

# CFL535G, TDR2010 and TDR2050

## Advanced Dual Channel TDR



- **600 V CAT IV input protection filter built in (Model TDR2050)**
- **Step and pulse TDR selections**
- **Distance dependent gain**
- **Test straight from the box**
- **Trace tagging**
- **2ns pulse width**
- **Designed for use on all metallic paired cables**

### DESCRIPTION

The Megger® CFL535G, TDR2010 and TDR2050 are state of the art, dual channel, high resolution, compact Time Domain Reflectometers with a color screen for locating faults on paired metallic cables.

All TDRs in this series have a minimum resolution of 0.1 m / 0.3 ft and a 20 km / 65 kft maximum range depending on the velocity factor selected and the cable type.

Various output impedances are available (25, 50, 75, 100, 125, 140 ohms, model dependent) and an auto impedance matching feature. The velocity factor can be set between 0.2 and 0.99 to meet any cable test requirements.

The TDR2050 is the first in its class to have 600 V CATIV input protection filter built in, giving the ability to connect to known live lines. This is particularly useful for detecting illegal taps without having to power down the line.

### FEATURES AND BENEFITS

The CFL535G, TDR2010 and TDR2050 have a large, high resolution, color, WVGA display with easy set up features. Directional control buttons, together with soft keys, provide intuitive and easy operation for the user.

An AUTO selection option ensures that the most effective parameters are selected depending on the range required, aiding rapid diagnosis of the TDR trace. The ability to manually override the auto function allows fine tuning to enable identification of hard to determine faults.

Dual trace and dual cursor capabilities allow full flexibility, giving the operator full control and instant indication of distance between two points.

A trace comparison feature also allows close examination between trace conditions. Extra high resolution together with a white-light backlight, user definable color schemes give the graphical display a vibrance, aiding the user in identifying key events on the trace.

### 600 V CAT IV input protection

TDR2050 is the first TDR in this class to include a built-in 600 V input protection filter. The ability to connect to potentially live circuits means a more flexible instrument suited for a wider range of applications.

### Trace Storage

100 internal trace memories provide for the storage and recall of test results. The traces can be recalled to the display for analysis or compared with an active display to aid in fault location.

Alternatively the stored results can be downloaded to a computer, via the USB port, using the TraceXpert software and USB lead provided.

### Step TDR function

The dead zone effect of a standard pulse TDR can mask near end faults and make them undetectable. The addition of a step function on the TDR2050 eliminates this problem.

Step TDR technology means that the signal is injected at full strength and stays there until a disturbance is detected. This makes step TDR technology perfect for detecting near end faults that standard pulse TDRs can miss.

### Distance dependent gain

This feature, built into the TDR2050, eliminates the drop off of signal attenuation on longer lines by gradually increasing the gain along the returned signal, enabling a more even representation of the relative attenuation at all points along the trace.

### Fault identification

Megger's own built-in AutoFind mode allows for speedy identification of faults. One press of the AutoFind key automatically adjusts the range and gain, and positions the cursor to the first major event on the cable. Press the AutoFind key again and the cursor will jump to the next detected disturbance.

### FindEnd function

TDR2050 also incorporates a FindEnd function, which allows the user to automatically search the trace to identify the end of the cable under test. This is useful in situations where a fast cable length measurement is required.

For those who wish to maintain manual control, manual operation allows full override access to refine the response for easy fault identification.

### Color schemes

The very different light conditions that could be present when using the TDR2050, combined with the limitations of eye conditions such as color blindness, makes the addition of set color schemes in the instrument extremely important.

TDR2010 and TDR2050 have 6 additional set color schemes on top of the Default and Outdoor schemes included on other Megger TDRs. There are also 2 custom slots where the user can specify their own scheme by setting up to 7 screen elements to their own choice of color.

### Trace Tagging

TDR2010 and TDR2050 also incorporate a Trace Tagging feature which allows the user to add a name to saved traces. This could be the circuit ID, building name or any other identifying text the user wishes to save with the trace.

A text string of up to 32 alphanumeric characters can be stored against each trace and this can consist of upper case letters including accents.

### TraceXpert PC software

The CFL535G, TDR2010 and TDR2050 come complete with the Megger TraceXpert software which gives full control over downloading, reporting and uploading of saved trace results. Designed around a database and programmed for ease of use and simplicity, TraceXpert offers the ideal application for all your data processing requirements.

### Models include:

#### CFL535G

A fully featured high resolution TDR with backlit color display and powered by Li-ion rechargeable battery batteries. This model comes complete with 2 pairs of mini-clip Test Leads.

#### TDR2010

The same as the CFL535G but with Trace Tagging and additional Color Scheme selection.

#### TDR2050

The same as TDR2010 but with the addition of 600 V CAT IV rating, Step, DDG and FindEnd functions.

### ADDITIONAL FEATURES (MODEL DEPENDENT)

- Backlit graphics color LCD (800x480)
- Adjustable display contrast
- Resolution to 0.1 m
- USB connection to PC allowing upload and download of traces
- For use on Telecom TNV-3 circuit, or 150 V CAT IV power circuits (CFL535G and TDR2010 only)
- For use on power circuits to 600 V CAT IV (TDR2050 only)
- Power blocking filter built-in
- Environmental protection to IP54
- Selectable output impedance (25, 50, 75, 100, 125 and 140 Ω)
- 2ns pulse for near end fault location

- AUTO option selecting gain and pulse for each range
- AUTO option matches output impedance to cable
- Display distance in meters or feet
- Li-ion rechargeable battery (12 hours typical life)

### APPLICATIONS

- Personnel involved in the location of cable faults as part of a responsive or routine maintenance program.
- Electrical inspectors during quality checks following work on all new cable installations and modifications to existing cable installations.
- Testing reels of cable for shipping damage, cable shortages, cable usage, and inventory management.
- Testing for faults on hidden cabling in vehicles such as trains and airplanes where access is restricted and voltage may be present.
- Tracking down illegal connections (taps) on the power system.
- Checking for performance on umbilical cables in oceanographic and mining situations.
- Maintaining rail network signal communications and power cabling.
- Ensuring safe and efficient state of commercial heating and air conditioning cable.

### SPECIFICATIONS

Except where otherwise stated, this specification applies at an ambient temperature of 20°C

#### GENERAL

##### Range

Up to 20000 m with a minimum resolution of 0.1 m

m	ft	ns
10	30	125
25	80	250
50	160	500
100	320	100
250	800	2500
500	1600	5000
1000	3200	10000
2500	8000	25000
5000	16000	50000
10000	32500	100000
20000	65000	200000

##### Accuracy

±1% of range ±1 pixel at 0.67 VF  
[Note - The measurement accuracy is for the indicated cursor position only and is conditional on the velocity factor being correct.

##### Resolution

1% of range

<b>Input protection</b>	This instrument complies with IEC61010-1 to protect the user in the event of connection to live systems. TDR2050 is rated at 600 V CAT IV while the other models are rated at 150 V CAT IV. TDR2050 is specifically designed to allow use on energized systems up to the rated voltage. All other models are designed for use on de-energized systems and fused leads must be used if the potential voltage between terminals could exceed 300 V
<b>Output pulse</b>	Up to 20 volts peak to peak into open circuit. Pulse widths determined by range, cable and model used.
<b>Gain</b>	Set for each range with user selectable steps (in Manual operating mode)
<b>Velocity factor</b>	Variable from 0.2 to 0.99 in steps of 0.01
<b>TX null</b>	Automatic Trace Tagging - 32 characters chosen from upper case letters including accents  Color schemes - Default, Outdoor, Custom  Step TDR - Eliminates the Dead Zone effect.  DDG - Available in ranges 1000 m and above in 0.5 dB steps Cable Impedance - 25, 50, 75, 100, 125, 140 ohm + AUTO
<b>Power down</b>	User programmable auto power off timer 1, 5, 10 mins or never
<b>Battery</b>	Li-ion rechargeable battery
<b>Battery charge time</b>	6 hours at 0 °C to 40 °C
<b>Battery life</b>	12 hours typical
<b>Safety</b>	These instruments comply with IEC61010-1 for connections to live systems up to 150 V CAT IV or 300 V CAT III (2010 only). TDR2050 is rated at 600 V CAT IV. Fused leads must be used if the voltage between terminals exceeds 300 V. Compliant with EN60950-1, EN61010-1, UN38.3 and EN62133
<b>EMC</b>	Complies with Electromagnetic Compatibility Specifications (Light industrial) BS EN 61326-1, with a minimum performance of 'B' for all immunity tests.

**MECHANICAL**

<b>IP rating</b>	The instrument is designed for use indoors or outdoors and is rated to IP54.
<b>Case</b>	ABS
<b>Dimensions</b>	290 mm (11.4 in.) x 190 mm (7.5 in. x 55 mm (2.2 in.)
<b>Weight</b>	1.7kg (3.8lbs)
<b>Connectors</b>	Four 4mm-safety terminals and two F connectors. Other standard push on adapters will fit. F connectors not available on TDR2050.
<b>Test lead</b>	1.5 meters long consisting of 2 x 4 mm shrouded connector to miniature crocodile clips (CFL535G and TDR2010) or 1.5 meter fused leads (TDR2050)
<b>Display</b>	800 x 480 pixel color graphics LCD, viewable in external environments.
<b>Color Schemes</b>	Selectable CFL535G x2 TDR2010, TDR2050 x8 Custom CFL535G x1 TDR2010, TDR2050 x2
<b>Backlight</b>	Permanent backlight with all color schemes (adjustable brightness)

**ENVIRONMENTAL**

<b>Operating temperature range and humidity</b>	-15 °C to +50 °C (5 °F to 122 °F)
<b>Storage temperature range and humidity</b>	-20 °C to 70 °C (-4 °F to 158 °F)

**ORDERING INFORMATION**

<b>Description</b>	<b>Cat. No.</b>	<b>Description</b>	<b>Cat. No.</b>
TDR2050 Power TDR	1005-023		
TDR2010 Dual Channel Comms	1005-449		
CLF535G Dual channel	1006-138		
<b>Included accessories</b>		<b>Optional accessories</b>	
Dual lead set with bed of nails clips (CFL535G and TDR2010 only)	6231-655	Single power lead set with fused clips	1002-135
Dual power lead set with fused clips (TDR2050 only)	1002-136	Miniature clip test lead set (1 pair)	6231-652
Download kit	1003-353	Bed of nails test lead set (1 pair)	6231-653
Carry case with straps	1003-217	Fused 500 mA test lead set (1 pair)	1002-015
AC-DC charger	1003-352	Replacement battery	1002-552
Power cable	25970-002	Terminal adapter kit (TDR2050 only)	1003-218
AC-DC power charger	1003-352	AC power lead	25970-002
Terminal adapter kit with BNC (CFL535G and TDR2010 only)	1003-218	Dual power lead set with bed of nails clips (TDR2050 only)	6231-655
User guide	CFL535G--TDR2010--TDR2050_UG	Dual fused lead set (CFL535G and TDR2010 only)	1002-136
		Dual power lead set with fused clips	1003-326
		Dual miniature clip test lead set	6231-654
		Short leadset BNC to croc clips	6231-694
		BNC adapter	25965-154

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**CERTIFICATION ISO**  
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