impedance (TI), Screening and Coupling Attenuation (AS and AC))
  - 50Ω ports and cable test option * (required for Mode conversion and EMC parameters options)

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TECHNICAL SPECIFICATIONS

Measuring range	772 kHz – 600 MHz	
Parameters	All standard electrical low frequency and high frequency parameters (Resistance, Capacitance, Insertion Loss, Impedance, NEXT, FEXT, …)	
Standards	Performs electrical tests on cables responding to: • ANSI/TIA-568.2-D for Category 3, 5e, 6, 6a and 7 • IEC 61156-5/-6 for Category 5e, 6, 6a and 7 • YD/T 1019-2013; YD/T 838.X-2016 series for Category 5e, 6, 6a and 7	
Measuring length	100m recommended sample cable length100m (up to 305m with interpolation/calculation option)	
Components	• 4 pairs connecting frame for LF & HF measurements • Embedded Network Analyser for HF measurements • Embedded windows based PC with Windows 10 operating system • 1 OptiTest license, AESA measurement and data management software • Power supplies, interfaces, connecting cables and measurement accessories	
Supply Voltage	100 - 240 VAC / 50 - 60 Hz, Consumption: 600 W without printer, 1000 W with printer	
Dimensions & weight	450 x 750 x 325 mm (17.7” x 29.5” x 12.8”), ≈ 35 kg (78 lb)	
Versions	Lyra DT 604 HF only	Lyra DT 604 LF & HF
Article No	01.0604.0001.0	01.0604.0002.0

HIGH FREQUENCY ACCURACY

	0.772 MHz - 10 MHz	**10 MHz - 100 MHz**	**100 MHz - 250 MHz**	**250 MHz – 600 MHz**
Attenuation *(corrected to 20°C)*				
-80 dB to -50 dB*	± 1.3 dB	± 1.5 dB	± 1.7 dB	± 3 dB
-50 dB to -25 dB	± 0.5 dB	± 0.5 dB	± 0.6 dB	± 0.9 dB
-25 dB to 0 dB	± 0.2 dB	± 0.2 dB	± 0.3 dB	± 0.8 dB
Near-End & Far-End Crosstalk *(NEXT & FEXT)*				
-90 dB to -60 dB*	± 2 dB	± 2 dB	± 2 dB	± 4 dB
-60 dB to -30 dB	± 1.6 dB	± 1.4 dB	± 1.4 dB	± 1,8 dB
-30 dB to -10 dB	± 0.5 dB	± 0.8 dB	± 0.8 dB	± 1.5 dB
	0.772 MHz - 10 MHz	**10 MHz - 100 MHz**	**100 MHz - 250 MHz**	**250 MHz – 600 MHz**
Impedance				
90Ω - 110Ω	± 0.75Ω	± 1.5Ω	± 2Ω	± 3Ω
70Ω - 90Ω & 110Ω - 130Ω	± 1Ω	± 1.5Ω	± 2.5Ω	± 3.5Ω

*: Measured with lower bandwidth to reduce VNA noise

LOW FREQUENCY ACCURACY (OPTION)

Resistance R *(corrected to 20°C)*	
Ra, Rb	± 0,1% + 10 mΩ
R	
DR	Computed
Capacitance C	
C	± 0,25% ± 10pF at 800 Hz ± 0,25% ± 10pF at 125 Hz ± 0,25% ± 50pF at 12,5Hz
K	± 1% ± 6pF at 800 Hz ± 1% ± 3pF at 125 Hz ± 1% ± 30pF at 12,5 Hz
E	

Resistance : 0-19.999 kΩ
Capacitance : 0 – 2'000 nF

SPECIFICS

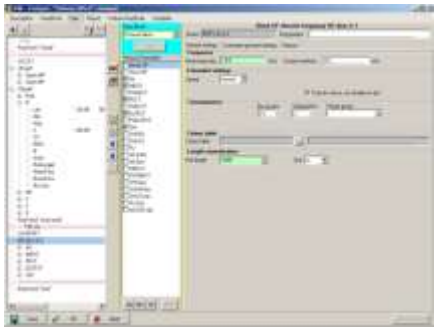
- The system is equipped with an embedded Vector Network Analyzer (VNA)
- The Lyra DT is a so-called Desktop system, compact and stand alone ATE designed to be placed on a desk

AVAILABLE OPTIONS

The equipment can be completed with:

- Switch for a 50Ω external connection
- Mode conversion parameters (TCL, ELTCTL,…)
- EMC parameters
  (Transfer Impedance, Screening/Coupling Attenuation)
- Alien crosstalk
- 9000 Low Frequency standards
- 9800 High Frequency standards
- Warranty extension, maintenance contract and spare parts

KEY BENEFITS



USER-FRIENDLY

- Fast and easy connection of the cable
- Same connection frame for HF and LF measurements
- Multilingual OptiTest software
- Direct results without post calculation
- Calibration managed/saved by computer

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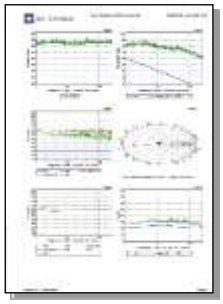
ACCURATE

- The equipment is checked against traceable calibration standards according to ISO/IEC 17025
- The risk of human error is reduced to its minimum



SMART

- All data (results and conditions) are saved on the internal PC
- Reports can be printed
- Data can be exported through the LAN in an ASCII or XLS file

Overview

SYSTEM

Fast and easy time-saving self-cutting knives to attach the end of cable pairs to the test fixture.
Same connection frame for low frequency and high frequency measurements.
Accept wire diameters up to 1.2mm (17 AWG).
Full two ports calibration (Thru-Open-Short-Load) for high accuracy measurement.
No movable parts for maximum measurement speed and reliability.
Robust mechanical design to facilitate maintenance and servicing operations.

HIGH FREQUENCY PARAMETERS

The high frequency parameters are measured as pairs only (1 quad = 2 pairs).
The measurement can be done according to a configurable curve or predefined fixed points.
2 connecting frames allow to connect both ends of the cable for an automatic measurement of all parameters.
A complete calibration is saved in the system allowing to change specifications without having to perform a new calibration.

Measured parameters

Transmission:	Attenuation or Insertion Loss
	Near end crosstalk
	Far end crosstalk
Reflection:	Impedance

Calculated parameters

Fitted Impedance
Return Loss (RL) (Open/Short and Terminated 100Ω) (fully complex method)
NEXT Power Sum
FEXT Power Sum
Individual ACR, ACR Worst Case, Power Sum ACR
ELFEXT Pair to Pair
Phase Delay
Velocity of Propagation (VOP) also in %
Group Delay, Delay skew
and more …

Statistical parameters

Maximum and minimum measured values	Worst case
Pair of worst case	Frequency of worst case
and more …	

LOW FREQUENCY PARAMETERS (OPTION)

The low frequency parameters feature is designed to measure pairs or quads.
The resistance is measured at 4 points (Kelvin bridge)
The capacitance can be measured at different frequencies in order to accommodate different cable lengths
(Please refer to our application note 'Length Restrictions in Cable Testing').
The feature provides self-calibration.

Measured parameters	Pairs	Quads
Conductor Resistance	Ra, Rb	Ra, Rb, Rc, Rd
Loop Resistance	R	R1, R2
Resistance unbalanced	DR	DR1, DR2, DR3
Capacitance	C	C1, C2, C3
Capacitance unbalanced	K	K1-K12
Capacitance unbalanced to ground	Ei, E	Ei1-Ei3, E1-E3

Calculated parameters (100 Hz to 10kHz)

Attenuation
Characteristic Impedance
Crosstalk
Phase
Velocity of propagation (VOP)

Statistical parameters

Maximum and minimum measured values
Absolute minimum measured value
Average value
Quadratic average
Standard deviation
and more …

Upper quality factor
Lower quality factor
RC product
Standard deviation RC
Variance

OPTITEST (Software)

The measuring system is equipped with OptiTest (a module of our CIQ quality data managemen software) which allows to prepare a measurement, to control the ATE to automatically acquire all the values of the defined parameters, to evaluate the results, to provide the measurement reports in the desired format and finally to save or export the measured values.
The software has been developed in the Microsoft® Windows™ environment and complies with the Windows features.

Creation and administration of test specification

The early creation of "Test Plan" file allows to define:
- the successive measuring sequences (Line test, LF, HF, EMC, …)
- the appropriated limits and conditions (including complex limit curves)
- the scales (logarithmic or linear)
- the HF measuring method (sweep or frequency table; start/stop frequencies; number of points,…)
- the configuration of reports

The test plan is created only once per cable type and can be saved and re-used accordingly.
Possibility to create an unlimited number of cable specifications and test sequences.
These “test specifications” will be stored with an individual customised name and are easily retrievable.
Most of the limits and formulas recommended by the international standards are already integrated.
Their variables are programmable to enable the preparation of special specifications

Measurement

The operator only needs to connect the cable on the frame, set the right test plan, fulfil the specific data (order number, operator name,…) and start the full automatic measurement.
- Fully automatic calibration management including automated calibration procedure
- Preliminary line test to verify the cable connection (short cut, crossover,…)
- Switching sequences indicated by LEDs
- In case of problem, the operator can repeat the measurement or continue in accepting the wrong value.

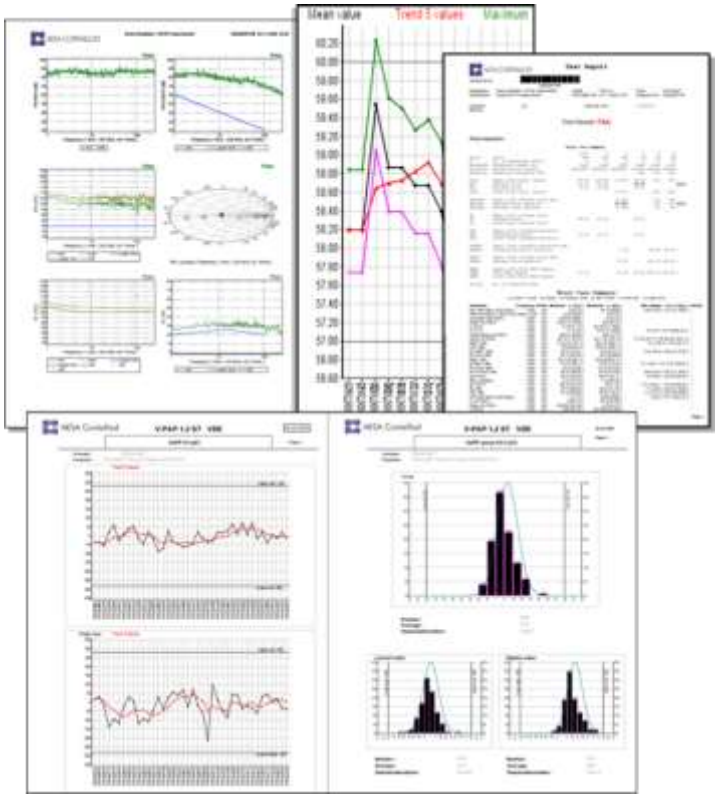
Reporting

Report generation is set in the test plan and is automatically generated.
The results may be displayed, printed, stored as PDF files, exported (e.g. Excel) or sent by email.
Different highly comprehensive reports can be generated containing a limit case compilation with graphics and for each measuring block a separate summary with related graphics.
Filters and search criteria normally generate sample lists which facilitate multiple further actions such as:
- Display and process measured values
- Print reports and labels

Evaluation

All data is available for evaluation at any time. Thus, all test data of a cable can be collectively evaluated and printed. Some examples of how to perform evaluations are:

- Sample list sorted by test order
- Search with pre-defined or customized filters through the data pool
- Generate quality charts (statistics)
- Statistical distribution (Gauss type curve)
- Evolution and parameter survey as function of time
- Measurements repartition in a defined time period to determine the testing load



Data management

Connected to CIQ (AESA quality data management system), all data gathered with OptiTest can be used for further statistical evaluations and combined with other measurements gathered during the complete manufacturing process, from incoming good inspection to the dispatch of the finished product.

Options

1. *Switch for options*

This option includes the necessary hardware to connect specific options to the system (e.g. TCL, EMC,...).

- **Switch + 50 ohms N-connector for options** Article No: 50.0001.0032.0

2. *Mode conversion parameters TCL & ELTCTL**

To perform Mode conversion parameters measurements, the following accessories are required:

- One hardware connecting frame with special balun
- One software package (specific measurement module)

These accessories allow measuring all Mode conversion parameters like TCL, TCTL, LCL, LCTL, EL LCTL and EL TCTL.

** this option requires a system with a 50 ohms switch. If the system is not equipped with it, it must be ordered separately.*

- **TCL & ELTCTL option 4 pairs** Article No: 51.0001.0024.0

3. *EMC Parameters (TI, AS, AC)**

To perform EMC measurements (Transfer Impedance, Screening and Coupling Attenuation) with the tri-axial method, following accessories are required:

- One hardware package to prepare the sample and take care for the impedance adaptation
- One software package (specific measurement module)

These accessories allow measuring the Transfer Impedance, the Screening and Coupling Attenuation according to IEC 62153-4-9 when knowing the impedance of the internal coaxial cable created with the sample under test.

** this option requires a system with a 50 ohms switch. If the system is not equipped with it, it must be ordered separately.*

Pictures next page.

- **Transfer Impedance Kit, ∅ 2.3 - 9.8 mm** Article No: 51.0001.0072.0
- **Transfer Impedance Kit, ∅ 6 - 22 mm** Article No: 51.0001.0073.0

4. *Printer*

Article No: 51.0500.0021.0

LaserJet printer

5. *Set of ISO 17025 certified LF standards type AESA 9000*

Article No: 45.9000.0001.0

This set of "Low Frequency" standards, certified ISO 17025, allows the periodic calibration, thus proving the accuracy of the complete measurement system. The kit is composed of:

- Standard type 9001	C1,2	19,20 nF	± 0,1 %	± 30 ppM/°C
- Standard type 9002	C1,2	192,0 nF	± 0,1 %	± 30 ppM/°C
- Standard type 9003	C3	16,0 nF	± 0,1 %	± 30 ppM/°C
	K1, K2, K3	16000 pF	± 0,1 %	± 30 ppM/°C
- Standard type 9004	E1, E2, E3	12000 pF	± 0,1 %	± 30 ppM/°C
- Standard type 9005	RA, RD	192 Ω	± 0,01 %	± 2 ppM/°C
	RB, RC	1920 Ω	± 0,01 %	± 2 ppM/°C

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6. *Set of ISO 17025 certified HF standards type AESA 9800*

Article No: 45.9800.0001.0

This set of "coaxial" primary standards, certified ISO 17025, allows the periodic calibration, thus proving the accuracy of the complete measurement system (Vector Network Analyzer + RF multiplexer + connecting frame).
This set of "coaxial" primary standards should not be mixed up with the "symmetrical" zero correction kit, delivered with the ATE, which is used to carry out the periodical zero correction files of the equipment, required to measure LAN cables.
The set of certified HF standards is composed of:

- 2 attenuation references type 9801 – 3dB
- 2 attenuation references type 9802 – 6dB
- 2 attenuation references type 9803 –10dB
- 2 attenuation references type 9804 –20dB
- 2 attenuation references type 9805 –30dB
- 2 x 50Ω terminations
- 2 special connectors for the terminations
- 4 HF connecting cables for the attenuation
- 1 set of miscellaneous HF material

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7. Warranty Extension

Article No: 60.0900.0001.0

AESA is confident with its technology and the quality of its goods. This is why the system is supplied with a 2-years warranty period. In order to protect its customer's investment, AESA offers the possibility to extend the warranty period to 3 years.

8. Maintenance contract

Article No: 60.0100.0002.0

Even the most reliable systems require regular, planned, and preventive maintenance as well as periodical calibrations. AESA proposes service packages to extend the operating life of your equipment, control of your maintenance costs and ensure optimal performances.

9. Spare Parts

AESA recommends following set of spare parts for a safety operation of two years:

Lyra Type	Mini KIt	Full Kit
1 CKE measuring bridge type KM		✓
1 R measuring bridge type RM		✓
1 LF relay matrix board type AZU		✓
1 CPU board		✓
2 test heads (4 if two different connecting frames)	✓	✓
2 HF relays (3 if two different connecting frames)	✓	✓
1 control boards set	✓	✓
1 set of HF cable	✓	✓
1 set of different mechanical and electronic hardware	✓	✓
Article No	50.0900.0003.0	50.0900.0002.0