GREENLEE®
COMMUNICATIONS

FIBRE CATALOGUE

FAST. ACCURATE. RELIABLE.™

COMMUNICATIONS | CABLE TV | FIBRE | TESTING

Distribution in the UK & Ireland

Lambda

www.lambdaphoto.co.uk

Introduction

Welcome to the International Fibre Catalogue from Greenlee Communications. This catalogue consolidates the portfolio of products available from Greenlee Communications for the Professional installation and maintenance of fibre optic cabling systems.

It covers our complete range of instruments and solutions for: Fusion splicing, Inspection, Cleaning and Testing of fibre networks.

The range of fibre Test Instruments provided by Greenlee Communications covers easy to operate and economically priced; Fusion Splicers, Fibre Fault Locators (field use Handheld OTDRs), a wide selection of Optical Power Meters, Light Sources, Live Fibre Identifiers, Visual Fault Locators and Video Inspection solutions in the Greenlee Mini Fibre Tools and XL fiberTOOLS™ ranges.

Included alongside these test sets are fibre stripping and preparation tools, cleaning products and a range of accessory items to enable you to outfit technicians performing fibre optic installation and maintenance on multi-mode and single-mode networks.

These products complete the Greenlee promise of delivering quality, professional tools and test products.

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Contents

The specifications contained in this catalogue may be subject to change without prior notification.

Introduction

The 910FS Core Alignment fusion splicer provides lower loss fusion splices than cladding or V-groove technology fusion splicers.

The active alignment mechanism of the 910FS Core Alignment splicer makes adjustments to compensate for concentricity, dirt and overall diameter.

Single Mode Fibre (SMF) has a core diameter of between 8 and 10 microns but if the core and cladding is not co-axial, a mechanical alignment of the cladding (in V-grooves) can not optimally align the cores in two dimensions; Resulting in higher splice losses.

Core Alignment Technology

The 910FS Core Alignment fusion splicer employs a Core Detection System (CDS) also known as a Profile Alignment System (PAS). Light is shone into the fibre and embedded cameras are used to identify the core of the fibre by detecting the difference in the refraction of light caused at the core/cladding interface. The type of fibre is also determined at this stage and allows the 910FS fusion splicer to automatically select the optimum splicing profile.

Core alignment splicers use six motors and two cameras to align the fibres in the X, Y and Z dimensions. The motors then bring the fibres together in the Z direction prior to splicing.

The 910FS Core Alignment Splicer is able to compensate for any misalignment of the fibre cores held in the V-grooves since the V-grooves are moved to align the cores of both fibres precisely. This is done in a dynamic feedback loop (PAS) methodology that automatically senses the active area of the fibre core and adjusts the alignment of the two cores to minimise loss.

Any misalignment of the fibres within the V-grooves, due to fibre tolerances, contamination or misuse is automatically compensated resulting in repeatable, low loss splices.

915CL Optical Fibre Cleaver

FEATURES

- Cleaves Single-Mode and Multi-Mode Fibre
- Transferable Adaptors available for 250, 900µm, Bow-Tie & Splice-On-Connector (SC, ST, FC and LC)
- Auto return blade
- Blades rotate for long life
- No batteries or power required
- Fibre Sharps Bin
- Fixed scale clamp

ORDERING INFORMATION

PART No.	CAT. No.	DESCRIPTION
52078354E	915CL	Optical Fibre cleaver (supplied with fixed clamp)
52082727	920CL	Optical Fibre cleaver (supplied with fixed clamp)
Adaptors		
52064143	910FS-250	250µm Adaptor (PAIR-FH-250)
52064142	910FS-900	900µm Adaptor (PAIR-FH-900)
52067851	910FS-3MM	Adaptor 3mm (910FS)
52076996	910FS-LT	LT-900 Loose tube Fibre Adaptor
52081862	910FS-Universal	Universal Adaptor
52067833	CLAMP	Fixed Clamp
Accessories		
52055935	PA1171	Fibre Stripper
52051283	PA1511	Kevlar Scissors
52082583	915CL-BLADE	Cleaving wheel

SPECIFICATIONS

Fibre Type	SM (G.652); MM (G.651); DS (G.653); NZDS (G.655); BIF (G.657)
Fibre Cleaved Length	10mm
Cladding Diameter	125µm
Coating Diameter	250µm and 900µm (Primary & Secondary Coating)
Fibre Count	Single
Cleaving Angle	≤0.5º
Blade Rotation Positions	16
Blade Life	48,000 Cleaves
Weight	255g
Dimensions	58 x 55 x 48mm
Splice-On-Connector	Adaptors available (see page 7)

915CL


920CL

910FS Core Alignment Optical Fusion Splicer

FEATURES

- 14.5cm (5.7") Flip-Over LCD Screen
- True Core Alignment for Low Loss Splices
- Windows 10 compatible
- Auto-Check Fibre End Face
- Auto-Calculation of Estimated Splice Loss
- Selectable Heating Modes
- Splice-On-Connector Options (SC, LC, ST & FC)
- Transferable or Fixed Fibre Adaptors (250, 900µm, 3mm)

ORDERING INFORMATION

PART No.	CAT. No.	DESCRIPTION
52064876E	910FS	Optical Fusion Splicer
52063414	910FS-ELEC	Replacement Electrodes
52064143	910FS-250	250µm Adaptor (Pair)
52064142	910FS-900	900µm Adaptor (Pair)
52063415	910FS-BATT	Battery-Li Ion (910FS)
52063416	910FS-PS	Battery Charger (AC Mains transformer)
52064875E	910FS-KIT1	Contractor Fusion Splicer Kit
		• 910FS Optical Fusion Splicer
52078354	915CL	• 915CL Optical Fibre Cleaver
52064874E	910FS-KIT2	Contractor Fusion Splicer Kit
		• 910FS Optical Fusion Splicer
52078354	915CL	• 915CL Optical Fibre Cleaver
52055935	PA1171	• PA1171 Fibre Stripper
52063415	910FS-BATT	• Extra Rechargeable Li-ion Battery

910FS

915FS Active Cladding Optical Fusion Splicer

FEATURES

- Auto-Calculation of Estimated Splice Loss
- Splice-On-Connector Options (SC, LC, ST & FC)
- Active Cladding Technology Alignment
- Auto-Check Fibre End Face
- Selectable Heating Modes
- Transferable or Fixed Fibre Adaptors (250, 900µm)
- Loose Tube to SOC Capable
- IP 52

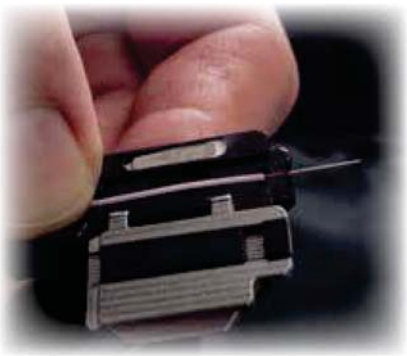
ORDERING INFORMATION

PART No.	CAT. No.	DESCRIPTION
52079876E	915FS	Fusion Splicer Kit
52063414	910FS-ELEC	Replacement Electrodes
52064143	910FS-250	250µm Adaptor (Pair)
52064142	910FS-900	900µm Adaptor (Pair)
52080292	915FS-BATT	Battery-Li Ion (915FS)
52080896	915FS-PS	Battery Charger (AC Mains transformer)
52079879E	915FS-KIT1	Contractor Fusion Splicer Kit
		915FS Fusion Splicer Kit
52078354	915CL	915CL Optical Fibre Cleaver
52079878E	915FS-KIT2	Contractor Fusion Splicer Kit
		915FS Fusion Splicer Kit
52078354	915CL	915CL Optical Fibre Cleaver
52055935	PA1171	5 in 1 Fibre Stripper
52080292	915FS-BATT	Extra Rechargeable Li-Ion Battery

915FS

ACCESSORIES (applicable to both 910FS & 915FS)

PART No.	CAT. No.	DESCRIPTION
52064141	01325	Splice-On-Connector Adaptor (SC & LC)
52066481	02401	Splice-On-Connector Adaptor (ST & FC)
52064143	910FS-250	250µm Adaptor (PAIR-FH-250)
52064142	910FS-900	900µm Adaptor (PAIR-FH-900)
52067851	910FS-3MM	Adaptor 3mm (910FS)
52076996	910FS-LT	LT-900 Loose tube Fibre Adaptor
52081862	910FS-Universal	Universal Adaptor
52067833	CLAMP	Fixed Clamp
52066954	02571	European Line Cord
52066952	02570	UK Line Cord
52066930	02568	12 V DC Car Adaptor
52082728	920CLEAVER BLD	Replacement cleaving wheel
52082729	920CL CLVR Case	Protective case



900 µm Transferrable Adaptor

SPECIFICATIONS	910FS	915FS
Applicable Fibres	SMF (ITU-T G.652), MMF (ITU-T G.651), DSF (ITU-T G.653), NZDSF (ITU-T G.655), BIF (ITU-T G.657), EDF	
Fibre Cleaved Length	8 to 16mm (Coating diameter: 0 to 250µm); 16mm (Coating dia. 250 to 1000µm)	
Cladding Diameter	80 to 150µm	
Coating Diameter	100 to 1000µm	
Fibre Count	Single	
Fibre Aligning Method	Auto Core Alignment	Active Cladding Alignment
Splice Loss (Typical)	SMF/BIF ≤0.02dB/ MMF≤0.01dB / DSF/NZDSF/EDF ≤0.04dB(typical)	
Attenuated Splice Function	0.1dB – 15dB	
Splicing Mode	60 Preset / User Definable Modes	
Splice Time (Typical)	≤9 seconds	
Splice Loss Evaluation	Yes	
Fibre Check	Fibre cleaving angle / axis offset / loss / fibre alignment / focus etc.	
Splice-On-Connector	LC, SC, ST and FC (see page 6)	
Arc Calibration Mode	Automatic and Manual	
Protection Sleeve Length	60mm, 40mm, Micro Sleeves	
Storage of Splice Results	5,000 splices	5,000 splices /100 screenshots
Tension Test	2N	
Fibre Display Magnification	240x	Dual CMOS cameras, 200x zoom
Tube Heating Time (Typical)	Auto heating 24s - 36s (28s default) and user defined	
Display	5.7" Colour, Turn-Over LCD	3.5 inch Colour LCD, Auto-Flip
Electrode Life	3000 - 4000 Burns	5000 arcs
Splices per Battery Charge	250 (60mm Shrink Cycles)	150+ (splice + heating) cycles
Humidity	0 to 95%	
Temperature	-10°C to 50°C	-25°C to 50°C
Storage Temperature:	-20°C to 70°C	-30°C to 70°C
Power Supply	100~240V AC /DC Power Adaptor (50/60Hz) 6600 mAh Li-ion Battery	110~240V AC/DC Power Adaptor (50/60Hz) 4400 mAh Li-ion Battery
Weight (Including Battery)	3.14 kg	1.2kg (without battery) / 1.5kg (with battery)
Dimensions (HxWxD)	180 x 160 x 155 mm	135 × 125 × 125 mm

Splice on Connectors

PART No.	CAT. No.	QTY	DESCRIPTION	QTY	CAT. No.	PART No.
52066346	02302	12	SC/APC Singlemode, Green 900µm Boot	100	02360	52066430
52066348	02303	12	SC/UPC Singlemode, Blue 900µm Boot	100	02361	52066441
52066349	02304	12	SC/PC 62.5µm Multimode (OM1), Beige 900µm Boot	100	02364	52066442
52066350	02305	12	SC/PC 50µm Multimode (OM2), Black 900µm Boot	100	02365	52066443
52066351	02306	12	SC/PC 50µm Multimode (OM3), Aqua 900µm Boot	100	02368	52066444
52066352	02308	12	SC/PC 50µm Multimode (OM4), Aqua 900µm Boot	100	02371	52066445
52066452	02313	12	FC/APC Singlemode, Green 900µm Boot	100	02372	52066461
52066453	02314	12	FC/UPC Singlemode, Blue 900µm Boot	100	02377	52066462
52066454	02316	12	FC/PC 62.5µm Multimode (OM1), Beige 900µm Boot	100	02378	52066463
52066455	02322	12	FC/PC 50µm Multimode (OM2), Black 900µm Boot	100	02379	52066464
52066456	02323	12	FC/PC 50µm Multimode (OM3), Aqua 900µm Boot	100	02381	52066465
52066479	02328	12	FC/PC 50µm Multimode (OM4), Aqua 900µm Boot	100	02384	52066477
52066466	02330	12	ST/UPC Singlemode, Blue 900µm Boot	100	02385	52066457
52066467	02332	12	ST/PC 62.5µm Multimode (OM1), Beige 900µm Boot	100	02386	52066458
52066468	02334	12	ST/PC 50µm Multimode (OM2), Black 900µm Boot	100	02387	52066459
52066480	02335	12	ST/PC 50µm Multimode (OM3), Aqua 900µm Boot	100	02388	52066460
52066469	02343	12	ST/PC 50µm Multimode (OM4), Aqua 900µm Boot	100	02389	52066478
52066446	02345	12	LC/APC Singlemode, Green 900µm Boot	100	02390	52066353
52066447	02346	12	LC/UPC Singlemode, Blue 900µm Boot	100	02395	52066354
52066448	02348	12	LC/PC 62.5µm Multimode (OM1), Beige 900µm Boot	100	02397	52066355
52066449	02351	12	LC/PC 50µm Multimode (OM2), Black 900µm Boot	100	02398	52066356
52066450	02355	12	LC/PC 50µm Multimode (OM3), Aqua 900µm Boot	100	02399	52066357
52066451	02359	12	LC/PC 50µm Multimode (OM4), Aqua 900µm Boot	100	02400	52066358

SOC ADAPTORS COMPATIBILITY WITH OTHER MANUFACTURERS SPLICING MACHINES		
52075260	13044	AFL/Fujikura SOC Adaptor
52075281	20523	Furakawa/Fitel SOC Adaptor
52075282	20585	Sumitomo SOC Adaptor
52075283	20608	INNO SOC Adaptor
52075284	20622	FIS Super Cougar SOC Adaptor

LC Type Splice on Connector

SC Type Splice on Connector

FC Type Splice on Connector

ST Type Splice on Connector

EML-100 Electronic Marker Locator

Greenlee Communications' Marker-Mate electronic marker locator along with, OmniMarker and UniMarker buried electronic markers form a complete solution for marking and locating buried utilities and other devices to depths of at least 1.5m. Ideally suited to marking fibre optic ducts that, without metallic elements, are otherwise difficult to pinpoint.

FEATURES

- Detects up to nine different marker types
- Rapid switching between scan and single modes
- Digital signal processor accuracy
- Bar graph, numeric & audible signal strength indicators
- Headphone jack
- Low battery warning
- Weather resistant
- Scan mode provides simultaneous detection of all marker types
- User-adjustable Detection Threshold
- Large-character display
- Adjustable speaker volume
- Battery level indicator
- Adjustable time out feature
- Rugged construction

Fibre Marker Ball

Electronic Marker Locator

ORDERING INFORMATION

PART No.	CAT. No.	DESCRIPTION
50607984	EML100	Electronic Marker Locator
52079024	Yellow / Black	OmniMarker
52081332	Yellow / Black	UniMarker

GENERAL	
Housing Material	High density welded polyethylene
Identification	Solid moulded colour and moulded text
Detection Range	1.5m typical for all models (using Greenlee EML-100 or RD8000MRX)
Detection Offset	15cm maximum at 1.5m
ELECTRICAL	
Detection Field	Dipole (UniMarker model), Spherical (OmniMarker model)
Frequency Tolerance	± 0.35 %
MECHANICAL	
Overall Diameter	115mm max
Minimum Trench Width	100mm OmniMarker case is dimpled to allow this 115mm for UniMarker devices
Anchoring	Two "tie down" loops along flange. UniMarker devices are supplied with a mounting clip
Weight	136g OmniMarker 70g UniMarker

Greenlee have introduced the 92 kHz markers, targeted at marking fibre optic cable installations, in response to requests from telecom companies who wish to differentiate their ducts carrying copper communication cables from those carrying fibre optic communication cables. It has also been found in practice that installing metallic tracer wires or tapes alongside or in fibre optic ducts is unreliable; they rarely have proper continuity for the whole duct length, often found corroded or not connected at joints.

Multi-mode Fibre Characteristics

Multi-mode Fibre Cable @ 850 nm / 1310 nm							
Designation	Fibre Type	Jacket Colour	Bandwidth	Multi-mode Optics (MMF)	MAX Length		
					1GB/s	10 Gb/s	40/100 Gb/s
OM1	62.5/125	Orange	200 MHz/km / 500 MHz/km	SX, SR, LX*, LRM*	300m 984ft	30m 98ft	NA
OM2	50/125	Orange	500 MHz/km / 500 MHz/km	SX, SR, LX*, LRM*	600m 1968ft	150m 492ft	NA
OM3	50/125	Aqua	1500 MHz/km / 500 MHz/km	SX, SR, LRM, LX4	1000m 3280ft	300m 984ft	100m 328ft
OM4	50/125	Aqua / Magenta	3500 MHz/km / 500 MHz/km	SX, SR, LRM, LX4	1100m 3608ft	550m 1804ft	150m 492ft

DS1G DataScout™

The DataScout 1G is a multi-service handheld tester capable of testing Gigabit Ethernet, Y.1588v2, IPTV, VoIP, WiFi, and legacy DS-1/DS-3/Datacom transport services and more. The extended runtime battery and fanless design enable the DataScout to perform continuous testing on battery power for up to 8 hours without recharging. The tool includes a “two taps to test” user interface and “green means go, red means stop” pass/fail indication testing. Results are automatically stored via the 4 GB internal flash memory.

DataScout 1G helps to ensure business services are provisioned correctly at the time of installation, which reduces truck rolls. Additionally, the company says operational expenses are reduced because of the low learning curve for technicians. During field trials with major carriers, technicians new to network testing were quickly proficient using the DataScout 1G with little to no training. DS1G can support Fibre presented network protocols via Optical SFP (1000-Base-X) port.

FEATURES

- 10M to 1G Ethernet - 8 streams
- RFC-2544 & Y.1564
- E1, E3, T1, T3
- C37.94 Teleprotection (SCADA)
- IPTV testing
- Remote control via VNC
- Layer 1-4 BERT
- Transport Testing
- CODIR, DATACOM
- Wi-Fi testing
- VoIP testing

ORDERING INFORMATION - HARDWARE OPTIONS

PART No.	CAT. No.	DESCRIPTION
52068223	DS1G-BAS	DataScout 1G Ethernet Analyser Kit (includes DS1G-SW-BAS)
52068224	DS1G-PDH1	DataScout 1G Ethernet & T1/E1 Analyser Kit (includes DS1G-SW-T1 or E1)
52068225	DS1G-PDH2	DataScout 1G Ethernet, T1/E1 & T3/E3 Analyser Kit (includes DS1G-SW-T3 or E3 & DS1G-SW-T1 or E1)

ORDERING INFORMATION - SOFTWARE OPTIONS

DS1G-SW-BAS	Basic Ethernet BERT/LOOPBACK/RFC-2544 Analysis
DS1G-SW-ADV	Advanced Ethernet Multi-Stream & Y.1564 Analysis (requires DS1G-SW-BAS)
DS1G-SW-VOIP	VOIP (SIP) Live Calling & Analysis
DS1G-SW-IPTV	IPTV TR101290 Alarm & Stream Analysis
DS1G-SW-WIFI	WIFI 802.11B/G/N Analysis
DS1G-SW-E1	E1 BERT/PDL/Pulse Mask Errors/Alarms Analysis (requires DS1G-PDH1 or PDH2)
DS1G-SW-CODIR	CODIR Sub rate analysis requires PDH 1 hardware
DS1G-SW-T1	T1 BERT/PDL/Pulse Mask Errors/Alarms Analysis (requires DS1G-PDH1 or PDH2)
DS1G-SW-DCOM	DATACOM Sub rate analysis requires PDH 1 hardware
DS1G-SW-E3	E3 (requires DS1G-PDH2)
DS1G-SW-T3	T3 (requires DS1G-PDH2)
DS1G-SW-C37	IEEE C37.94-2002 Analysis

Contact Sales for software options

SFPS SUPPORTED

PART No.	CAT. No.	DESCRIPTION
52068257	DS-SFP-MMF-SX	SFP-1000 BASE-X-SX 850nm Multimode Transceiver
52068258	DS-SFP-SMF.LX	SFP-1000 BASE-X-LX 1310nm Singlemode Transceiver
52068259	DS-SFP-SMF-ZX	SFP-1000 BASE-X-ZX 1550nm Singlemode Transceiver
52068260	DS-SFP-MMF-C37	SFP- 2MBPS 850nm Multimode Transceiver (2KM) C37.94

DS1G displaying software options.
Licences can be purchased to enable services.

Two Taps to Test

DS10G DataScout™ Multi-Service Network Analyser

FEATURES

- Ethernet Validation Conformance to SLA: Throughput, Latency, Frame Loss, Burst
- 802.11 (b, g, n) Wireless Validation
- DS3 Testing
- DS1 Testing
- Signaling (TIMS/DS0) Testing
- Intelligent Timing Verification
- Datacom Testing
- 4 Wire DDS Testing

DS10G

CONTROLLER OPTIONS

CAT. No.	DESCRIPTION
DS10G-HW-B3	Base Controller Without Datacom Interface
DS10G-HW-B4	Base Controller With Datacom Interface
DS10GX-HW-B1	Remote Controlled Headless Base Controller without Datacom Interface
DS10GX-HW-B2	Remote Controlled Headless Base Controller with Datacom Interface

TEST INTERFACE OPTIONS

Ethernet Option	
DS10-HW-ETH	Dual Port to 10G Ethernet
Wi-Fi Option	
DS10-HW-WIFI	WI-FI Test & Remote Control Interface
Transport Options	
DS10-HW-PDH1	Dual Port DS1 Test Interface
DS10-HW-PDH2	DS3 & Dual Test Interface
DS10-HW-P	ISDN-PRI Test Interface
DS10-HW-DDS	DDS Test Interface
TIMS Test Option	
DS10-HW-T	TIMS Test Interface
RITS Test Option	
DS10-HW-RITS	Intelligent DS1 Clock & Timing Analysis Interface

SOFTWARE OPTIONS

CAT. No.	DESCRIPTION
Ethernet Test Options	
DS10G-SW-201	Dual Port 10/100/1000 BaseT/X Ethernet Testing
DS10G-SW-110	Single Port 10G Test Interface
DS10G-SW-ADV	Enable multi stream (16) & Y.1564 Service tests
DS1 Test Options	
DST-SW-DT1	Enables Dual Port T1 Testing
DST-SW-N1	EnablesT1 CSU/NIU Emulation
DST-SW-X	Enables DS0 Drop & Insert Bypass
DST-SW-DCOM	Enables DTE/DCE Interface Testing
DST-SW-E1	Enables E1/T1 on-the-fly Testing
DS3 Test Options	
DST-SW-H3	Adds DS3 Thru-Mode Testing
DST-SW-D1D	Adds DS1 Drop from DS3 Signal
DST-SW-NX	Adds DS3 CSU/NIU emulation
PRI Test Options	
DST-SW-E	Euro/Asian ISDN-PRI Support
TIMS Test Options	
DST-SW-PRO4	Adds 4-Button Custom Frequency Program
DST-SW-4	Adds 4-Wire 100/135Ω Testing
DST-SW-EM	Adds E&M Type I-V Signaling, Trunk, PBX & Tie Line Testing
DST-SW-DG	Adds Measurement of Dropouts, Hits, Amplitude and Phase Jitter
DST-SW-SS	Adds Selective Signaling
DST-SW-TON	Adds Transmit of Warble ID-Tone
DST-SW-DVM	Enables Digital Volt Meter
DST-SW-SSM	Enables Synch Status Message Decode on T1 / E1 Signals
Remote Control Option	
DS10-SW-RC	Remote Control Via LAN or Wi-Fi

DS10Gx

2017 Communications Solutions Product Of The Year

TMC Award Winner!!

Tablet not included

Fully equipped platform. Unused ports can be blanked off.

930XC Handheld Multimode OTDR

FEATURES

- 850/1300nm wavelength
- Up to 24dB SWDR
- Optical Power Meter
- Stabilised Light Source
- Visual Fault Locator
- Fibre analysis software for report generation
- Large backlight LCD colour display
- RS-232/USB interface
- NiMH batteries for 8 hours continuous use
- Software compatible to Win. XP, 7, 8, 8.1,10
- Multiple languages
- Pass/Fail thresholds
- Event table
- Insertion loss
- Return loss
- LinkViewer Software analysis

ORDERING INFORMATION

PART No.	CAT. No.	DESCRIPTION
52067080E	02607	930XC-20M-FC Multimode OTDR W/FC Bulkhead
52067079E	02606	930XC-20M-SC Multimode OTDR W/SC Bulkhead
52067081E	02608	930XC-20M-ST Multimode OTDR W/ST Bulkhead

930XC Handheld Singlemode OTDR

FEATURES

- 2 & 3 wavelength options available: 1310/1550nm; 1310/1490/1550nm; 1310/1550/1625nm
- Up to 35dB SWDR on the 2 wavelength model
  Up to 38dB SWDR on the 3 wavelength model
- Optical Power Meter
- Stabilised Light Source
- Visual Fault Locator
- Microbend detection
- Fibre analysis software for report generation
- Large backlight LCD colour display
- Measure length and defects of coiled fibre
- 1625nm operation for live fibre testing (30F)
- RS-232/USB interface
- NiMH batteries for 8 hours continuous use
- LinkViewer Software analysis

930XC
Complete FTTH maintenance tool includes;
- Optical Power Meter
- Stabilised Light Source
- Visible Fault Locator

ORDERING INFORMATION

PART No.	CAT. No.	DESCRIPTION
Dual Wavelength Singlemode OTDR		
52067083E	02610	930XC-20C Singlemode OTDR, 1310/1550nm FC/UPC
52067082E	02609	930XC-20C Singlemode OTDR, 1310/1550nm SC/UPC
52067084E	02611	930XC-20C Singlemode OTDR, 1310/1550nm ST/UPC
52067086E	02613	930XC-20C Singlemode OTDR, 1310/1550nm FC/APC
52067085E	02612	930XC-20C Singlemode OTDR, 1310/1550nm SC/APC
Triple Wavelength Singlemode PON OTDR		
52067088E	02615	930XC-30P Singlemode OTDR, 1310/1490/1550nm FC/UPC
52067087E	02614	930XC-30P Singlemode OTDR, 1310/1490/1550nm ST/UPC
52067089E	02616	930XC-30P Singlemode OTDR, 1310/1490/1550nm SC/UPC
52067091E	02618	930XC-30P Singlemode OTDR, 1310/1490/1550nm FC/APC
52067090E	02617	930XC-30P Singlemode OTDR, 1310/1490/1550nm SC/APC
Triple Wavelength Singlemode Filtered OTDR		
52067093E	02620	930XC-30F Singlemode OTDR, 1310/1550/1625nm FC/UPC
52067092E	02619	930XC-30F Singlemode OTDR, 1310/1550/1625nm SC/UPC
52067094E	02621	930XC-30F Singlemode OTDR, 1310/1550/1625nm ST/UPC
52067096E	02626	930XC-30F Singlemode OTDR, 1310/1550/1625nm FC/APC
52067095E	02623	930XC-30F Singlemode OTDR, 1310/1550/1625nm SC/APC
930XC OTDR ACCESSORIES		
52034541	20988	930XC Carry Case
52034549	20996	FC Bulkhead Connector (For UPC & APC)
52034550	20997	ST Bulkhead Connector (For UPC & APC)
52034551	20998	SC Bulkhead Connector (For UPC & APC)
52047065	25691	Power Supply, Universal
52039299	10582	Vehicle adaptor (5.5 Outer Diameter, 2.1Inner Diameter)
52034542	20989	USB Cable for OTDR
52034543	20990	RS-232 Cable
52034552	20999	NIMH Battery (9.6V)

Singlemode & Multimode OTDR Kit

FEATURES

- Combines 930XC SM and MM OTDRs in 1 kit
- 850/1300nm & 1310/1550nm
- FC, ST and SC Adaptors available
- Compact handheld design
- Easy to use
- Fast automated testing
- LinkViewer Software analysis
- Up to 24dB dynamic range on MM and up to 35dB range on SM
- Large backlight LCD display
- Measure length and defects on SM & MM fibre
- Fibre analysis software for data management & report generation
- RS-232/USB interface
- NiMH batteries for 8 hours continuous use
- Microbend detection

ORDERING INFORMATION

PART No.	CAT. No.	DESCRIPTION
52067457E	26307	930XC-SM (APC) + MM (UPC) Kit - (SM & MM OTDR Kit)

Select appropriate patch cord to match your OTDR port.
Either xx/UPC or xx/APC.

Greenlee's OTDR Range Characteristics

SPECIFICATIONS

	930XC-20C	930XC-30F	930XC-30P	930XC-20M	
Wavelength (± 20nm)	1310/1550	1310/1550/1625	1310/1490/1550	850/1300	
Dynamic Range (dB)	35	38/37/37	38/37/37	21/24	
Event Deadzone (m)	1.0	1.0	1.0	≤2.5	
Attenuation Deadzone (m)	4.5	4.5	4.5	≤12	
Pulsewidth (ns)	5, 10, 30, 100, 300, 1µs, 2.5µs, 10µs, 20µs			12, 30, 100, 275, 1µs, 2µs	
Selectable Ranges (km)	0.3, 1.3, 2.5, 5, 10, 20, 40, 80, 120, 160, 240			0.1, 0.3, 0.5, 1.3, 2.5, 5, 10	0.1, 0.3, 0.5, 1.3, 2.5, 5, 10, 20, 40, 80
Sampling Points	16,000 (Maximum)			16,000 (Maximum)	
Average Time	15s/30s/1 min/2 min/3 min				
Distance Measurement Accuracy	±(1m + 5 x 10^{-5} x distance + sampling space)				
Connector Type	PC or APC (interchangeable FC, SC, ST)				
Reflection Detect Accuracy	±4 dB				
Attenuation Detect Accuracy	±0.05 dB/dB				
Measurement Data Storage	1,000 test curves				
Data Transmission	RS-232/USB port				
Visual Fault Locator (VFL)	3mW; 650nm				
Optical Power Meter (OPM)	InGaAs				
OPM Wavelengths	850, 1300, 1310, 1490, 1550, 1625nm				
OPM Range	+6 to -70dBm (+6 to -60dBm @ 850nm)				
OPM Display resolution	0.01dB				
OPM MOD Identification	1kHz, 2kHz				
Stabilized laser Source (SLS)	Wavelength same as selected in OTDR mode ≤ -7dBm				
Power Supply	NiMH chargeable battery/AC adaptor				
Battery Life	Support over 8 hours operating on one charge or over 20 hours standby				
Operating Temperature	-10°C to 50°C				
Storage Temperature	-20°C to 60°C				
Relative Humidity	0 to 95% (non-condensing)				
Weight	1.9lbs. (0.87kg)				
Dimensions	7.7" H x 3.9" W x 2.4" L (196mm x 100mm x 64mm)				
Compliance	BelCore GR196, CE, FCC, UL, RoHS, WEEE				
Fibre Analysis Software	Version 3.2				

Launch Cables

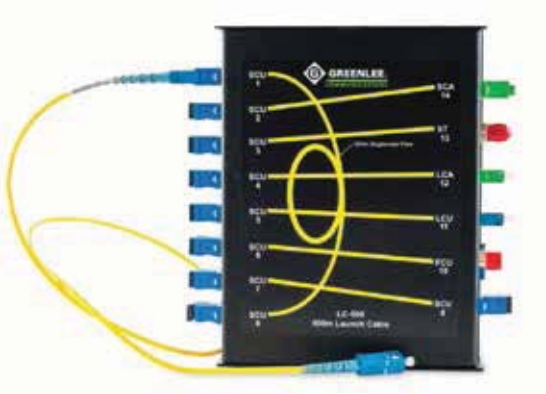
Launch cables are used to reduce the effect deadzones caused by mechanical connection of the OTDR to the Fibre under Test. Constructing a backscatter trace before the Near end connector enables the technician to evaluate the connector for Insertion Loss & return Loss. Also known as a Pulse Suppressor.

FEATURES

- Universal compact design
- Rugged construction

BENEFITS

- Troubleshoot the input connector and the initial fibre span that may be masked by the deadzone of an OTDR
- Characterise input and output connectors and the entire fibre link
- Minimise Dead zones
- Eliminate multiple patch cables



LC-500 Patch Panel Matrix with 1m SC/PC-SC/PC patch cable

ORDERING INFORMATION

PART No.	CAT. No.	DESCRIPTION
52076057	LC-500	500M Launch Cable with Patch Panel Matrix
52081881	LC500SCAPCSM	500M Launch Cable SC APC Singlemode
52081882	LC500SCUPCSM	500M Launch Cable SC UPC Singlemode
52081883	LC1000SCAPCSM	1000M Launch Cable SC APC Singlemode
52081884	LC1000SCUPCSM	1000M Launch Cable SC UPC Singlemode
52081885	LC2000SCAPCSM	2000M Launch Cable SC APC Singlemode
52081886	LC2000SCUPCSM	2000M Launch Cable SC UPC Singlemode
52081887	LC150SCPCMM	150M Launch Cable SC PC 50/125 Multimode
52081888	SCLC Adaptor	SC TO LC Adaptor (Use the SC to LC Adaptor to convert the Launch Cable to LC connectors

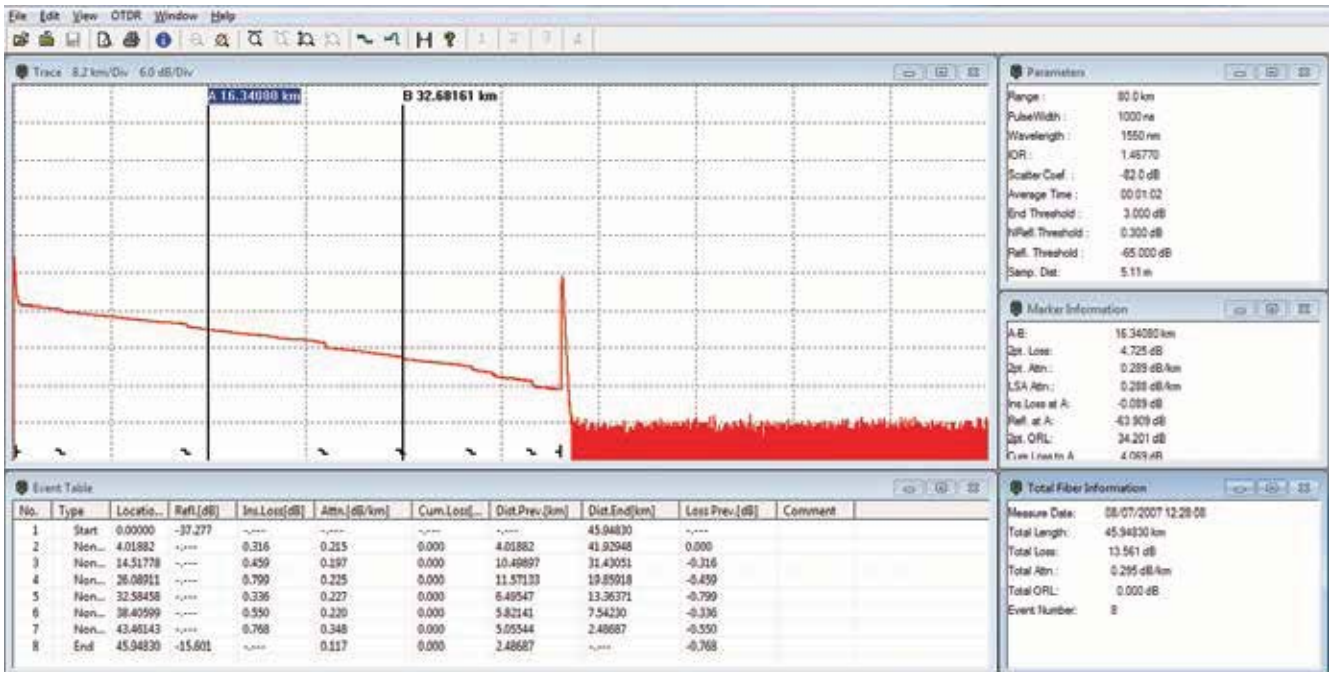
LC2000SCUPCSM 2 km Singlemode Launch cable

PATCH CORDS AVAILABLE

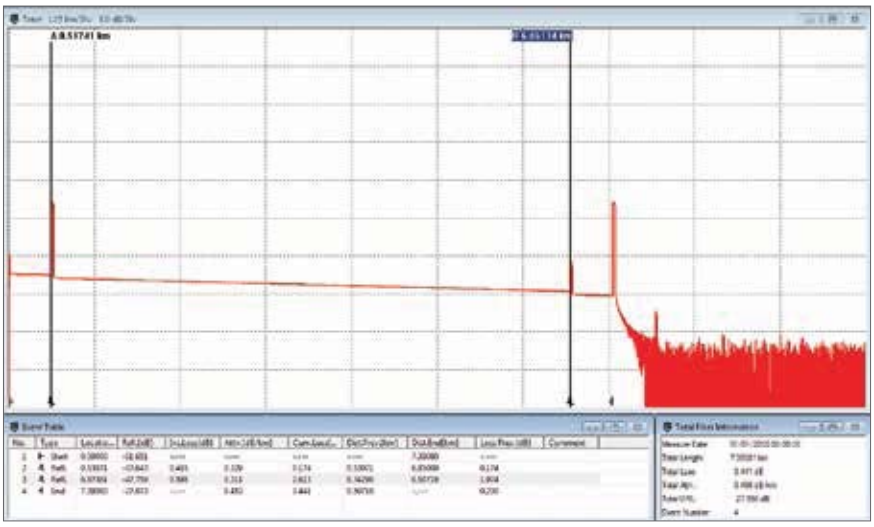
PART No.	CAT. No.	DESCRIPTION
52068683	SCUPC-SCUPC	Fibre Cable SC/UPC SC/UPC 1m 9/125/3mm
52068684	FCUPC-FCUPC	Fibre Cable FC/UPC FC/UPC 1m 9/125/3mm
52068685	STUPC-STUPC	Fibre Cable ST/UPC ST/UPC 1m 9/125/3mm
52068686	SCPC-SCPC	Fibre Cable SC/UPC SC/UPC 1m 62.5/125/3mm
52068687	FCPC-FCPC	Fibre Cable FC/UPC FC/UPC 1m 62.5/125/3mm
52068688	STPC-STPC	Fibre Cable ST/UPC ST/UPC 1m 62.5/125/3mm
52068689	SCPC-SCPC/50	Fibre Cable SC/UPC SC/UPC 1m 50/125/3mm
52068690	FCPC-FCPC/50	Fibre Cable FC/UPC FC/UPC 1m 50/125/3mm
52068721	STPC-STPC/50	Fibre Cable ST/UPC ST/UPC 1m 50/125/3mm
52068722	SCAPC-SCAPC	Fibre Cable SC/APC SC/APC 1m 9/125/3mm
52068723	FCAPC-FCAPC	Fibre Cable FC/APC FC/APC 1m 9/125/3mm
52068725	SCUPC-SCAPC	Fibre Cable SC/UPC SC/APC 1m 9/125/3mm
52068726	SCUPC-LCAPC	Fibre Cable SC/UPC LC/APC 1m 9/125/3mm
52068727	SCUPC-LCUPC	Fibre Cable SC/UPC LC/UPC 1m 9/125/3mm
52068728	SCAPC-LCAPC	Fibre Cable SC/APC LC/APC 1m 9/125/3mm
52068729	SCAPC-LCUPC	Fibre Cable SC/APC LC/UPC 1m 9/125/3mm
52068730	FCUPC-FCAPC	Fibre Cable FC/UPC FC/APC 1m 9/125/3mm
52068731	FCUPC-LCUPC	Fibre Cable FC/UPC LC/UPC 1m 9/125/3mm
52068732	FCUPC-LCAPC	Fibre Cable FC/UPC LC/APC 1m 9/125/3mm
52068733	FCAPC-LCAPC	Fibre Cable FC/APC LC/APC 1m 9/125/3mm
52068734	FCAPC-LCUPC	Fibre Cable FC/APC LC/UPC 1m 9/125/3mm
52068735	SCUPC-FCAPC	Fibre Cable SC/UPC FC/APC 1m 9/125/3mm
52068736	SCAPC-FCUPC	Fibre Cable SC/APC FC/UPC 1m 9/125/3mm
52068737	SCPC-FCPC	Fibre Cable SC/UPC FC/UPC 1m 62.5/125/3mm
52068738	SCPC-FCPC 50UM	Fibre Cable SC/UPC FC/UPC 1m 50/125/3mm

LC150SCPCMM 150 metre Multimode Launch cable

TraceViewer Software

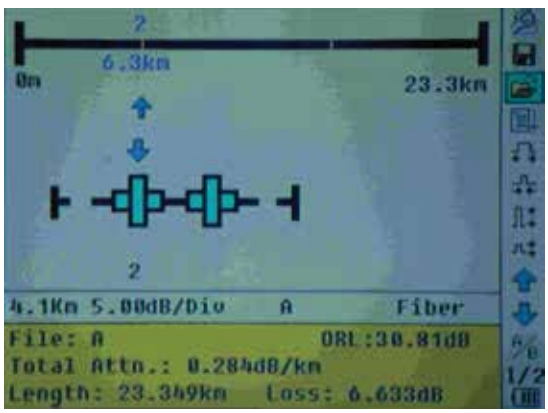


TraceViewer Software showing trace, event table, Parameters, Marker Information & Total Fibre Information.



TraceViewer with expanded trace view highlighting the benefit of Launch Cables to examine Near & Far end connectors.

LinkViewer Software



LinkViewer Software showing optical events that exceed the threshold of the Fibre Under Test.

Optical Power Meters (OPM)

FEATURES

- Referenced & Absolute optical power readings
- Download results via USB (GRP460 only)
- Various connector options available
- Multimode and Singlemode operation
- Rugged and compact size
- 850, 1300, 1310, 1490, 1550, 1611, 1625nm calibrated wavelengths
- Stores up to 1000 measurements per wavelength
- Audible tone alert from incoming 2kHz signal
- NIST traceable measurements
- Long battery life
- Conversion to Live Fibre ID with GLFI 110
- Windows 10 compatible

ORDERING INFORMATION

PART No.	CAT. No.	DESCRIPTION
52056202	GRP450-02	OPM, Germanium, 0.01dB, dB/dBm
52056204	GRP450-04	OPM, Filtered InGaAs, 0.01dB, dB/dBm
52056205	GRP455-02	OPM, Germanium, 0.01dB, dB/dBm w/Memory
52056207	GRP455-04	OPM, Filtered InGaAs, 0.01dB, dB/dBm w/Memory
52056208	GRP460-02	OPM, Germanium, 0.01dB, dB/dBm, Memory & PC
52056210	GRP460-04	OPM, Filtered InGaAs, 0.01dB, dB/dBm, Memory & PC
CONNECTOR OPTIONS		
52056231	GAC020	2.5mm Universal Adaptor for OPM
52056232	GAC021	1.25mm Universal Adaptor for OPM
52056233	GAC026	SC Adaptor for OPM
52056234	GAC027	ST Adaptor for OPM
52056235	GAC028	FC Adaptor for OPM
52056236	GAC029	LC Adaptor for OPM
52038126	-	Single Instrument, Belt-Mounted Carry Pouch
52075265	GAC126	SC/APC Adaptor for OPM
52075264	GAC540	Opti Tap Patchcord SC/APC for OPM

SPECIFICATIONS

dB/dBm	GRP450-02	GRP450-04
On-board storage	GRP455-02	GRP455-04
Data transfer to PC	GRP460-02	GRP460-04
Detector type	**Ge**	**Filtered InGaAs**
Wavelength range	850nm to 1625nm	
Measurement range	+6 to – 70dBm	+23 to –45dBm
Resolution	0.01dB	
Absolute accuracy	+/- 0.25dB	
Optical interface	Universal 2.5mm (Order 1.25mm or screw on adaptors separately)	
Tone identification	2kHz Incoming signal, Audible Alert	
Power on	Push button ON, Auto shutoff	
Storage	Store up to 1000 measurements/wavelength GRP 455 & 460	
Data transfer	Mini USB Port (1000 points/wavelength) GRP 460 ONLY	
Dimensions	6.1 x 0.94 x 0.75in. (15.5 x 2.38 x 1.90cm)	
Weight	3.0oz (85g)	

Greenlee OPM Data Manager software is available for download from the dedicated Greenlee website at http://minifibre.greenlee.com (available for use with GRP460 OPM only)

Example of Test Report

SC ST LC FC

OptiTap

Optical Light Sources (OLS)

FEATURES

- Dual- and Single- Wavelength options
- 2kHz Tone output
- Long Battery Life
- Rugged and compact size
- Stable, calibrated output
- NIST Traceable
- Multimode and Singlemode wavelength options

ORDERING INFORMATION

PART No.	CAT. No.	DESCRIPTION
52060849	GDLS350FB	850/1300nm Dual LED Source (Supplied with SC Adaptor)*
52060850	GDLS355FB	1310/1550nm Dual Laser Source (Supplied with SC Adaptor)*
52060686	GDLS360FB	1490/1625nm Dual Laser Source (Supplied with SC Adaptor)*
CONNECTOR OPTIONS		
52061736	GAC022B	SC Adaptor for FB Version
52061737	GAC023B	FC Adaptor for FB Version
52061738	GAC024B	ST Adaptor for FB Version
52061739	GAC025B	LC Adaptor for FB Version
52056237	GAC022	SC Adaptor for OLS - GDLS 350 & GDLS 355
52056238	GAC023	FC Adaptor for OLS - GDLS 350 & GDLS 355
52056239	GAC024	ST Adaptor for OLS - GDLS 350 & GDLS 355
52038126	-	Single Instrument, Belt-Mounted Carry Pouch

*Please see below for available adaptors

SC

ST

LC

FC

	GDLS350FB		GDLS355FB		GDLS360FB	
Discontinued Models	**GTP210**	**GTP230**	**GTP220**	**GTP250**	**GTP240**	
Wavelength	850nm	1300nm	1310nm	1550nm	1490nm	1625nm
Output Power	-20dBm Typ.		-4.0dBm Typ.		-4.0dBm Typ.	
Laser Classification	**LED**		Class 1 (FDA 21 CFR 1040, 11)		Class 1 (FDA 21 CFR 1040, 11)	
Output Stability	+/- 0.05dB after 15 minutes, + /- 0.03dB after 1 hour warm-up					
Spectral Width	40nm/120nm		5nm/5nm		5nm/5nm	
Optical Interface	Universal Connector Interface (FC, SC, ST & LC) - LC only on FB versions					
Tone Output	2kHz					
Power On	Push Button ON, Auto Shut-off					
Battery	CR2					
Dimensions	6.1 x 0.94 x 0.75in (15.5 x 2.38 x 1.90cm)					
Weight	3oz (85g)					
Operating Temperature	-10°C to 50°C					
Storage Temperature	-30°C to 60°C					

FI-100 Live Fibre Identifier

FEATURES

- Low insertion loss
- Easy operation
- Versatile
- Click lock
- Fibre ID
- Tone Detect
- Signal direction

ORDERING INFORMATION

Part No.	CAT No.	DESCRIPTION
52068188	FI-100 KIT	Fibre Identifier Kit
52068108	FI-100-250µm/Rib	250µm Adaptor
52068109	FI-100-900µm	900µm Adaptor
52068110	FI-100-2mm	2mm Adaptor
52068111	FI-100-3mm	3mm Adaptor
52068113	FI-100-Case	Soft Carry Case
52068114	FI-100-Sunshade	Sun Shade

SPECIFICATIONS

Identified Wavelength Range	800-1700nm	
Identified Signal Type	270Hz (±5%), 330 Hz (±5%),1kHz (±5%),, 2kHz (±5%)	
Detector Type	1mm InGaAs	
Adaptor Types	250µm (Applicable for Bare Fibre)	
	900µm (Applicable for 900µm Secondary Coated Fibre)	
	2mm (Applicable for 2mm Jacketed Cable)	
	3mm (Applicable for 3mm Jacketed Cable)	
Signal Indication	Left & Right LED	
Signal Direction Test Range (CW/900µm fibre)	-46 to +10dBm (1310nm)	
	-50 to +10dBm (1550nm)	
Signal Power Test Range (CW/900µm fibre)	-50 to +10dBm	
Signal Frequency Display	270Hz, 1kHz, 2kHz	
Tone Detect Test Range (Average)	900µm, 2mm, 3mm	-30 to 0dBm (270Hz, 1kHz)
		-25 to 0dBm (2kHz)
	250µm	-25 to 0dBm (1kHz, 2kHz)
		-20 to 0dBm (2kHz)
Insertion Loss (Typical/Maximum)	0.3 / 0.8dB at 1310nm	
	1.5 / 2.5dB at 1550nm	
Battery	AAA Alkaline (2)	
Operating Temperature	-10 to +60ºC	
Storage Temperature	-25 to +70ºC	
Dimension	196 x 30.5 x 27mm	
Weight	195g	
Certifications	CE, FCC, WEEE	

ACCESSORIES

FI-100 KIT contains instruction manual, sun shade and two AAA batteries.

2015 Diamond Technology Reviews

FI-100 Fibre Identifier

The FI-100 Fibre Identifier measures core power in a fibre optic cable. Fibre is inserted into the fibre adaptors, and the clamping mechanism causes a macrobend on the fibre. Two photodiodes measure the small portion of light that is “spilled” out of the fibre.

The FI-100 is able to measure the direction of light travel and can positively identify fibres using 270 Hz, 330 Hz, 1 kHz, or 2 kHz tone detect frequencies. Precision fibre adaptors for each fibre size introduce the exact amount of mechanical bend in the fibre without causing excessive loss. Technicians can probe fibres to identify which are active before disconnecting. This prevents the disconnection of a fibre that is being used for a critical service. The precise fibre adaptors also make the FI-100 well-suited for bend-insensitive fibre, Greenlee says.

Fibre tracing allows the technician to identify a fibre when a tone is injected into it with a complementary laser source. The other end of the fibre can be located without disconnecting each fibre in a pedestal or cabinet that houses multiple fibres.

Mandrels

- 250µm
- 900µm
- 2mm
- 3mm

ensures accuracy with no compromise.

180XL Visual Fault Locator

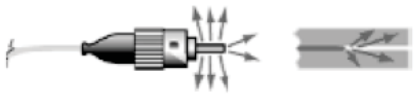
LOCATING BREAKS AND BENDING LOSSES

The 180XL visual fault finder is an indispensable tool for quickly identifying bending losses and breaks in optical fibres. If a fibre is bent too tightly, red laser light will be seen escaping through the jacket. Likewise, if a fibre is broken, escaping light will be visible where the break is located.

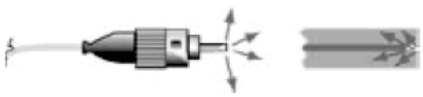
IDENTIFYING BAD CERAMIC CONNECTORS

Ceramic connectors are easily tested using the 180XL visual fault finder. A fibre broken inside, or past, the ferrule will cause it to glow, as shown below at left. If the whole connector glows, it is definitely defective.

If the end face polish of the connector is bad, light will be reflected internally, as shown below right. This will also make the ferrule glow when the 180XL is used.



Fibre broken in ferrule



Poor end face polish

FEATURES

- Continuous wave output mode for steady fault illumination
- Blinking output mode increases viewing contrast
- Easy to use “Quick Connect” interface fits all 2.5mm fibre optic connectors
- Ergonomic switch permits easy one-handed operation
- Simple, versatile, and user-friendly design
- Rugged, compact, and splash proof aluminium housing
- High output 1.0mW (0dBm) 650nm red laser
- Up to 7km range
- Two AA-size alkaline batteries provide 80 hours of continuous operation
- Nylon belt holster included

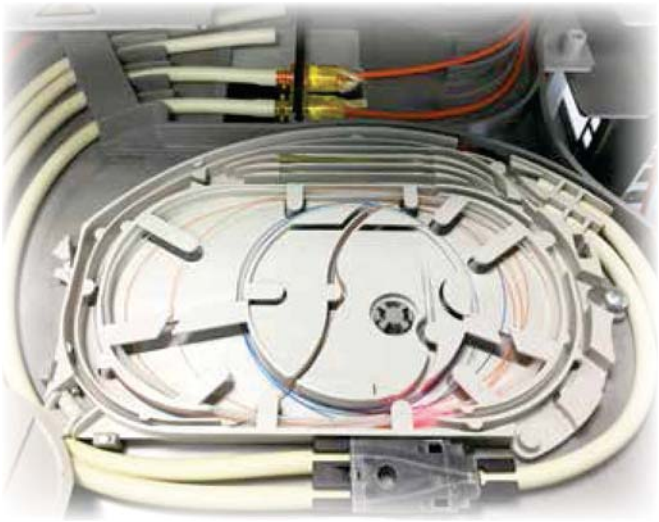
ORDERING INFORMATION

PART No.	CAT. No.	DESCRIPTION
52068671	180XL	Visual Fault Locator Kit (2.5mm UCI)
52084595	-	Barrel/Battery holder
52068673	180XL-1.25	1.25mm adaptor

SPECIFICATIONS

Wavelength	650nm +/-10nm
Emitter Type	Fabry Perot
Output Power	0dBm
Spectral Width (CPR)	<2nm
Laser Classification	2
Range	7km
Modes of Operation	CW and 2Hz Modulation
Method of Display Operation	Red/Green LED
Fibre Type	Singlemode, Multimode
Connector Interface	2.5mm Universal, Optional 1.25mm adaptor
Battery	AA (2)
Battery Life	80 Hours with 3.9Wh batteries
Weight	0.15lbs, (70g) (not including batteries)
Dimensions	7.08” x 0.91” Dia (180mm x 23mm Dia)
Operating Temperature	-10 to +45C
Storage Temperature	-40 to +70C
Certifications	CE, WEEE, CDRH Reach RoHs

2.5mm – 1.25mm adaptor



Microbend easily visible in splice tray using 180XL

GUPM100 Optical Power Meter

NEW

FEATURES

- 850, 1300, 1310, 1490, 1550, 1610, & 1625nm wavelengths
- Smartphone compatible (Android and iOS)
- Plug-and-play design
- Single Mode and Multi Mode testing
- Transmit live dB and dBm readings via USB 2.0
- Set reference/zero functionality
- Accepts all connector styles

SPECIFICATION	GUPM100-02	GUPM100-04
Wavelength Range	850nm to 1625nm	
Calibrated Wavelengths	850, 1300, 1310, 1490, 1550, 1610, 1625	
Measurement Range	+6 to -70dBm	+23 to -45dBm
Measurement Types	dB (Insertion Loss) / dBm (Absolute Power)/Watts	
Resolution	0.01dB	
Absolute Accuracy	+/- 0.25dB	
Detector Type	InGaAs	Filtered InGaAs
Optical Interface	Universal 2.5mm (Other adapters available)	
Tone Identification	2kHz Incoming Signal - Audible Alert	
Storage	Storage within Greenlee Data Manager	
Data Transfer	USB 2.0	
Dimensions	9.5cm x 1.9cm x 1.9cm	
Weight	22.68g	

ORDERING INFORMATION

PART No.	CAT. No.	DESCRIPTION
GUPM100-02	520082268	USB OPM supplied with 2.5 mm Universal adaptor
GUPM100-04	520082269	USB Hi-Power OPM supplied with 2.5 mm Universal adaptor

GOPM01 / GOPM02 Micro Optical Power Meter

NEW

FEATURES

- Wide measurement range (+6 to -70dBm)
- High power CATV range (+26 to -50dBm)
- Optional VFL for safe and effective fault locating
- Singlemode and multimode compatible
- Calibrated wavelengths of 850/1300/1310/1490/1550/1625nm
- 270Hz, 1kHz and 2kHz tone detect
- Auto power off

PARAMETER	SPECIFICATION	
Model	GOPM01	GOPM02
Measurement Range	+6 to -70 dBm (1310/1490/1550/1625)	+26 to -50 dBm (1310/1490/1550/1625)
	-60 to +6dBm (850/1300)	-40 to +26dBm (850/1300)
Calibrated Wavelengths	850, 1300, 1310, 1490, 1550, 1625nm	
Display Resolution	0.01dB	
Accuracy*	+/-0.2dB	
Linearity*	+/-0.2dB	
Connector	Universal 2.5mm	
Wavelength Response	700 - 1700nm	
Detector	InGaAs	
Power Supply	AAA x 2 Alkaline/Rechargeable via USB	
Battery Lifetime	>60 Hours (OPM mode)	
Operating Temperature	-10 to +50C (<90% Relative Humidity)	
Storage Temperature	-20 to +60C (<90% Relative Humidity)	
VFL Wavelength	650nm +/-20nm	
VFL Output	≤ 1mW/ 2Hz	
VFL Range	4km	
Size	105 x 52 x 24mm (4.25 x 2.0 x 0.9")	
Weight	100g (0.22lbs)	
Auto Power Off	10 minutes of no activity	
Certifications	CE, RoHS, CDRH, WEEE, EAC	

ORDERING INFORMATION

ORDER No.	DESCRIPTION
GOPM01	Standard Power OPM with VFL
GOPM02	High Power OPM with VFL
03579	1.25mm Adapter
08325	Micro OPM Carry Case

GMFT-SM Fibre Optic Test Set

FEATURES

- 1310/1550nm wavelengths
- Optical Power Meter
- Stabilised Laser Light Source
- >55dB dynamic range
- Easy to use
- Stores 1000 measurements per wavelength
- Fibre ID with modulating tone (audible & Visual)
- LCD display on OPM
- Fibre analysis software for report generation
- USB interface

ORDERING INFORMATION

PART No.	CAT. No.	DESCRIPTION
52070561	GMFT-SM	Single Mode Kit **Kit includes:** 1-GDLS355 1310/1550 Dual Laser 1-GRP460-02 Optical Power Meter 1- Soft Carry Case: 100 x 210 x 40 mm, weight = 60g

GMFT-MM Fibre Optic Test Set

FEATURES

- 850/1300nm wavelengths
- Optical Power Meter
- Stabilised LED Light Source
- 40dB dynamic range
- Easy to use
- Stores 1000 measurements per wavelength
- Fibre ID with modulating tone (audible & Visual)
- LCD display on OPM
- Fibre analysis software for report generation
- USB interface

ORDERING INFORMATION

PART No.	CAT. No.	DESCRIPTION
52070562	GMFT-MM	Multi Mode Kit **Kit includes:** 1-GDLS350 850/1300 Dual LED 1-GRP460-02 Optical Power Meter 1- Soft Carry Case: 100 x 210 x 40 mm, weight = 60g

GMFT-SM/MM Fibre Optic Test Set

FEATURES

- 850/1300/1310/1550nm wavelengths
- Optical Power Meter
- Stabilised Laser Light Source
- >55dB dynamic range-SM
- 40dB dynamic range-MM
- Easy to use
- Stores 1000 measurements per wavelength
- Fibre ID with modulating tone (audible & Visual)
- LCD display on OPM
- Fibre analysis software for report generation
- USB interface

ORDERING INFORMATION

PART No.	CAT. No.	DESCRIPTION
52070563	GMFT-SM-MM	Single Mode/Multi Mode Kit **Kit includes:** 1-GDLS355 1310/1550 Dual Laser 1-GDLS350 850/1300 Dual LED 1-GRP460-02 Optical Power Meter 1- Soft Carry Case: 100 x 210 x 40 mm, weight = 60g

GVIS300C Video Inspection System (Digital Video Inspection)

FEATURES

- Automated image centring
- FOV 860µm x 640µm
- Wi-Fi or USB connection to Laptop/PC or cloud
- Generate reports
- High Definition Image
- Visual Fault Locator
- Hands-free voice commands (Windows Vista, 7 and above)
- Pass/Fail analysis (IEC 61300-3-35)
- Stream power measurements from GRP460-02
- Digital archiving
- Optical Power Meter
- Internal memory

Refer to p.33 for GVIS Adaptor ordering information

GVIS400HDP Video Inspection System (Digital Video Inspection)

FEATURES

- Automatic or manual Pass/Fail analysis (IEC 61300-3-35)
- Field of View 800µm x 600µm
- USB connection to Laptop/PC
- Generate reports
- High Definition Image
- Hands-free voice commands (Windows Vista, 7 and above)
- Magnify and centre
- Stream power measurements from GRP460-02
- Digital archiving

GVIS300 Video Inspection System (Analogue Video Inspection)

FEATURES

- ¾ µm scratch resolution
- 135x magnification
- FOV 630µm x 440µm
- Rugged and compact size
- Quick change adaptor tips for all connector styles
- Unique focussing mechanism eliminates need for “focus wheel”
- Thin (less than 2.5cm dia.) ergonomic probe design
- 90mm LCD Display
- Li Ion Battery & smart technology AC charger system
- Optional Video Capture Module for digital archiving of the image

GPAD 255B Wi-Fi Portable Access Device

FEATURES

- Transmits live images and data via Wi-Fi from the GVIS 400-HDP via GPAD 255B USB
- Use with GVIS 400 for live images and PASS/FAIL functionality, or wirelessly transmit dB loss readings with the Greenlee USB Power Meter (UPM 100)
- Compatible with Greenlee Video Inspection System software for Android, iOS smartphones and Windows
- Voice Command

SPECIFICATIONS	GVIS400-HDP	GVIS300	GVIS300C
FOV (Field of View)	860µm x 640µm	630µm x 440µm	860µm x 640µm
Resolution	<1 micron	¾ micron	<1 micron
Display screen size	N/A	3.5in (90mm) diagonal	5in (127mm) diagonal
Battery Life	N/A	8 to 10hrs continuous	4 to 5hrs continuous
Battery charge time	N/A	3 hours	2 hours
Operating Temp.	0°C to 50°C	0°C to 50°C	0°C to 50°C
Storage Temp.	-40°C to 70°C	-40°C to 70°C	-40°C to 70°C
Optical Magnification	135x, 200x	x135	135x, 200x
Camera type	HD Megapixel CMOS sensor		HD Megapixel CMOS sensor
Pass/Fail analysis	Selectable or IEC 61300-3-35	N/A	Selectable or IEC 61300-3-35
Focus control	External Focus System	External Focus System	External Focus System
Cord Length	44cm - 100cm	44cm - 100cm	44cm - 100cm
Connector	USB 2.0	USB 2.0	USB 2.0
Light Source	White LED	Blue LED	White LED
Lighting Technique	Coaxial	Coaxial	Coaxial
Size: Probe	180mm x 25mm x 19mm	180mm x 25mm x 19mm	180mm x 25mm x 19mm
Monitor	N/A	120mm x 89mm x 32mm	140mm x 146mm x 57mm
Weight (Probe)	160g	160g	160g

GVIS400HDP in wireless configuration

ORDERING INFORMATION

PART No.	CAT. No.	DESCRIPTION
52079393	GVIS300C	Probe and monitor with Analysis software, Memory, Reports, & Wi-Fi data transfer
52079394	GVIS300C-02-V	As above with Ge OPM & VFL (+6 to -70 dBm)
52079395	GVIS300C-04-V	As above with InGaAs OPM & VFL (+23 to -45 dBm)
52066366	GVIS400HDP	GVIS400HDP Probe with Auto Analysis Software, Carry Case, 10 x 1.25mm Swabs, 10 x 2.5mm Swabs, Cleaning Pen & SqR™, 1.25mm, 2.5mm, SC & LC Adaptors
52056253	GVIS300MP	GVIS 300 Monitor & Probe, 601C Carry Case, SC Bulkhead & 2.5mm Universal Adaptor, Battery Charger, Cleaning Pen & SqR™
52056254	GVIS300MP-USB	GVIS 300 Monitor & Probe w/USB option, 601C Carry Case, SC Bulkhead & 2.5mm Universal Adaptor tips, Battery Charger, Cleaning Pen & SqR™
52079391	GPAD255B	WiFi Portable Access Device
52079392	GPAD255B-02	WiFi Portable Access Device with OPM (+6 to -60 dBm)

Instruments Designed for POF & Fibre Optic Cable Testing

The XL fiberTOOLS™ are designed for the professional to perform installation and maintenance measurements on both Plastic & Glass fibre optic networks.

The instrument family consists of standard instruments for routine cable testing, through to Stabilised Light Sources with stringent Launch Conditions for the Avionics and Defence Industries and Research Laboratories.

Greenlee's LED Light Sources have been manufactured with specific launch conditions to overcome the inconsistent measurements caused by standard Light Sources.

The Multimode products that have specific launch conditions are designed for greater accuracy and repeatable results.

Greenlee also manufacture instruments to test POF links. POF links are being used in a number of industries particularly on short links where optical budgets aren't too tight. The automotive industry is a good example of this.

The XL fiberTOOLS™ are fully featured, general purpose fibre optic instruments, easy to operate and economically priced to outfit all technicians performing fibre optic installation and maintenance.

Greenlee also manufacture a range of Optical Light Sources and Power Meters with enhanced EMI performance, manufactured to Military standards, these offer the ultimate in accuracy.

Greenlee's range of Optical Light Sources and Power Meters were designed specifically for: avionics, automotive, defence and research.

Optical Power Meters are available with different detectors. Choose between InGaAs, Si or Ge for operational wavelength.

560XL Fibre Optic Power Meter (Formerly 555B)

FEATURES

- Multi-Wavelength Storage
- 0.01dB measurement resolution
- Absolute (dBm) & Referenced (dB) Power measurements
- Long battery life
- User selectable auto shut-off
- Rugged and splash-proof
- SOC interface adapts to all commonly used connectors*
- Economically priced
- Easy to use - three buttons control all functions

OPTICAL SPECIFICATIONS	
Detector Type	1mm Indium Gallium Arsenide (InGaAs)
Calibration Wavelengths	850nm, 1300nm, 1310nm and 1550nm
Power Range	+3dBm to -60dBm
Accuracy	±0.25dB
Resolution	0.01dB
Power Requirements	Two AA 1.5V batteries (approx. 100 hours continuous operation)
Connector Interface	SOC

ENVIRONMENTAL SPECIFICATIONS	
Calibration Wavelengths	850nm, 1300nm, 1310nm and 1550nm
Power Range	+3dBm to -60dBm
Accuracy	±0.25dB
Resolution	0.01dB
Power Requirements	Two AA 1.5V batteries (approx. 100 hours continuous operation)
Connector Interface	SOC

Refer to p.31 for ordering information

567XL Silicon Fibre Optic Power Meter (Formerly 557B)

FEATURES

- Multi-Wavelength Storage
- 0.01dB measurement resolution
- Absolute (dBm) & Referenced (dB) Power measurements
- Long battery life
- User selectable auto shut-off
- Rugged and splash-proof
- Economically priced
- SOC interface adapts to all commonly used connectors*

OPTICAL SPECIFICATIONS	
Detector Type	3 x 3.5mm Silicon
Calibration Wavelengths	635nm, 780nm, 850nm (Due to display 630nm will be displayed)
Power Range	+3dBm to -60dBm
Accuracy	±0.25dB
Resolution	0.01dB
Power Requirements	Two AA 1.5V batteries (approx. 100 hours continuous operation)
Connector Interface	SOC

Refer to p.32 & 33 for all available adaptors

568XL High Intensity Optic Power Meter (Formerly 558B)

FEATURES

- Multi-Wavelength Storage
- 0.01dB measurement resolution
- Absolute (dBm) & Referenced (dB) Power measurements
- Long battery life
- User selectable auto shut-off
- Rugged and splash-proof
- Economically priced
- SOC interface adapts to all commonly used connectors*
- Easy to use - three buttons control all functions

OPTICAL SPECIFICATIONS		
Detector Type	2 mm Indium Gallium Arsenide (InGaAs)	
Calibration Wavelengths	980nm, 1310nm and 1550nm	
Power Range	+25dBm to -30dBm (1310nm and 1550nm);	
	+25dBm to -27dBm measurement range at 980nm	
	To avoid thermal damage, limit exposure to high power (greater than +23dBm) to less than 30 minutes	
Absolute Accuracy	±0.25dB at calibration conditions	
Wavelength Dependence	975 to 985nm	0.025dB/nm
	1270 to 1330nm	0.0033dB/nm
	1500 to 1625nm	0.0016dB/nm
Polarization Dependence	<0.1dB	
Resolution	0.01dB	
Power Requirements	Two AA 1.5V batteries (approx. 100 hours continuous operation)	
Connector Interface	SOC	

Refer to p.31 for ordering information

570XL 850/1300nm LED Source (Formerly 252)

OPTICAL SPECIFICATIONS			
Centre Wavelength	850nm	1300nm	
Range (Typical)	840nm to 880nm	1270nm to 1345nm	
Max. Spectral Width (FWHM)	55nm	150nm	
Stability (1 hour)	±0.05dB	±0.05dB	
Typical Power Output (µm)			
100/140	-20dBm	-20dBm	(252A-AS100)
62.5/125	-20dBm	-20dBm	(252A)
50/125	-20dBm	-21dBm	(252B)
Modulation Frequencies	270Hz, 1kHz and 2kHz	270Hz, 1kHz and 2kHz	
Power Requirements	Two AA 1.5V batteries (approx. 80 hours continuous operation)		
Connector Interface	FC, SC or ST		

FEATURES

- Stable calibrated output
- Easy to use
- Continuous wave and modulated output
- Long battery life - approx. 80 hours
- User selectable auto shut-off
- Rugged and splash-proof
- Economically priced
- Fixed connector interface FC, SC or ST
- 850/1300nm wavelengths

580XL 1310/1550nm Laser Source (Formerly 262A)

OPTICAL SPECIFICATIONS		
Centre Wavelength	1310nm	1550nm
Range (Typical)	1280nm to 1340nm	1520nm to 1580nm
Max. Spectral Width (FWHM)	<5nm	<5nm
Stability (1 hour)	±0.05dB	±0.05dB
Typical Power Output (µm)		
Minimum	-8dBm	-8dBm
Typical	-7dBm	-7dBm
Modulation Frequencies	270Hz, 1kHz and 2kHz	270Hz, 1kHz and 2kHz
Power Requirements	Two AA 1.5V batteries (approx. 80 hours continuous operation)	
Connector Interface	FC, SC or ST	

FEATURES

- Stable calibrated output
- Easy to use
- Continuous wave and modulated output
- Long battery life - approx. 80 hours
- User selectable auto shut-off
- Rugged and splash-proof
- Economically priced
- Fixed connector interface FC, SC or ST
- 1310/1550nm wavelengths

573XL 650nm LED Source for Large Core Plastic and Glass Fibre (Formerly 253B-POF)

OPTICAL SPECIFICATIONS	
Centre Wavelength	650nm
Range (Typical)	630nm to 670nm
Max. Spectral Width (FWHM)	<40nm
Stability (1 hour)	±0.05dB
Typical Power Output (µm)	
200/230 SI Fibre	-15dBm ±0.5dB
Modulation Frequencies	270Hz, 1kHz and 2kHz
Power Requirements	Two AA 1.5V batteries (approx. 24 hours continuous operation)
Connector Interface	Fixed ST or SOC adaptor available

FEATURES

- Stable calibrated output
- Easy to use
- Continuous wave and modulated output
- Long battery life - approx. 24 hours
- User selectable auto shut-off
- Rugged and splash-proof
- Economically priced
- Fixed ST and SOC Adaptor options are available
- 650nm wavelength

577XL M90 850nm LED Source with M90 Launch Condition (62.5/125µm Fibre)

(Formerly 257A-M90)

OPTICAL SPECIFICATIONS	
Centre Wavelength	850nm
Range (Typical)	840nm to 880nm
Max. Spectral Width (FWHM)	<55nm
Stability (1 hour)	±0.05dB
Launch Profile	M90
Typical Power Output (µm)	
62.5/125µm GI Fibre	-20dBm ±0.5dB
Modulation Frequencies	270Hz, 1kHz and 2kHz
Power Requirements	Two AA 1.5V batteries (approx. 24 hours continuous operation)
Connector Interface	Universal Connector Interface, Physical Contact (UCI-PC)

FEATURES

- Stable calibrated output
- Easy to use
- Continuous wave and modulated output
- Long battery life - approx. 24 hours
- User selectable auto shut-off
- Rugged and splash-proof
- Economically priced
- UCI Adaptor options are available
- 850nm wavelength

578XL M90 1300nm LED Source with M90 Launch Condition (62.5/125µm Fibre)

(Formerly 255A-M90)

OPTICAL SPECIFICATIONS	
Centre Wavelength	1300nm
Range (Typical)	1270nm to 1345nm
Max. Spectral Width (FWHM)	150nm
Stability (1 hour)	±0.05dB
Launch Profile	M90
Typical Power Output into:	
62.5/125µm GI Fibre	-20dBm ±0.5dB
Modulation Frequencies	270Hz, 1kHz and 2kHz
Power Requirements	Two AA 1.5V batteries (approx. 24 hours continuous operation)
Connector Interface	Universal Connector Interface, Physical Contact (UCI-PC)

FEATURES

- Stable calibrated output
- Easy to use
- Continuous wave and modulated output
- Long battery life - approx. 24 hours
- User selectable auto shut-off
- Rugged and splash-proof
- Economically priced
- UCI Adaptor options are available
- 1300nm wavelength

577XL AS100 850nm LED Source with AS-100 Launch Condition (100/140µm Fibre)

(Formerly 257A-AS100)

OPTICAL SPECIFICATIONS	
Centre Wavelength	850nm
Range (Typical)	840nm to 880nm
Max. Spectral Width (FWHM)	<55nm
Stability (1 hour)	±0.05dB
Launch Profile	AS100
Typical Power Output (µm)	
100/140µm GI Fibre	-20dBm ±0.5dB
Modulation Frequencies	270Hz, 1kHz and 2kHz
Power Requirements	Two AA 1.5V batteries (approx. 24 hours continuous operation)
Connector Interface	Universal Connector Interface, Physical Contact (UCI-PC)

FEATURES

- Stable calibrated output
- Easy to use
- Continuous wave and modulated output
- Long battery life - approx. 24 hours
- User selectable auto shut-off
- Rugged and splash-proof
- Economically priced
- UCI Adaptor options are available
- 850nm wavelength

XL Series Multimode LED Light Sources

XL Series LED Sources*					
	570XL		573XL	577XL	578XL
Nominal	850nm	1300nm	650nm	850nm	1300nm
Range (nm)	820 - 870	1260 - 1350	630 - 670	840 - 880	1270 - 1345
Max. spectral width (FWHM)	55nm	150nm	40nm	55nm	150nm
Stability, 1 hour	±0.05dB	±0.05dB	±0.05dB	±0.05dB	±0.05dB
POWER OUTPUT					
200/230µm SI MM fibre	–	–	-15dBm ***		–
100/140µm GI MM fibre	-13dBm	-20dBm	–	-20dBm**(AS-100)	-20dBm
62.5/125µm GI MM fibre**	-13dBm	-20dBm	–	-20dBm** (M90)	-20dBm** (M90)
50/125µm GI MM fibre	-14dBm	-21dBm	–		-21dBm
9/125µm SM fibre	–	–	–	–	-38dBm
Power output uncertainty	±0.5dB	±0.5dB	±0.5dB	±0.5dB	±0.5dB
Connector interface	FC, SC, or ST		SOC or ST	Universal connector interface	
Functions	MOD: Modulated output mode (270Hz, 1kHz, 2kHz) CW: Continuous Wave output mode Freq: selectable modulation frequency				
Modulation frequencies	270Hz, 1kHz, and 2kHz (±0.5%) using switch inside battery compartment				
Power requirements	Two AA-size alkaline batteries				
Battery life	> 24 hours				
ENVIRONMENT					
Operating temperature	-15°C to 55°C				
Storage temperature	-35°C to 70°C				
Humidity, non-condensing	0% to 95%				
Dimensions	7.2 x 14.2 x 3.5cm (2.8 x 5.6 x 1.4in)				
Weight					
Single	215g (7.6oz)				
Dual	241g (8.5oz)				

* Within specified operating environment of 20°C to 25°C ** Calibrated launch level, equilibrium modal distribution *** Calibrated launch level

M-Series Launch Condition Specifications

577XL - AS100 (850nm), optimized for full-fill condition of 100/140µm fibre with a NA of 0.29

FARFIELD SPECIFICATION (NA)*			NEARFIELD SPECIFICATION (MFD)* [nm]		
Relative Intensity	Low	High	Relative Intensity	Low	High
5%	0.245	0.255	5%	80.0	95.0
15%	0.210	0.225	15%	70.0	85.0
75%	0.100	0.120	75%	30.0	45.0

577XL - M90 (850nm), optimized for full-fill condition of 62.5/125µm fibre with a NA of 0.275

FARFIELD SPECIFICATION (NA)*			NEARFIELD SPECIFICATION (MFD)* [nm]		
Relative Intensity	Low	High	Relative Intensity	Low	High
5%	0.250	0.275	5%	57.0	63.0
15%	0.230	0.255	15%	53.0	59.0
75%	0.100	0.130	75%	29.0	35.0

*MFD = Mode Field Diameter NA = Numerical Aperture (sine of scan angle)

560XL-EMI Fibre Optic Power Meter with enhanced EMI performance

OPTICAL SPECIFICATIONS	
Detector Type	1mm InGaAs
Calibration Wavelengths (nm)	850, 1300, 1310, 1550
Power Range	+3dBm to -60dBm
Accuracy	±0.25dB
Resolution	0.01dB
Power Requirements	Two AA 1.5V batteries (approx. 100 hours continuous operation)
Connector Interface	SOC

FEATURES

- 0.01dB measurement resolution
- Multi-Wavelength Storage
- SOC interface adapts to all commonly used connectors*
- Absolute (dBm) & Referenced (dB) Power measurements
- User selectable auto shut-off
- Long battery life
- Economically priced
- Rugged and splash-proof
- Enhanced EMI performance: MIL-STD-461E, Method RS103, tested to 190 V/m
- Engineered for use in areas with high electrical interference

570XL-AS100-EMI 850/1300nm LED Source with enhanced EMI Performance

OPTICAL SPECIFICATIONS		
Centre Wavelength	850nm	1300nm
Range (Typical)	840nm to 880nm	1270nm to 1345nm
Max. Spectral Width (FWHM)	55nm	150nm
Stability (1 hour)	±0.05dB	±0.05dB
Typical Power Output (µm)		
100/140	-13dBm	-20dBm
62.5/125	-13dBm	-20dBm
50/125	-14dBm	-14dBm
Modulation Frequencies	270Hz, 1kHz and 2kHz	270Hz, 1kHz and 2kHz
Power Requirements	Two AA 1.5V batteries (approx. 80 hours continuous operation)	
Connector Interface	UCI	

FEATURES

- Stable calibrated output
- 850nm / 1300nm wavelength LED Source
- Long battery life - approx. 80 hours
- Continuous wave and modulated output
- User selectable auto shut-off
- Supports a wide range of UCI connectors, including FC, SC, and ST
- Economically priced
- Enhanced EMI performance: MIL-STD-461E, Method RS103 tested to 200 V/m
- Easy to use
- Configured to meet AS100 launch conditions
- Rugged and splash-proof

580XL-EMI 1310/1550nm Laser Source with enhanced EMI Performance

OPTICAL SPECIFICATIONS		
Centre Wavelength	1310nm	1550nm
Range (Typical)	1280nm to 1340nm	1520nm to 1580nm
Max. Spectral Width (FWHM)	<5nm	<5nm
Stability (1 hour)	±0.05dB	±0.05dB
Typical Power Output (9/125µm)		
Minimum	-8dBm	-8dBm
Typical	-7dBm	-7dBm
Modulation Frequencies	270Hz, 1kHz and 2kHz	270Hz, 1kHz and 2kHz
Power Requirements	Two AA 1.5V batteries (approx. 80 hours continuous operation)	
Connector Interface	UCI	

FEATURES

- Stable calibrated output
- 1310nm / 1550nm wavelength Laser Source
- Long battery life - approx. 80 hours
- Continuous wave and modulated output
- User selectable auto shut-off
- Supports a wide range of UCI connectors, including FC, SC, and ST
- Economically priced
- Enhanced EMI performance: MIL-STD-461E, Method RS103 tested to 200 V/m
- Rugged and splash-proof
- Easy to use

5670XL Multimode Fibre Optic Test Set

FEATURES

- 850/1300nm loss measurements
- Insertion loss test set for Multimode fibre
- Rugged package design
- Connector for FC, SC or ST
- Economically priced
- Easy-to-use portable package

5670-FC Includes	
560XL	Optical Power Meter
570XL-FC	850/1300nm LED Source w/FC Connector
T1020	FC/PC SOC Adaptor
914B	Carrying Case

5670-SC Includes	
560XL	Optical Power Meter
570XL-SC	850/1300nm LED Source w/SC Connector
T1062	SC/PC SOC Adaptor
914B	Carrying Case

5670-ST Includes	
560XL	Optical Power Meter
570XL-ST	850/1300nm LED Source w/ST Connector
T1030	ST/PC SOC Adaptor
914B	Carrying Case

5680XL Singlemode Fibre Optic Test Set

FEATURES

- 1310/1550nm loss measurements
- Insertion loss test set for Singlemode fibre
- Rugged package design
- Connector for FC, SC or ST
- Economically priced
- Easy-to-use portable package

5680-FC Includes	
560XL	Optical Power Meter
580XL-FC	1310/1550nm Laser Source w/FC Connector
T1020	FC/PC SOC Adaptor
914B	Carrying Case

5680-SC Includes	
560XL	Optical Power Meter
580XL-SC	1310/1550nm Laser Source w/SC Connector
T1062	SC/PC SOC Adaptor
914B	Carrying Case

5680-ST Includes	
560XL	Optical Power Meter
580XL-ST	1310/1550nm Laser Source w/ST Connector
T1030	ST/PC SOC Adaptor
914B	Carrying Case

5890XL Multimode & Singlemode Fibre Optic Test Set

FEATURES

- 850/1300nm loss measurements
- 1310/1550nm loss measurements
- Connector for FC, SC or ST
- Rugged package design
- Easy-to-use portable package
- Economically priced
- Insertion loss test set for Multimode & Singlemode fibre

5890-FC Includes	
560XL	Optical Power Meter
570XL-FC	850/1300nm LED Source w/FC Connector
580XL-FC	1310/1550nm Laser Source w/FC Connector
T1020	FC/PC SOC Adaptor
915B	Carrying Case

5890-SC Includes	
560XL	Optical Power Meter
570XL-SC	850/1300nm LED Source w/SC Connector
580XL-SC	1310/1550nm Laser Source w/SC Connector
T1062	SC/PC SOC Adaptor
915B	Carrying Case

5890-ST Includes	
560XL	Optical Power Meter
570XL-ST	850/1300nm LED Source w/ST Connector
580XL-ST	1310/1550nm Laser Source w/ST Connector
T1030	ST/PC SOC Adaptor
915B	Carrying Case

CP-2976 & CP-3137 Silicon Fibre Optic Power Meter (Formerly 557B replaced by 567XL)

FEATURES

- Multi-Wavelength Storage
- 0.01dB measurement resolution
- Absolute (dBm) & Referenced (dB) Power measurements
- Long battery life
- User selectable auto shut-off
- Rugged and splash-proof
- SOC interface adapts to all commonly used connectors*
- Economically priced
- CP-2976 calibrated at 660nm (567XL with 660nm calibration)
- Easy to use - three buttons control all functions
- CP-3137 calibrated at 650nm (567XL with 650nm calibration)

OPTICAL SPECIFICATIONS		
	CP-2976	CP-3137
Detector Type	3 x 3.5mm Silicon	3 x 3.5mm Silicon
Calibration Wavelengths	660nm, 780nm, and 850nm	650nm, 780nm, and 850nm
Power Range	+3dBm to -60dBm	+3dBm to -60dBm
Accuracy	±0.25dB	±0.25dB
Resolution	0.01dB	0.01dB
Power Requirements	Two AA 1.5V batteries (approx. 100 hours continuous operation)	
Connector Interface	SOC	

NB! The optical Power Meter displays 630nm on both Customised Products but is calibrated to the wavelengths above.

573XL 650nm LED Source for Large Core Plastic and Glass Fibre (Formerly 253B/POF)

FEATURES

- Stable calibrated output
- Easy to use
- Continuous wave and modulated output
- Long battery life - approx. 24 hours
- User selectable auto shut-off
- Rugged and splash-proof
- Economically priced
- Fixed ST and SOC Adaptor options are available
- 650nm wavelength

OPTICAL SPECIFICATIONS	
Centre Wavelength	650nm
Range (Typical)	630nm to 670nm
Max. Spectral Width (FWHM)	<40nm
Stability (1 hour)	±0.05dB
Typical Power Output (µm)	
200/230 SI Fibre	-15dBm ±0.5dB
Modulation Frequencies	270Hz, 1kHz and 2kHz
Power Requirements	Two AA 1.5V batteries (approx. 24 hours continuous operation)
Connector Interface	Fixed ST or SOC adaptor available

Ordering Information - XL fiberTOOLS™ Series

PART No.	CAT. No.	DESCRIPTION
52022371	84501	170XL 635nm Visual Fault Locator
52058728	00024	510XL SENSOLITE™ Light Sensor
52022353	84485	560XL InGaAs Optical Power Meter
52058723	00025	567XL Silicon Fibre Optical Power Meter
52058724	00026	568XL High Intensity Optical Power Meter
52022355	84486	570XL-FC 850/1300nm LED Source (FC)
52022356	84487	570XL-SC 850/1300nm LED Source (SC)
52022357	84488	570XL-ST 850/1300nm LED Source (ST)
52058784	00023	573XL 650nm LED Source with Fixed ST Connector
52061770	00598	573XL 650nm LED Source with SOC Adaptor Interface
52058727	00029	577XL-AS100, 850nm LED Source with 100/400µm Launch Condition
52058726	00027	577XL-M90, 850nm LED Source with 62.5/125µm Launch Condition
52061054	00753	578XL-M90, 1300nm LED Source with 62.5/125µm Launch Condition
52022358	84489	580XL-FC 1310/1550nm Laser Source (FC)
52022359	84490	580XL-SC 1310/1550nm Laser Source (SC)
52022360	84491	580XL-ST 1310/1550nm Laser Source (ST)
52022361	84492	5670-FC Multimode Test Set (FC)
52022362	84493	5670-SC Multimode Test Set (SC)
52022363	84494	5670-ST Multimode Test Set (ST)
52022365	84495	5680-FC Singlemode Test Set (FC)
52022366	84496	5680-SC Singlemode Test Set (SC)
52022367	84497	5680-ST Singlemode Test Set (ST)
52022368	84498	5890-FC Single/Multimode Test Set (FC)
52022369	84499	5890-SC Single/Multimode Test Set (SC)
52022370	84500	5890-ST Single/Multimode Test Set (ST)
52039994	21057	CP-2976 (567XL Calibrated at 660nm) Optical Power Meter
52039998	12290	CP-3137 (567XL Calibrated at 650nm) Optical Power Meter
52058804	00244	560XL-EMI InGaAs Optical Power Meter
52058806	00245	570XL-EMI 850nm/1300nm LED Source with AS100 Launch Condition
52058805	00246	580XL-EMI 1310/1550nm Laser Source

Snap On Connector (SOC) for XL Series Instruments

Snap On Connectors (SOC) are used on the XL Fibre Optic Power Meters and 573XL LED light source.

The Snap On Connectors configure the instruments for various optical connectors. Contact Greenlee Communications for other available adaptors.
See p32 & p33 for suitable connectors.

FC

T1020

ST

T1030

SC

T1062

Universal Connector Interface (UCI) for XL Series Instruments

Users will need to purchase a Universal Connector Interface (UCI) adaptor for use with specific light sources.

Please specify the desired connector adaptor type when ordering. Contact Greenlee Communications for other available adaptors.
See p32 & p33 for suitable connectors.

FC

APC-108

SC

ASC-108

ST

AST-108

Fibre Optic Instrument Adaptors – SOC and UCI

- Our SOC and UCI adaptors provide direct connectivity for Greenlee Communications fiberTOOLS® to a wide range of industry-standard fibre optic connectors
- Adaptor design ensures maximum accuracy and repeatability when performing critical measurements on fibre optic systems
- Easy to clean and use
- Single-mode and multimode compatible
- SOC adaptors are compatible with both PC and APC interfaces
- UCI adaptors feature durable phosphor bronze alignment sleeve

50606871 (90SOC) Adaptor Removal Tool

CONNECTOR TYPE	SOC ADAPTOR			UCI ADAPTOR		
DESCRIPTION		PART NO.	CAT. NO.		PART NO.	CAT. NO.
1.25 mm Quick-Connect Universal Adaptor (LC, MU, etc.)		50605881	T1026	Use hybrid cable		
2.5 mm SOC Quick-Connect Adaptor		50605874	T1025		50607038	AU-250
E-2000		50605997	T10E2		50606987	AE2-10
FC		50605768	T1020		50605720 52039961	APC-108 APC-108C
LC		50606000	T10LC	Use hybrid cable		
MIL-T-29504/4 & /5 Termini		50605898	T1038	Use hybrid cable		
MT-RJ		50606055	T13A2***	Use hybrid cable		
SC		50605751	T1062		50605744	ASC-108
SMA 905/906		50605966	T1087		50607021	ASM-90
ST		50605775	T1030		50605737	ATS-108
TOSLINK – Simplex		50606024	T10TB	Use hybrid cable		
TOSLINK – Duplex (Set of 2)		50606031	T10TD	Use hybrid cable		
Versatile Link – V/Z PIN		50606048	T10ZP	Use hybrid cable		
SMA 905/906		52037781	T1087-POF	N/A		
ST		52040191	T1030-POF	N/A		
FC Mating Adaptor (FC/PC and APC)		50107895	MPC-108	N/A		
SC Mating Adaptor (SC/PC)		50107879	MSC-S0	N/A		

Bare Fibre Adaptor

FEATURES

- Popular SC type connector with PC ferrule
- Easy to clean
- Smooth fibre feed
- Temporarily connect to fiber under test
- 900 micron buffer compatible

SPECIFICATIONS	
Ferrule diameter	2.5mm
Capillary diameter	Nominal -0 / +10um
Buffer diameter	250-900um
Fibre strip length	40mm

Fibre Optic Scribe

FEATURES

- Pen-type scribe with screw-in non-reversible carbide tip
- Wedge shaped tip
- Pocket-clip
- Stainless steel barrel

ORDERING INFORMATION		
PART No.	**CAT. No.**	**DESCRIPTION**
52050965	PA1922-1	Fibre Optic Carbide Scribe

SPECIFICATIONS
Weight 2oz. (57g)
Length 5.25” (197mm)

GVIS Adaptors - Ordering Information

ADAPTOR TIPS FOR GVIS PROBES		
52066359	GAC034B	E2000 Bulkhead Adaptor
52056257	GAC040B	SC Bulkhead Adaptor
52068858	GAC043B	FC/APC Bulkhead Adaptor
52056258	GAC041B	SC/APC Bulkhead Adaptor
52056259	GAC042B	FC Bulkhead Adaptor
52056261	GAC044B	LC Bulkhead Adaptor
52066360	GAC045B	LC/APC Bulkhead Adaptor
52056263	GAC046B	ST Bulkhead Adaptor
52056264	GAC047B	MTP Mating Adaptor
52056265	GAC048B	1.25mm Universal Connector
52056266	GAC049B	2.5mm Universal Connector
52060682	GAC100B	ODC Plug Tip
52060683	GAC101B	ODC Socket Tip
52060684	GAC104B	60º Angled
52060884	GAC107B	LC Bulkhead, 60º Angled
52060685	GAC109B	SC Bulkhead, 60º Angled
52064309	GAC175B	MTP/APC Bulkhead Adaptor
52064310	GAC176B	MTP/PC Bulkhead Adaptor
52075266	GAC115B	2.5mm APC Universal Connector
52075267	GAC116B	1.25mm APC Universal Connector
52075263	GAC052B	OptiTap SC/APC Adaptor

Universal GVIS

GVIS LC/PC

E2000 Bulkhead

GVIS MTP

FCPC Bulkhead

GVIS ST Adaptor

LCPC

SC APC

SCPC

Single-mode and Multimode Reference Cables

Greenlee Communications reference cables offer both single-mode and multimode applications and are manufactured to higher tolerances and higher standards than regular fibre optic cables. These reference cables offer high quality, repeatability connections between measurements where low Insertion loss and high Return Loss are required.

To ensure maximum accuracy, high quality reference cables manufactured by Greenlee Communications must conform to stringent insertion loss, return loss and endface specifications. Greenlee Communications reference cables are also accompanied by a Certificate of Compliance and a plot of the endface geometry. In addition, the reference cables are labelled with a unique serial number.

Greenlee Communications single fibre reference cables are available with single-mode SMF-28, 50/125µm, 62.5/125µm and 100/140µm multimode graded index fibre.

Greenlee Communications reference cables are designed and manufactured to ensure repeatability and high performance in measurements with all standard and custom modular and fiberTools products. All Greenlee Communications products are designed, manufactured and tested with single-mode and multimode reference cables.

Please see ordering information table to select your reference cable. Custom reference cables manufactured to customer specifications are also available. Contact Greenlee Communications for more information.

FEATURES

- Tighter tolerances for maximum measurement accuracy
- Low Insertion Loss
- High Return Loss
- Precision PC and APC (8° angle polished) endface profiles conform to TELCORDIA GR-326-CORE requirements
- Broad range of terminations available including FC, SC, ST, DIN, LC, MU and E2000

Ensures accurate measurements for repeatable and reproducible testing to the latest industry standards.

Meets and/or exceeds the latest industry standards including:

- TIA/EIA-455-171 (FOTP-171A), issued June 2001
- TIA-568B, TIA-562-7 (OFSTP-7) and TIA-526-14 (OFSTP-14) for optical link testing
- TIA-455-171 (FOTP-171, Attenuation) and TIA-455-8 (FOTP-8, Return Loss) for cable assembly testing
- Corresponding IEC measurement standards

SPECIFICATIONS

Insertion loss:	**SM**	**MM**
Reference end	≤ 0.15dB	≤ 0.25dB
Instrument end	≤ 0.25dB	≤ 0.25dB
Return loss:		
Reference End PC	≥ 55dB	≥ 40dB
Reference End APC	≥65dB	≥ 45dB
Instrument End	≥ 65dB	≥ 40dB

CONNECTOR ENDFACE PROFILE PER TELCORDIA GR326-CORE

Launch condition:	
50/125µm	Per TIA-568B.3
62.5/125µm	Per TIA-568B.3
100/140µm	Per SAE ARP5061 (draft)

REFERENCE CABLE SERIES

		56XX-YYY Matching Connectors Matching Connectors DIAMOND/Ceramic				57XX-YYY Fixed FC-PC Narrow Key Ceramic Connector			58XX-YYY Fixed FC-APC Narrow Key DIAMOND Connector			59XX Fixed FC-APC Narrow Key Ceramic Connector
		SMF-28	**50/125**	**62.5/126**	**100/140**	**SMF-28**	**50/125**	**62.5/125**	**50/125**	**100/140**	**62.5/125**	**SMF-28**
11	DIN-APC-Diamond	◈	◈	◈	◈	◈	◈	◈	◈	◈	◈	◈
1U	DIN-PC-Diamond	◈	◈	◈	◈	◈	◈	◈	◈	◈	◈	◈
26	FC-PC-W. Key Diamond	◈	◈	◈	◈	◈	◈	◈	◈	◈	◈	◈
28	FC-APC/W. Key Diamond	◈	◈	◈	◈	◈	◈	◈	◈	◈	◈	◈
2J	FC-APC/N Key Ceramic	◈	◈	◈	◈	◈	◈	◈	◈	◈	◈	◈
2K	FC-PC/W. Key Ceramic	◈	◈	◈	◈	◈	◈	◈	◈	◈	◈	◈
36	ST-PC Diamond	◈	◈	◈	◈	◈	◈	◈	◈	◈	◈	◈
3K	ST-PC Ceramic	◈	◈	◈	◈	◈	◈	◈	◈	◈	◈	◈
61	SC-APC Diamond	◈	◈	◈	◈	◈	◈	◈	◈	◈	◈	◈
66	SC-PC Diamond	◈	◈	◈	◈	◈	◈	◈	◈	◈	◈	◈
6J	SC-APC Ceramic	◈	◈	◈	◈	◈	◈	◈	◈	◈	◈	◈
6K	SC-PC Ceramic	◈	◈	◈	◈	◈	◈	◈	◈	◈	◈	◈
E2	E2000-PC Diamond	◈	◈	◈	◈	◈	◈	◈	◈	◈	◈	◈
E8	E2000-APC Diamond	◈	◈	◈	◈	◈	◈	◈	◈	◈	◈	◈
LC	Ceramic	◈	◈	◈	◈	◈	◈	◈	◈	◈	◈	◈
MU	Ceramic	◈	◈	◈	◈	◈	◈	◈	◈	◈	◈	◈

◈ Available configuration LC and MU available only with 1.6mm
◈ NOT Available Minicord (SMF-28, 50/125 and 62.5/125)
XX: Reference End Connector
YYY: Fibre Type

TIA-568B & FOTP-171A Certified Reference Cables

ORDERING INFORMATION		
PART NO.	**UPC NO.**	**DESCRIPTION**
SM standard reference cables Type A to Type B		
50606581	60658	562K-101 Reference cable, SM FC PC
50606611	60661	563K-101 Reference cable, SM ST PC
50606642	60664	566K-101 Reference cable, SM SC PC
50606673	60667	56E2-101 Reference cable, SM E2000PC
50606703	60670	56LC-LSM Reference cable, LC-PC X2 SM Minicord
50606765	60676	56MU-LSM Reference cable, MU-PC X2 SM Minicord
MM standard reference cables Type A to Type B (50/125µm)		
50606598	60659	562K-105 Reference cable, MM50 FCPC
50606628	60662	563K-105 Reference cable, MM50 STPC
50606659	60665	566K-105 Reference cable, MM50 SCPC
50606680	60668	56E2-105 Reference cable, MM50 E2000PC
50606710	60671	56LC-LM5 Reference cable, MM50 LCPC
MM standard reference cables Type A to Type B (62.5/125µm)		
50606604	60660	562K-106 Reference cable, MM62.5 FCPC
50606635	60663	563K-106 Reference cable, MM62.5 STPC
50606666	60666	566K-106 Reference cable, MM62.5 SCPC
50606697	60669	56E2-106 Reference cable, MM62.5 E2000PC
50606727	60672	56LC-LM6 Reference cable, MM62.5 LCPC
SM Hybrid Reference Cables (FC-PC to Type A)		
50606802	60680	572J-101 Reference cable, SM FCPC-FCAPC
50606819	60681	576J-101 Reference cable, SM FCPC-SCAPC
50606826	60682	57E8-101 Reference cable, SM FCPC-E2000APC
50607335	60733	57LC-LSM Reference cable, SM FCPC-LCPC
50607366	60736	57MU-LFM Reference cable, SM FCPC-MUPC
MM Hybrid Reference Cables (FC-PC to Type A - 50/125µm)		
50607342	60734	57LC-LM5 Reference cable, MM, 50 FCPC-LCPC
50607373	60737	57MU-LM5 Reference cable, MM, 50 FCPC-MUPC
MM Hybrid Reference Cables (FC-PC to Type A - 62.5/125µm)		
50607359	60735	57LC-LM6 Reference cable, MM, 62.5 FCPC-LCPC
50607380	60738	57MU-LM6 Reference cable, MM, 62.5 FCPC-MUPC

SPECIFICATIONS	
Ferrule OD	2.4990 ±0.0005mm
Fibre to Ferrule Eccentricity	<0.25µm (SM) and <3µm (MM)
Insertion Loss	<0.15dB (SM, 1310/1550nm) and <0.25dB (MM, 850/1300nm)
Return Loss	>55dB (SM, 1310/1550nm) and >40dB (MM, 850/1300nm)
Beam Exit Angle	<0.25° (SM) and <0.5° (MM)
Standard Length	3m

HOW TO ORDER A CABLE ASSEMBLY:

Use for specifying a patch cord, pigtail or a customer-supplied device.

Connector #1 — **Cable** — **Connector #2**

Order Length ≤ 5 meters, Final Length -0%/ +5%
Order Length ≥ 5 meters, Final Length -0%/ +10%
Minimum Order Length: 1 foot. For shorter lengths, please call the factory!

Enter order codes from price list: □□□□–□□□–□□**R**□□–□□

Connector #1

Connector #2
Additional options:
00 = no connector
02 = customer component pigtail

Cable Code

Length
If fractional lengths: "R" is substituted for decimal point

□ = Meters
F = feet, N = inches

Custom Optic Code
Optional

*fiber*TOOLS™ Hard Carry Case

FEATURES

Designed to hold Greenlee handheld instruments and a full range of test accessories.

900B and 901B Hard Carrying Cases

- Top tray holds up to 3 (900B) or 4 (901B) handheld instruments and a 180XL Visual Fault Finder
- Bottom compartment of both models stores additional instruments and test accessories
- Compact, waterproof and lockable
- Moulded from black structural foam resin

ORDERING INFORMATION

PART No.	CAT. No.	DESCRIPTION
50606840	900B	Carry Case Ruggedised 3 Unit
50606857	901B	Carry Case Ruggedised 4 Unit

SPECIFICATIONS

900B	901B
Weight: 1170g	Weight: 1170g
Dimensions: 275 x 250 x 125mm	Dimensions: 275 x 250 x 125mm

Hard Carry Case

FEATURES

Recommended Option for GVIS Video Inspection System.

Hard Carry Case

- Foam inlay for added instrument protection

ORDERING INFORMATION

PART No.	CAT. No.	DESCRIPTION
52063091	-	Hard Carry Case

SPECIFICATIONS

Weight: 1080g
Dimensions: 420 x 300 x 100mm

Deluxe Carrying Case

FEATURES

Designed to hold Greenlee Mini Fibre Tools (GMFT) and accessories.

Deluxe Carry Case

- Can hold up to 5 Instruments (Power Meters/Sources/VFL)
- For use with GMFT
- Pockets for accessory and cleaning material storage
- Compact and lightweight
- Shoulder strap

Carry Case only

ORDERING INFORMATION

PART No.	CAT. No.	DESCRIPTION
52057086	-	Deluxe Carry Case

SPECIFICATIONS

Weight: 430g
Dimensions: 195 x 280 x 75mm

*fiber*TOOLS™ Carrying Case

FEATURES

Designed to hold Greenlee handheld instruments and full range of test accessories.

914B and 915B Soft Carry Cases

- 2 or 3 instrument versions
- Zip-able pocket for accessory storage
- Compact and lightweight
- Shoulder strap

Carry Case only

ORDERING INFORMATION

PART No.	CAT. No.	DESCRIPTION
52039678	914B	2 Instrument Carry Case
52039680	915B	3 Instrument Carry Case

SPECIFICATIONS

914B	915B
Weight: 257g	Weight: 290g
Dimensions: 200 x 170 x 85mm	Dimensions: 210 x 195 x 120

Soft Carry Case

FEATURES

Designed to hold a variety of Greenlee OTDRs, Fibre Testers, Tools and accessories.

930C Soft Carry Case

- Suitable for multiple instrument storage
- Can hold up to 2 OTDRs and accessories
- Pockets for accessory and cleaning material storage
- Compact and lightweight
- Shoulder strap


Carry Case only

ORDERING INFORMATION

PART No.	CAT. No.	DESCRIPTION
52034541	930C	Soft Carry Case

SPECIFICATIONS

Weight: 500g
Dimensions: 380 x 185 x 180mm

Backpack Tool Kit

FEATURES

Evenly distribute the load whilst freeing up your arms & hands. hold a variety of Greenlee Testers, Tools and accessories.

Backpack Tool Kit

- Thick shoulder straps for maximum comfort whilst carrying many tools
- Suitable for multiple instrument /tool storage
- Pockets for accessory and cleaning material storage
- Lightweight
- Carry handle

ORDERING INFORMATION

PART No.	CAT. No.	DESCRIPTION
52081096	BP001	Backpack Tool Kit

SPECIFICATIONS

Weight: 1930g
Dimensions: 65 x 350 x 200mm

ProGrip 5-in-1 Fibre Optic Stripper

FEATURES

- Precision ground stripping cavities for:
  - 2.0 - 2.4mm outer jacket
  - 2.0 - 3.0mm loose tube
  - 2.8 - 3.0mm outer jacket
  - 900µm buffer insulation
  - 900/125µm and 250/125µm buffer/acrylate
- Factory calibrated
- Dual-durometer ProGrips for improved comfort and control

ORDERING INFORMATION

PART No.	CAT. No.	DESCRIPTION
52055935	PA1171	Pro-Grip Stripper, 5-in-1 Fibre Optic

SPECIFICATIONS

Weight: 140g
Dimensions: 173mm

ProGrip 3-in-1 Fibre Optic Stripper

FEATURES

- Precision ground stripping cavities for:
  - 2.0mm outer jacket
  - 900µm buffer insulation
  - 250/125µm buffer/acrylate
- Factory calibrated
- Dual-durometer ProGrips for improved comfort and control

ORDERING INFORMATION

PART No.	CAT. No.	DESCRIPTION
52055938	PA1177	Pro-Grip Stripper, 3-in-1 Fibre Optic

SPECIFICATIONS

Weight: 130g
Dimensions: 160mm

Midspan Slitter

FEATURES

- The Mid Span Slitter is an efficient and indispensable tool for fibre optic cable termination.
- The sharp blade is made of super-alloy, suitable for longitudinal stripping of outdoor optical loose tube cable.
- The stripping opens the tube on upper and lower sides for easy access of the fibre.
- The Mid Span Slitter comes with 4 groove diameters. Select the proper groove, put in the loose tube, press the blade into the tube coating, close and clamp the two half grooves, and move the blade along the tube to strip.

APPLICATIONS

- Used for fibre optic cable termination.

BENEFITS

- Small, light weight design for maximum portability
- Simple operation without any adjustments
- Provides easy access to fibre
- Super-alloy blade ensures precision and continued sharpness after multiple uses
- Four groove diameter options:
  (Ø 1.5~Ø 1.9mm) / (Ø 2.0~Ø 2.4mm) / (Ø 2.5~Ø 2.9mm) / (Ø 3.0~Ø 3.3mm)

ORDERING INFORMATION

PART No.	CAT. No.	DESCRIPTION
52076413	05712	Sheath Slitter

SPECIFICATIONS

Weight: 30g
Dimensions: 50 x 40 x 25mm

Economy Kevlar® Cutter

FEATURES

- Cut protective Kevlar® strands in fibre optic cable
- Hard-chromed serrated edges to easily cut through Kevlar®
- Comfortable handles with large finger openings

ORDERING INFORMATION

PART No.	CAT. No.	DESCRIPTION
52051283	PA1511	Kevlar® Cutter

Kevlar® is a registered trademark of E.I. Dupont, Inc.

SPECIFICATIONS

Weight: 60g
Length: 197mm

Economy Fibre Optic Stripper

FEATURES

- Pre-calibrated and factory set to ensure precision
- Rubber dipped handles
- Lock closure for safety and transport
- Strips 2.0 to 3.0mm fibre jacket, 900µm buffer and 125µm acrylate
- Spring loaded closure with distance stops

ORDERING INFORMATION

PART No.	CAT. No.	DESCRIPTION
52050605	PA1162	Stripper Fibre Optic 3-Level

SPECIFICATIONS

Weight: 86g
Length: 127mm

Pocket Cable Stripper

FEATURES

- Specifically designed for stripping power and telecommunications cables from 19mm to 40mm in diameter
- Strips solid conductor, stranded conductor and multiple conductor cables.
- Easy blade depth adjustment
- Blade rotates for circular, longitudinal and spiral cuts

ORDERING INFORMATION

PART No.	CAT. No.	DESCRIPTION
52040895	1903	Pocket Cable Stripper
50079158	07915	Cutting Blades (Pack of 2)

SPECIFICATIONS

Weight: 189g
Length: 167mm

Universal Slitter

FEATURES

- Strips and slits 4.5-25mm diameter Round Cables
- Precision stripping and slitting of rubber, PVC, nylon and most insulation materials
- Adjustable depth of cut
- Circumferential, longitudinal and spiral cuts
- Cable is supported during use
- Cable support arm edge is used to pry off thick insulation
- Laser-trimmed, stainless-steel blade for long use
- A perfect tool for mid-point taps
- Spare blade included

ORDERING INFORMATION

PART No.	CAT. No.	DESCRIPTION
52050604	PA1822	Cable Slitter 4.5-25mm Inch Clamshell
52050563	PA2109	Replacement Blade (Qty 2)

SPECIFICATIONS

Weight 7 oz. (200g)
Length 5.7” (145mm)

Round Cable Cutters

FEATURES

- To cut fibre outer cable jacket
- Cuts solid or stranded cable up to AWG 6
- Precise and effortless cuts
- Round cutting form minimises cable deformation
- Both are ideal for UTP and Coax, RG58, RG59 and RG6/6Q;
  Use PA1175 for RG7 and RG11

ORDERING INFORMATION

PART No.	CAT. No.	DESCRIPTION
52055936	PA1175	Pro-Grip Cutter, Contour Cable Cutter
52055940	PA1179	Pro-Grip Cutter, Dual Contour Cable Cutter

Pocket Probe Pick

FEATURES

Probe pick for pulling wire, slicing, stripping cable and cleaning debris off terminal panels. Small and lightweight. Pen-sized with clip for carrying in pocket.

- Spudger tip
- Wire hook
- Wire stripper and slitting tooth
- Non-conductive scraping tip

ORDERING INFORMATION

PART No.	CAT. No.	DESCRIPTION
52049188	PA1915	Pocket Probe Pick/Blister

SPECIFICATIONS

Weight 3oz. (86g)
Length 6.5” (166mm)

Ultimate Fibre Tool Kit

FEATURES

This Ultimate Kit contains all the slitters, strippers, and Kevlar® cutters you will need to start your fibre optic terminations. Also included is the premium 1600 Series Crimper with 3 interchangeable dies. The Ultimate Tool Bag has plenty of room for you to add your consumables.

ORDERING INFORMATION		
PART No.	**CAT. No.**	**DESCRIPTION**
52050427	PA4924	Ultimate Fibre Tool Kit

SPECIFICATIONS	
Dimensions	10.5“ W x 10.5” L x 9.5” D
	267mm W x 267mm L x 241mm D
Weight	2563g
Ultimate fibre tool Kit Includes	
PA1511	Kevlar® Cutter
PA1171	ProGrip 5-in-1 Fibre Optic Stripper
PA1162	Economy Fibre Optic Stripper
PA1161	Adjustable Jacket Stripper
PA1820	AM 25 Slitter
PA1821	AM 35 Slitter
PA1258	LC CST-mini Stripper
PA1600	1600 Series Crimp Frame
PA2044	STII Type Die Set
PA2664	SMA/SMB/FC/BICONIC Die Set
PA2668	SC & ST Die Set
PA1922-1	Fibre Optic Scribe
PA1920-1	SC/ST/FC Polishing Puck
PA1926-1	LC Polishing Puck
N/A	Plano® Tackle Box
PA4923	Ultimate Tool Bag

FiberReady Tool Kit

FEATURES

This kit contains an assortment of cable slitters, strippers and Kevlar® cutters to prep fibre optic cable along with our 1600 Series premium crimper with interchangeable dies.

ORDERING INFORMATION		
PART No.	**CAT. No.**	**DESCRIPTION**
52050428	PA906001	FiberReady Tool Kit

SPECIFICATIONS	
Dimensions	11.7 “W x 8.2” L x 3.3” D
	297mm W x 208mm L x 84mm D
Weight	1406g
FIBERREADY Tool Kit Includes	
PA1511	Kevlar® Cutter
PA1171	ProGrip 5-in-1 Fibre Optic Stripper
PA1822	Universal Cable Stripper
PA1600	1600 Series Crimp Frame
PA2044	STII Type Die Set
PA2664	SMA/SMB/FC/BICONIC Die Set
PA2668	SC & ST Die Set
N/A	Zippered Portfolio Case with Handles

Kevlar® is a registered trademark of E.I. Dupont, Inc.

Introduction

Greenlee Communications Ltd is pleased to continue our partnership with ITW Chemtronics® to provide cleaning products which compliment our test equipment and provide a complete solution for the installation and maintenance of fibre networks, covering requirements to Inspect, Clean & Test.

FOCCUS™ - Fibre Optic Combination Cleaning Universal Systems™ – Why is it important?

Over the last decade we have not only seen an increasing demand for speed of transmission but also a requirement for delivery of larger and larger amounts of data. Rapidly growing demand for high speed internet access, Home Entertainment, IPTV, HD and gaming is adding to the increasing bandwidth requirements of business transmissions and back-haul for mobile transmission. More and more, this is being supported by fibre as the fastest transmission media.

However, the fastest link is also the potential weakest link. Soiled connections or those that are not cleaned effectively can reduce transmission speeds.

Precision cleaning a fibre optic connection is the first step to network reliability and ultimately customer satisfaction.

If there is a weak link in a fibre optic network or installation it is likely to be the condition of the end-face of the fibre connector as the signal passes through it.

There are a wide range of potential contaminants or soils that can cause problems on a fibre end-face – not all contaminants are simply dust. These contaminants can extend to the vertical part of the ferrule and can migrate to the contact area where the fibre connectors mate.

What you need is a simple, repeatable cleaning method that removes all potential soils quickly and effectively.

This is provided by the Combination Cleaning Process™, which uses a small amount of precision solvent and automatically dries the end face as an integral part of the cleaning operation. The high-reliability, first time cleaning of the Combination Cleaning Process™ provides a safety net for the installer.

The Significance of Solvent Selection:

- The best selection is one that cleans the widest range of soils – not just dust
- The best performing cleaning solvents are precision hydrocarbons such as Electro-Wash™ “PX” or “MX”. A solvent based on HFE7100 and IPA is not as effective
- Even 99.9% proof IPA does not remove all soils – it is chemically disadvantaged
- The future of global precision cleaning may be an Aqueous Cleaner such as Fiber-Wash™ (which is patented)

Cleaning Kits

CFK1013E I&M Cleaning Kit

ORDERING INFORMATION

PART No.	CAT. No.	DESCRIPTION
52061805	CFK1013E	I&M Cleaning Kit

CONTAINS

- QbE®-2
- FW2150
- 48042F
- CP421
- 6704F
- ITW Bag
- 1 pocket QbE® Connector Cleaning platform with Flat Platen
- 2 MX Pens
- 2 Tubes, 2.5 mm Reticulated Foam Precision Swab (50 x 6 cm)
- 5 Packets General purpose wet wipe
- 1 Packet, 100 Lint Free Dry wipe
- 1 Clutch bag

CFK1202E FTTx Cleaning Kit

ORDERING INFORMATION

PART No.	CAT. No.	DESCRIPTION
52063013	CFK1202E	FTTx Cleaning Kit

CFK1202 – For FTTx applications – Includes swabs, wipes and cleaning solvents for ALL end face cleaning needs. The pQbE® platform cleans SC/LC (UPC and APC), MTP® type, Corning® OptiFit® and E2000 Geometry connectors.

CONTAINS

- pQbE®
- FW2150
- 48042F
- 25125F
- CP421
- 6704F
- ITW Bag
- C1 pocket QbE® Connector Cleaning platform with Recessed Platen
- 2 MX Pens
- 2 Tubes, 2.5 mm Reticulated Foam Precision Swab (50 x 6 cm)
- 1 Tube, 1.25 mm Fibre Optic Swab (15 x 15 cm)
- 5 Packets General purpose wet wipe
- 1 Packet, 100 Lint Free Dry wipe
- 1 Clutch bag

ACCESSORIES

PART No.	CAT. No.	DESCRIPTION
CLEANING PLATFORM		
52061801	QbE®	800 wipe, Large Box Cleaning Platform
52063014	QbE®-QS	200 Wipe, Pocket Platform w/integrated cleaning solvent, Flat Platen
52061802	PQbE®	200 Wipe, Pocket Platform for recessed fibre optic connectors
52066140	QbE®-2	200 Wipe, Pocket Platform, Flat Platen
SWABS		
52066139	25123X	1.25 mm Fibre Optic Swab (100 x 15 cm)
52060965	25125F	1.25 mm Fibre Optic Swab (15 x 15 cm)
52060964	48042F	2.5 mm Reticulated Foam Precision Swab (50 x 6 cm)
52066138	25183	2.5 mm Fibre Optic Swab (100 x 15 cm)
WIPES		
52063015	6704F	Lint Free dry Wipes (100)
52063016	CP410	Lens grade Pre-saturated wipe (BOX OF 50) OPTIC PREP™
52066141	FSA75	75 Impregnated Lint Free Wipes
PENS/SOLVENTS		
52061803	FW-2150	ElectroWash® MX Precision Cleaning Pen
52061804	FW-2190	Aqueous Fibre Optic Cleaning Pen

Dry or Wet Connector Cleaning Platforms - Portable and efficient, complete removal of microscopic contaminents

QbE® Cleaning Platform - 800 wipe large box cleaning platform

ORDERING INFORMATION		
PART No.	**CAT. No.**	**DESCRIPTION**
52061801	QbE	Cleaning Platform

QbE® - The original device for the Combination Cleaning Process™. To be used with the Electro-Wash® MX Pen or Fiber-Wash™ Pen, the QbE® has the largest cleaning surface of any fibre optic cleaning platform. 200 wipes can clean up to 800 end faces using the Combination Cleaning Process™.

pQbE® Cleaning Platform - 200 wipe pocket style cleaning platform

ORDERING INFORMATION		
PART No.	**CAT. No.**	**DESCRIPTION**
52061802	pQbE	Cleaning Platform

pQbE® - Combination Cleaning Process™ - use with Electro-Wash® MX Pen or Fiber-Wash™ Pen. The see through package shows the remaining wipes, whilst the water-proof packaging is weather resistant, is pocket sized and includes a convenient clip to attach a tool belt.

For FTTX applications, the pQbE® unique platen enables cleaning of the vertical as well as the end-face of the ferrule and will clean SC/LC (UPC and APC), MT-type, Optifit® and E-2000 end-faces.

Raised, ridged FiberSafe™ cleaning platen, conforms to recessed connectors end face. Contains 200 wipes.

QbE®-2 Cleaning Platform - 200 wipe pocket platform with Flat Platen

ORDERING INFORMATION		
PART No.	**CAT. No.**	**DESCRIPTION**
52066140	QbE-2	200 Wipe Cleaning Platform

QbE®-2 - Combination Cleaning Process™ - use with Electro-Wash® MX Pen or Fiber-Wash™ Pen. The see through package shows the remaining wipes, whilst the water-proof packaging is weather resistant, is pocket sized and includes a convenient clip to attach a tool belt. Contains 200 wipes.

Cleaning Pens

Electro-Wash® MX Precision Cleaning Pen

ORDERING INFORMATION

PART No.	CAT. No.	DESCRIPTION
52061803	FW2150	Electro-Wash® MX Precision Cleaning Pen

A high-performance precision hydrocarbon, which outperforms most HFE-7100 solvents cleaning the widest range of contaminants, with approximately 300 applications (<1ml) per pen.

Fiber-Wash™ Aqueous Fibre Optic Cleaning Pen

ORDERING INFORMATION

PART No.	CAT. No.	DESCRIPTION
52061804	FW2190	Aqueous Fibre Optic Cleaning Pen

Works as well as the precision hydrocarbon MX Pen on a wide range of contaminants, with approximately 300 applications (<1ml) per pen.

Cleaning Wipes

FSA Splice Wipes (Aqueous) - Impregnated lint free wipes

ORDERING INFORMATION

PART No.	CAT. No.	DESCRIPTION
52066141	FSA Splice Wipes	75 Impregnated lint free wipes

Aqueous impregnated wipe eliminating the need for Isopropol Alcohol (IPA).
A useful tool in the preparation of fibre prior to splicing.

Cleaning Swabs

25125F

1.25mm swabs, 15cm in length

48042F

2.5mm foam swabs

ORDERING INFORMATION

PART No.	CAT. No.	DESCRIPTION
52060964	48042F	2.5mm Reticulated Foam Precision Swab (Tube of 50) 6.8cm in length
52060965	25125F	1.25mm Swabs (Tube of 15) 15cm in length
52066138	25183	2.5mm Fibre Optic Swab (100) 15cm in length
52066139	25123X	1.25mm Fibre Optic Swab (100) 15cm in length

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948 Connector Cleaning System (Dry Method)

FEATURES

- Special lint-free fabric-on-a-reel quickly cleans ferrule endfaces of dust, oil and other contaminants
- Cleaning system is completely self-contained
- Dry Cleaning Method
- A single cleaning reel can be used for over 400 ferrule cleanings
- ReelCleaner™ can be used on all connector types including MTP and MT-RJ

ORDERING INFORMATION

PART No.	CAT. No.	DESCRIPTION
50606925	60692	948 Reel Cleaner Connector Cleaning System
50107925	10792	948/2 Replacement Reel Set 2 Pack

6704F Lint Free Wipes

FEATURES

- Special lint-free fabric cleans ferrule endfaces of dust, oil and other contaminants
- Dry Cleaning Method

ORDERING INFORMATION

PART No.	CAT. No.	DESCRIPTION
52063015	6704F	Lint Free Wipes (Pk 100)

Common Adaptor Types

FC/PC	SC/PC	ST/PC	LC/PC
			
E2000	**SMA**	**MU**	**MTRJ**
			

Maintenance of 910FS, 915FS, 915CL and 920CL

- Turn off splicer.
- Use Greenlee approved Foam swabs.
- Do not touch the electrodes.
- Never use compressed air.
- Use the cleaning brush only to clean debris from general working area, never on the lenses, V-grooves or mirrors.

V-grooves (Recommended Daily). See Figure 1.

Clean the bottom of the V-groove using the Electro-Wash® MX Precision Cleaning Pen and V-Groove Cleaning Swabs.

Fibre Clamps (Recommended Daily)

If contaminants are present on the clamps, proper clamping may not occur resulting in poor quality splices. The fibre clamps should be frequently inspected and periodically cleaned during normal operation. To clean the fibre clamps do the following:

- Clean the surface of the clamps with Electro-Wash® MX pre-saturated universal cleaning wipes (CP421).

Wind Protector Mirrors (Recommended Daily). See Figure 2.

If the wind protector mirrors become dirty, the fibre core position may be incorrect due to decreased optical path clarity, resulting in higher splice loss. To clean the mirror's, do the following:

i. Clean the mirror surface with Fusion Splice Mirror Cleaning Swab (EFB-12). The swab may be moistened with MX solvent, precision hydrocarbon.

ii. Mirror should look clean with no streaks or smudges.

Objective Lenses (Recommended Weekly). See Figure 3.

If the objective lens' surface becomes dirty, normal observation of the core position may be incorrect, resulting in higher splice loss or poor splicer operation. Therefore, clean both of them at regular intervals. Otherwise, dirt may accumulate and become impossible to remove.

To clean the objective lenses do the following:

i. Before cleaning the objective lenses, always turn off the splicer.

ii. Gently clean the lenses' (X-axis and Y-axis) surface with a dry Fusion Splice Mirror Cleaning Swab (EFB-12). Using the swab, start at the centre of the lens and move the swab in a circular motion until you spiral out to the edge of the lens surface.

iii. The lens surface should be clean and free of streaks or smudges.

iv. Turn on the power and make sure no smudges or streaks are visible on the monitor screen. Press X/Y key to change the screen and check the state of the lens surface on both the X- and Y-screens.

NOTE:

Do not touch the electrodes when cleaning.

It is recommended to clean the objective lenses when replacing the electrodes.

General Fusion Splicer Cleaning (Recommended Daily)

Use the cleaning brush only to clean debris from general working area, never on the lenses, V-grooves or mirrors.

Periodically clean the fibre adaptors with Electro Wash pre-saturated wipe (CP421).

Never touch the fibre clamping area of the fibre adaptors.

Cleaning Fibre Cleaver (Recommended Daily)

If the circular blade or clamp pads of the fibre cleaver become contaminated, the cleaving quality could degrade. This may lead to fibre surface or end-face contamination, resulting in higher splice loss. Clean the circular cleaving blade and clamp pads with a 2.5mm Foam swab. The Foam Swab may be moistened with MX Solvent, precision hydrocarbon.

Figure 1

Clean V-Groove daily

Figure 2

Mirror cleaning in lid

Figure 3

Objective lens

Optical Power Meter Calibration Glossary

Absolute Power Standards:

The reference photodetectors maintained by the National Institute of Standards and Technology (N.I.S.T.) in Boulder, Colorado. These reference photodetectors are used to transfer optical power calibration to two sets of Secondary Standards maintained by Greenlee Communications Ltd.

Active Set of Secondary Standards/Active Secondary Standard:

The most recently calibrated set of Secondary Standards, which are used to calibrate Working Standards used on the production floor. An Active Secondary Standard is one of the photodetectors in the Active Set of Secondary Standards.

Adaptor:

A mechanical device enabling the coupling and uncoupling of a connector. A bulkhead adaptor is used to couple two terminated cable ends. An interface adaptor is used to connect a cable to a light source, photodetector, or other device.

Aging of standards:

A gradual deviation from specifications due to wear and the deterioration of associated electronic components.

ANSI Certificate of Calibration:

A Certificate of Calibration (see below) that includes additional information specified by American National Standards Institute document ANSI/NCSL Z540. In addition to manufacturer, performance, and traceability information, an ANSI Certificate of Calibration must include the name and address of the customer and a detailed description of the methods and Working Standards used to perform the calibration. The calibration status of the Working Standards used must also be documented. Furthermore, an ANSI Certificate of Calibration must include a statement that the certificate or report may not be reproduced, except in full, without written permission from the calibration laboratory.

Backup Set of Secondary Standards/Backup Secondary Standard:

The set of Secondary Standards with calibration older than one year, but not exceeding two years. The calibration points of the Backup Set of Secondary Standards are compared to the Active Set at monthly intervals to verify the accuracy of the latter. A Backup Secondary Standard is one of the photodetectors in the Backup Set of Secondary Standards.

Calibration conditions:

The specific conditions under which a calibration factor is associated with a calibration wavelength. The calibration conditions typically include the centre wavelength and acceptable spectral deviation of the laser source in use; the output power of the laser source; the reference cable type and length; the type of connectors used to terminate the reference cable, including the manufacturer; the interface adaptor used; and the ambient temperature and humidity conditions.

Calibration factor:

A number used to correlate the response of a photodetector in a manufactured instrument with the photodetector response of a Secondary Standard or Working Standard. In instruments manufactured by Greenlee calibration factors are stored in non-volatile memory, and defined for each calibration wavelength.

Calibration wavelength:

A specifically defined wavelength used during the point calibration of a manufactured instrument. The absolute accuracy of measurements performed at other than the calibration wavelength may vary, depending on the response linearity of the photodetector incorporated in the instrument at that wavelength. Calibration wavelengths are listed below:

Centre Wavelength (nm)	Fibre Type Used	Photodetector
635	Single-mode	Si
660	Single-mode	Si
780	Single-mode	Si
850	Graded-index multimode	Si
980	Single-mode	InGaAs
1310	Single-mode	InGaAs
1550	Single-mode	InGaAs

Certificate of Calibration:

A document certifying that a manufactured instrument has been calibrated or re-calibrated to conform to published specifications, and that the calibration is traceable to an established standards bureau, i.e., the N.I.S.T. A Certificate of Calibration includes the following: the name and address of the manufacturer; the model number and description of the instrument; the instrument serial number; the condition in which the instrument was received and returned, i.e., within tolerance, out of tolerance, or non-operational; the calibration date, interval, and due date for re-calibration; the conditions under which the instrument was calibrated; the procedures used to perform the calibration; the identity of the calibration technician; and a signature of an authorized representative of the manufacturer.

Connector:

A mechanical device that allows an optical fibre or cable to be repeatedly coupled or uncoupled from an interface or another cable. An optical fibre fitted with connectors is said to be connectorised or terminated.

Connector repeatability:

The ability of a connector to be mated and unmated repeatedly without affecting its attenuation, return loss and other performance specifications. A lack of repeatability is usually attributable to the inability of a connector to maintain accurate and consistent alignment of the cores of the optical fibres.

Fibre optic cable:

An optical fibre, multiple fibres, or fibre bundles, which may include a jacket and strength members (kevlar, steel, or other materials), fabricated to meet optical, mechanical, and environmental specifications.

Linearity:

The ability of a photodetector to generate electrical current in amounts proportional to the incident wavelength and intensity of light.

Photodetector:

A semiconductor device that converts light energy into an electrical current. The conversion of light energy into electrical current is, in principle, proportional and linear with the incident power, which is expressed in Watts. The conversion ratio of a photodetector is dependent on the wavelength of the light received, therefore, this wavelength must be precisely defined for a point calibration (see below) to be valid.

Point calibration:

The correlation of electrical current produced by a photodetector, quantified in Amps, with an incident power of light energy, expressed in Watts, at a single defined wavelength. This photodetector response is expressed in Amps-per-Watt (A/W).

Secondary Standards:

The reference photodetectors maintained by Greenlee Secondary Standards are calibrated at regular intervals by the N.I.S.T. using the Absolute Power Standards maintained by the Institute. Greenlee maintains two sets of Secondary Standards, each set containing one reference photodetector of Si and InGaAs composition.

Each set of Secondary Standards alternates as Active and Backup at one-year intervals.

Spectral deviation:

The difference between the actual output wavelength of a light source and its specified wavelength. Spectral deviation is usually attributable to manufacturing tolerances.

Uncertainty:

The margin of error for a calibration or measurement attributable to external causes, such as connector repeatability, ambient temperature, back-reflections, or spectral deviation from a defined calibration wavelength. Uncertainty will cause slight variations in optical power measurements unless the conditions and equipment used are identical to those employed during the calibration of the instrument. Uncertainty is typically expressed in percent (%).

Working Standards:

A set of reference optical power meters incorporating photodetectors of Si or InGaAs composition that are calibrated using an Active Secondary Standard. These reference optical power meters are used to perform a point calibration of manufactured instruments at specified wavelengths.

Return Loss Measurement Methods

What is Return Loss?

A return loss measurement characterises the strength of a reflection produced by variations in the refractive index along a fibre optic link, known as a back-reflection or Fresnel reflection. Quantified in decibel (dB) units, return loss is the logarithmic expression of the ratio of the reflected power over the incident power, that is, the intensity of light reflected back to the return loss meter over the intensity of the light injected into the fibre, expressed as a positive number.

If not controlled, back-reflections can degrade the performance of a fibre optic system by interfering with the operation of the laser transmitter, or by generating noise at the receiver.

A common source of back-reflections is the junction where two fibre optic connectors are mated. Because of this, a connector with high return loss, which sends very weak reflections back to the transmitter, is superior to a connector with low return loss that sends back strong reflections. When measuring connectors, extremely low return loss values usually indicate a defect, such as core misalignment, poor fibre end-face contact, scratches, breaks, or end-face contamination.

RETURN LOSS MEASUREMENT METHODS

Optical Continuous Wave Reflectometry (OCWR) Method

The Optical Continuous Wave Reflectometry (OCWR) method for measuring return loss uses a continuous wavelength of light energy, which is passed through an interface, connector, or device under test. The returned power is then measured and the return loss is calculated. Using only a calibrated light source, coupler and an optical power meter, return loss measurements using the OCWR method can be accomplished with accuracy. OCWR test procedures are described in detail in FOTP-107.

Optical Time Domain Reflectometer (OTDR) Method

An Optical Time Domain Reflectometer (OTDR) launches a train of light pulses into the device under test and collects backscatter information as well as superimposed Fresnel reflections. The OTDR is optimised to accurately measure loss-per-distance based on the received backscatter level. An OTDR also gives an estimation of the strength of a reflection at a given distance based on its peak height.

Optical Reflection Discrimination (ORD) Method

Optical Reflection Discrimination (ORD) instruments, are based on the OTDR method. Much like the OTDR, the ORD instrument launches a train of light pulses. The reflected pulses are guided through a coupler to the optical receiver, amplified, and then sampled.

A time discrimination process allows the instrument to isolate and quantify individual reflections.

Since the optical receiver is highly linear, the amplitude of the reflections is directly proportional to the reflectivity, and, thus, the return loss. Whereas the conventional OTDR is optimized to measure backscatter signals, the ORD instrument is optimized to measure reflections.

ORD, OTDR, and Background Reflections

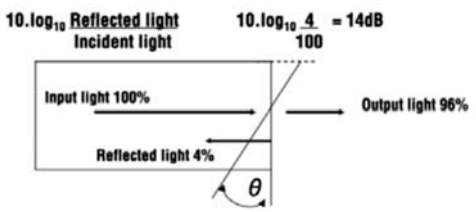
Both the ORD instrument and the OTDR discriminate reflections against elapsed time. Neither instrument registers background reflections. This lack of sensitivity to background reflections is an advantage when conducting multichannel measurements. Optical components in the measuring path, such as couplers and switches, do not influence the measurement.

Return loss defined

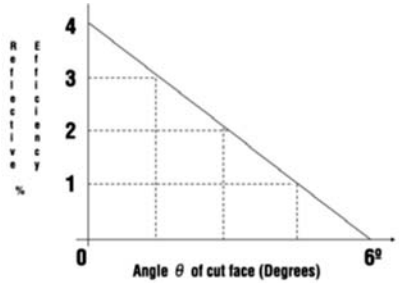
Reflections—or more specifically Fresnel reflections—occur at the boundary between two media with different refractive indices. The percentage of the light reflected can be calculated if the refractive indices of both media are known.

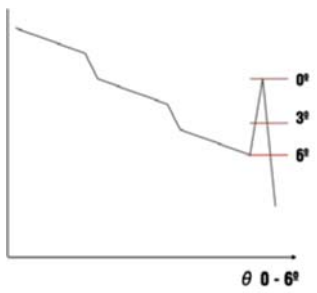
The most commonly known percentage of reflected power, the 4% reflection, is caused by a glass-to-air boundary. Reflectance in general is the ratio of reflected power to incident power. When knowledge of a reflection at a discrete point is important, the term reflectance is preferred. Reflectance is expressed in negative decibels (dB).

Optical return loss (ORL), often referred to as return loss, describes the ratio of reflected power over the incident power of a system as a whole. Similar in concept to reflectance, return loss is also expressed in decibels.



Most commonly used reference





As the angle of end face increases reflection decreases

Insertion Loss Measurement

What is Insertion Loss?

An insertion loss (IL) measurement characterizes the light loss through a component or connection.

There are two accepted methods for measuring insertion loss, both of which may be found in reference document FOTP-171, published by the Electronic Industry Association (EIA).

Insertion loss measurements require a light source, an optical power meter, and a patch cable manufactured to precise tolerances, known as a reference cable.

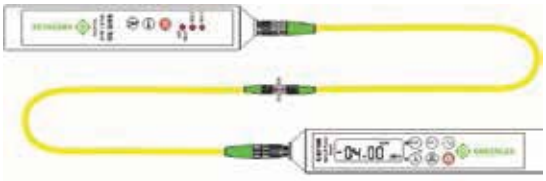
In general, an insertion loss measurement is a two step process:

1) Establish a baseline power level measurement for the light source and reference cable in use. This is referred to as “referencing” or “calibration.”
2) Connect the device under test and measure the difference between the measured power and the Reference power.

Insertion Loss Measurements

To measure the insertion loss of a connector/cable, do the following:

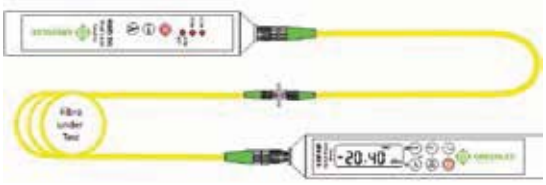
STEP 1: Connect an appropriate Greenlee LED or laser source to the optical power meter using a suitable reference cable. The reference cable should be 2 to 3 meters in length. See the illustration.



STEP 2: Make sure the source is in continuous wave (CW) output mode. Set the optical power meter to the output wavelength of the source using the [λ] key and to dBm units using the **[dBm]** key. Note that the dBm output from the reference cable should be within acceptable limits.

STEP 3: Store the reference power level by pressing the **[Rel]** key for a few seconds. The main numerical display should read 00.00 dB.

STEP 4: Disconnect the reference cable from the optical power meter and insert the cable to be tested using an appropriate bulkhead adaptor.



About dB, dBm, and Watts

Fibre optic measurements are performed using decibel (dB) units.

The decibel is a logarithmic, relative, dimensionless unit it gives no indication of the absolute power level.

Loss is always indicated using a minus (-) sign, and a gain is indicated by a plus (+) sign.

Because dB units are relative and dimensionless, a correlation with an absolute unit of measure must be established to be useful. To indicate absolute power, logarithmic decibel units are referenced to linear Watt units: 0dBm = 1 milliwatt (mW).

To convert Watt units to dBm, the following formula is used: $$P = 10 \log \left(\frac{Px}{1mW} \right) dBm$$

The table below illustrates the relationship between absolute logarithmic dBm units and absolute linear Watt units:

Absolute logarithmic dBm [P] Absolute linear Watts [Px]

+10dBm	10mW
+3dBm	2mW
0dBm	1mW
-3dBm	0.5mW
-10dBm	100µW
-20dBm	10µW
-30dBm	1µW

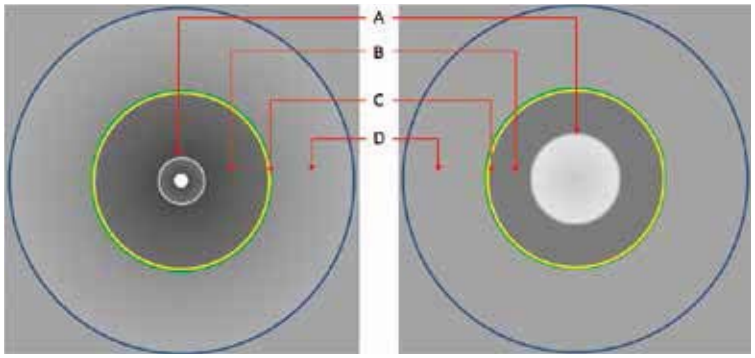
-40dBm	100nW
-50dBm	10nW
-60dBm	1nW
-70dBm	100pW
-80dBm	10pW
-90dBm	1pW

Video Inspection

Mating Connectors

The advantages of transmitting information in the form of light is not without its drawbacks. Low attenuation optical fibre is usually terminated at the exchange & customer using mechanical connections. These connectors can be the weak link in the whole transmission system. The cleanliness of these connectors has a direct impact on 2 very important parameters affecting transmission: Insertion Loss & Return Loss.

Insertion loss/attenuation limits over fibre links are being reduced to increase bandwidth from 10G to 40G to 100Gbps to 600Gbps. To keep the light propagating through the system it is essential to ensure the connector end face is kept clean. Not only is it important for the Core & Cladding zone, where the transmission signal propagates, but to mate correctly the whole contact area must be examined & kept clean. Contamination migration must also be eliminated.



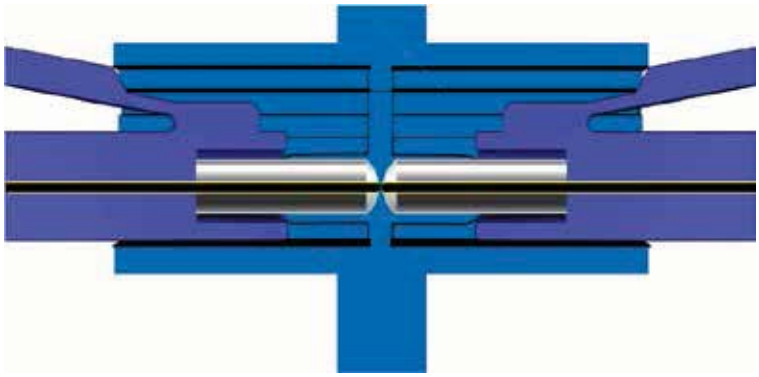
Areas of interest on Singlemode & Multimode connector end faces

Zone	Diameter (Single Mode Fibre)	Diameter (Multi Mode Fibre)
A (Critical)	0 to 25µm	0 to 65µm
B (Cladding)	25 to 120µm	25 to 120µm
C (Adhesive)	120 to 130µm	120 to 130µm
D (Contact)	130 to 250µm	130 to 250µm

IEC acceptance standards

Pre-terminated fibre patch cords enable “plug & play” operability. Failures are found to be due to contaminated end-face. If for any reason Insertion Loss testing is being skipped connector inspection becomes even more important.

IEC-61300-3-35 Each connector should be inspected before they are mated.



Bulkhead connection through coupler

Typical Insertion Loss and Return Loss values for un-mated connectors

Flat Face Connector		UPC Connector	
	I. Loss 0.4 to 0.7dB R. Loss <-14.4dB		I. Loss 0.2 to 0.5dB R. Loss >50dB
Flat face not widely used because of the popularity of PC faced connectors.		Because of its more pronounced face radius the return loss is better than the standard PC face.	
PC Connector		**APC Connector**	
	I. Loss 0.2 to 0.5dB R. Loss >40dB		I. Loss 0.3 to 0.6dB R. Loss >60dB
Because of its slightly radiused face the PC ferrule makes a better face to face contact than the flat faced ferrule. Most of the reflected light is bounced off into the cladding but some is returned to the source.		The angled face ferrule gives a slightly poorer insertion loss measurement but a very much better return loss value.	

IEC 61300-3-35 Overview

IEC 61300-3-35 is a standards document issued by the International Electro-technical Commission. It outlines acceptable methods for performing inspection on a fibre endface and for determining if the endface is suitable for use in an optical system. This document will serve as an overview of inspection scope specifications which must be met according to the IEC 61300-3-35 standard.

Field of View and Magnification

The most common misconception about the IEC document is that it outlines magnification levels which must be provided by the inspection scope. The terms “200X” and “400X” have been used by inspection equipment manufacturers for years, with the numbers being attributed to the IEC document. In fact, the IEC document makes no mention of either 200X or 400X magnification. Further complicating matters (beyond the initial misconception regarding the importance of magnification in general) is the idea that 400X is better than 200X when discussing inspection scopes.

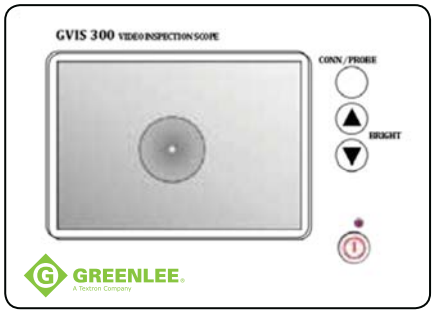
Rather than magnification, the IEC document instead outlines how much of the fibre endface must be viewable when using the camera microscope. The area on the endface which is viewable when using a microscope is called the “Field of View” (FOV) of that microscope.

Microscope systems...shall be calibrated for use in either low or high resolution applications... sec. 4.4.1.
From IEC 61300-3-35 Ed. 1.0. (Page 7)

Low resolution microscope systems shall have...a field of view of at least 250 um… sec. 4.4.2.

High resolution microscope systems shall have...a field of view of at least 120 um… sec. 4.4.3.

GVIS400 FoV: 860µm x 640µm



GVIS300 FoV: 630µm x 440µm

Why FOV?

Meeting minimum FOV requirements ensures that the proper zones on the fibre endface are shown. The IEC document outlines four zones on the fibre endface. In order for a fibre connector endface to pass any kind of inspection (automated or manual), each zone must be free of debris and defects which exceed certain sizes and/or quantities for that zone. The diameter of each zone is listed in the table below. All of these circular zones are centered directly in the middle of the fibre core.

Why Not Magnification?

Magnification is a term which expresses how much larger an image appears to the eye. A one-micron area can be blown up ten-thousand times and will thus be “10,000X” magnified, but the area shown will still only be one micron in diameter. In the example below, a 250 micron image (minimum acceptable FOV for low-resolution systems) is shown “magnified” on two separate screens.

250µm on 100mm
Screen: 400 x Mag

250µm on 1 metre screen at 4000 x Magnification

As shown above, the same area has different magnification levels depending on how it is displayed. This example proves that magnification level is arbitrary and thus is immaterial. The viewable area, however, is firmly set regardless of screen size and thus provides a workable, scalable standard (as the IEC document intends).

Over magnification can lead to excessive cleaning, remember: INSPECT → CLEAN (IF NECESSARY) → CONNECT

Benefits of Large FOV

It is highly recommended that technicians use inspection scopes with a larger field of view than the minimum required by the IEC. There are two main reasons why this is important:

1. Cleaning procedures should take the entire ferrule into consideration.
2. Damage to ferrules and connectors may affect functionality, even when outside the IEC zones.

Greenlee Communications POF Product Line

Greenlee Communications offers a comprehensive range of high performance, cost-effective instruments optimised for POF links and networks. Our solutions for POF measuring tests include:

Product Description

Greenlee Communications offers specific test solutions for Plastic Optical Fibre (POF) and Large Core 200/230 and 400/430 Plastic Clad Silica (PCS) fibre applications. The development of low-cost POF connectors, components and systems has opened up new application potentials for plastic fibre that were previously not cost effective. POF and PCS fibres have become popular choices for low-cost, point-to-point links in noisy EMI/RFI instruments and factory environments. These fibres have also become increasingly common in fibre-to-desk applications, and in and around the home.

One very popular link solution is the Versalink component product line from Hewlett Packard. Toshiba, AMP, NEC, and Sharp also manufacture a complete range of fibre optic solutions, based on Japanese Industrial Standard (JIS) F05/ FO6/FO7 and Digital Audio Standard EIAJ RC-5720.

Background

The original Hewlett Packard Versalink Link and Toshiba Toslink product lines offer one of the most cost-effective component solutions for designing interference- free, noise-free and secure fibre optic communications into even the most cost sensitive applications. Using POF and operating at 650nm, these systems are eye safe, simple to design, and easy to install.

Plastic optical fibre has been in constant evolution over the last ten years. POF has been recently adopted as an approved media by the ATM Forum for short haul applications up to 100 meters.

Traditionally, step-index POF has been applied to datacommunication links of up to 155 Mbps. When commercially released within the next few years, graded index POF will allow bandwidths exceeding 1 Gbps.

Optical Power Meters

567XL Handheld Optical Power Meter (567XL-52058723)

- Large area silicon detector for use with fibres up to 1mm diameter
- Ideal for optical power measurements in the field
- More than100 hours of continuous operation using two AA-size alkaline batteries

Stabilised 650nm LED Sources (573XL-52061770)

573XL Handheld 650nm LED source

- For measuring end-to-end loss of POF and large core PCS fibre links
- Visual Fault Finder for locating breaks and identifying fibres in large bundles

SOC Interface adaptors

10ZP SOC (Snap-On Connector) adaptor (50606048)

- For interface to Hewlett Packard Versalink-compatible Simplex and Duplex connectors (including Spectran Type V & Z pins)

10TB SOC adaptor (50606024)

- For interface to Simplex F05 and Spectran J Pin connectors
- Compatible with Digital Audio Standard EIAJ RC-5720 and Japan Industry Standard (JIS) F05

10TD SOC adaptor (50606031)

- For interface to Duplex FO7 and Spectran J Pin connectors
- Compatible with JIS-C-5976

10TD is supplied as a set of 2 adaptors (10TR and 10TX) for both possible coupling orientations.

10ZP

10TB

10TX

10TR

Versatile Link connector

Toslink simplex connector

Toslink duplex connector

An Overview of the LED and Laser Classification System in EN 60825-1 and IEC 60825-1

In 2001 the standard governing the safety of laser products in Europe (EN) and Internationally (IEC), was substantially revised and the Classification system was overhauled. This resulted in the introduction of three new laser classes (1M, 2M and 3R) and the abolition of Class 3A. Below is a brief description of each of the current laser classes.

The 60825-1 standards apply equally to lasers and LEDs. In most places we have used the word “laser”, but it can be replaced by “LED”. Generally speaking LEDs would be in the lower Classes (1, 1M, 2, 2M, 3R), but very exceptionally may be Class 3B. At the time of writing we are not aware of any Class 4 LEDs*.

The phrase “eye-safe” is used below. Please note that “eye-safe” is applicable to the whole optical spectrum from 180nm to 1mm wavelength, not just in the retinal hazard range of 400nm to 1400nm. Outside the retinal hazard range there is potentially a hazard to the cornea. A wavelength outside the retinal hazard range is therefore not automatically eye-safe!

Class 1

This class is eye-safe under all operating conditions.

Class 1M

This class is safe for viewing directly with the naked eye, but may be hazardous to view with the aid of optical instruments. In general, the use of magnifying glasses increases the hazard from a widely-diverging beam (eg LEDs and bare laser diodes), and binoculars or telescopes increase the hazard from a wide, collimated beam (such as those used in open-beam telecommunications systems).

Radiation in classes 1 and 1M can be visible, invisible or both.

Class 2

These are visible lasers. This class is safe for accidental viewing under all operating conditions. However, it may not be safe for a person who deliberately stares into the laser beam for longer than 0.25 s, by overcoming their natural aversion response to the very bright light.

Class 2M

These are visible lasers. This class is safe for accidental viewing with the naked eye, as long as the natural aversion response is not overcome as with Class 2, but may be hazardous (even for accidental viewing) when viewed with the aid of optical instruments, as with class 1M.

Radiation in classes 2 and 2M is visible, but can also contain an invisible element, subject to certain conditions.

Classes 1M and 2M broadly replace the old class 3A under IEC and EN classification. Prior to the 2001 amendment there were also lasers which were Class 3B but were eye-safe when viewed without optical instruments. These lasers are Class 1M or 2M under the current Classification system.

Class 3R

Radiation in this class is considered low risk, but potentially hazardous. The class limit for 3R is 5x the applicable class limit for Class 1 (for invisible radiation) or class 2 (for visible radiation). Hence CW visible lasers emitting between 1 and 5 mW are normally Class 3R.

Visible class 3R is similar to class IIIA in the US regulations.

Class 3B

Radiation in this class is very likely to be dangerous. For a continuous wave laser the maximum output into the eye must not exceed 500mW. The radiation can be a hazard to the eye or skin. However, viewing of the diffuse reflection is safe.

Class 4

This is the highest class of laser radiation. Radiation in this class is very dangerous, and viewing of the diffuse reflection may be dangerous. Class 4 laser beams are capable of setting fire to materials onto which they are projected.

Any laser product of a given Class may contain ‘embedded’ lasers which are greater than the Class assigned to the product, but in these cases engineering controls (protective housings and interlocks) ensure that human access to radiation in excess of product Class is not possible. Notable examples of this are CD and DVD players which are Class 1 laser products while containing Class 3R or Class 3B lasers and laser printers which are Class 1 laser products but contain Class 4 embedded lasers.

Note:- for a product to be classified correctly, it must be tested at the maximum output accessible under reasonably foreseeable single-fault conditions (eg in the drive circuitry). A non-M class product must pass both Condition 1 and Condition 2 of Table 10 in IEC/EN 60825-1, and an M-class product (which by definition has failed either Condition 1 or 2) must pass the irradiance condition in the same table.

*Generally speaking lasers are point sources while LEDs are extended sources. Extended sources have higher power limits than point sources for a given laser Class. Therefore a visible LED emitting 10 mW may be Class 2, while a visible laser pointer of the same power would be Class 3B. NB Laser pointers above Class 2 are banned for sale to the public by trading standards.

Optical Networks for the Broadband Future

Delivering bandwidth

Since the turn of the new millennium there has been massive growth in take-up of broadband with little sign of any slow down in demand. It could be argued that it began in 1989 with Telcos wanting to offer Video on Demand which drove the development of new access technologies such as ADSL. This means that serious consideration is now being given to fibre access solutions to meet these demands.

Delivery Mechanism			FTTC									FTTdp		FTTH		
			ADSL				VDSL					G.fast		PON		
			Basic	+	2	2+	Basic			2		single	multi	BPON	GPON	EPON
Throughput (Mbps)	Max	Down	3	8	15	20	13	26	52	30	100	1000	500	155.52 622.08 1244.16	1244.16 2488.32	1000 nominal
	Shared	1x16														~80
		1x32												~20 at 622 ~40 at 1244	~40 at 1244 ~80 at 2488.32	~40
Circuit Length			3	3	6	1.5	1.5	1	0.3	1	0.3	0.05	0.1	20km		10 20

How we consume bandwidth

Video & Rich media is changing the nature & volume of Net traffic. Convergence of Wifi & Cellular networks will mean more people are connected more of the time to consume…

We can consume & produce Rich content Anytime, Anyplace, Anywhere!

RFID-Tag every item everywhere!

The internet of things where everything is connected. In 2000 we had connected 100 million devices by 2010, 14 Billion were connected to the net. Forecasts show that the IoT market will grow from an installed base of 15.4 billion devices in 2015 to 30.7 billion devices in 2020 and 75.4 billion in 2025.

- You tube, HDTV – UHDTV (4KTV), Video conferencing, Video phones
- Cloud computing
- Unicast video
- Mobile backhaul
- Amateur video/ motion pictures
- Amazon, Netflix, Blockbuster, Apple as well as Telcos & Cable companies offering IPTV
- On-line gaming
- Virtual reality
- 3D video

PON

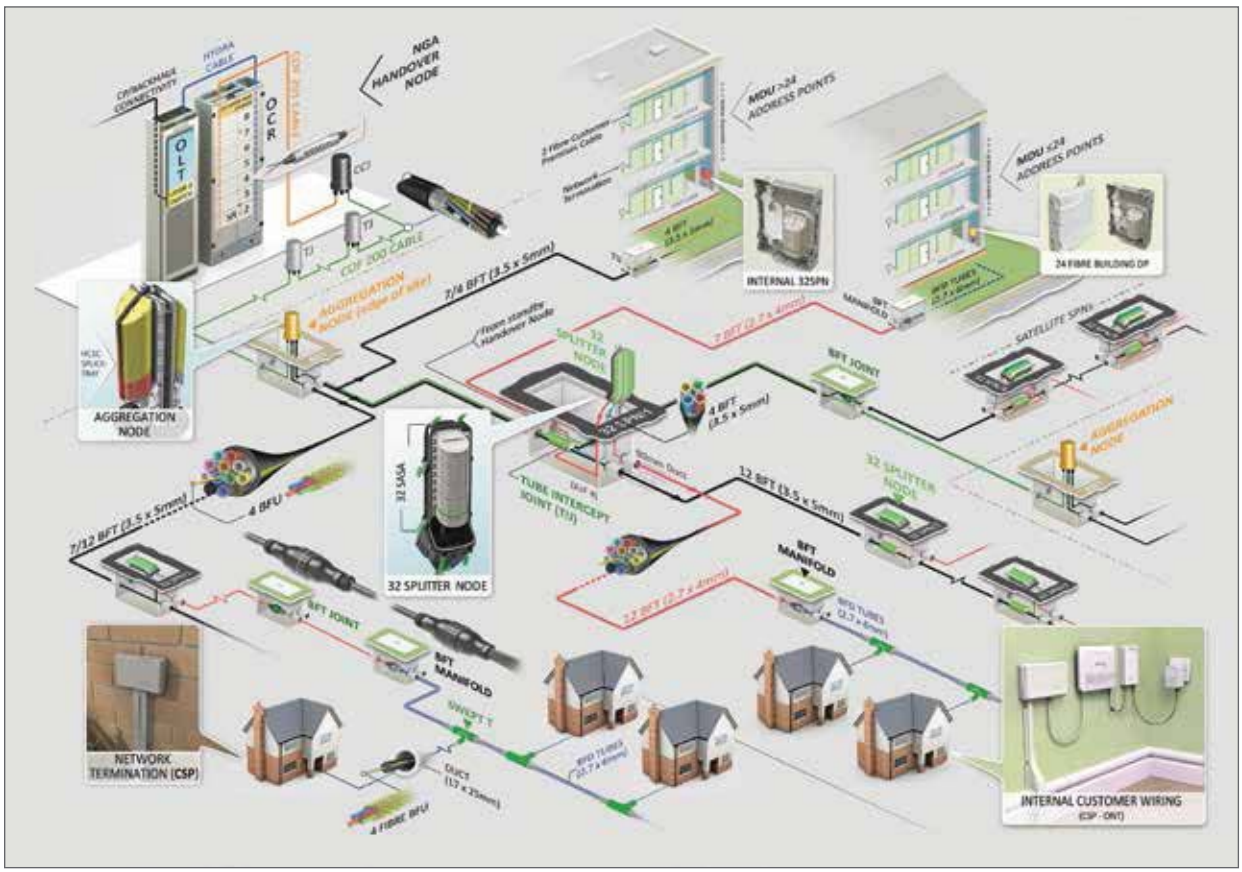
There are three major PON technologies:

- TDM PON
- WDM PON
- OFDM PON

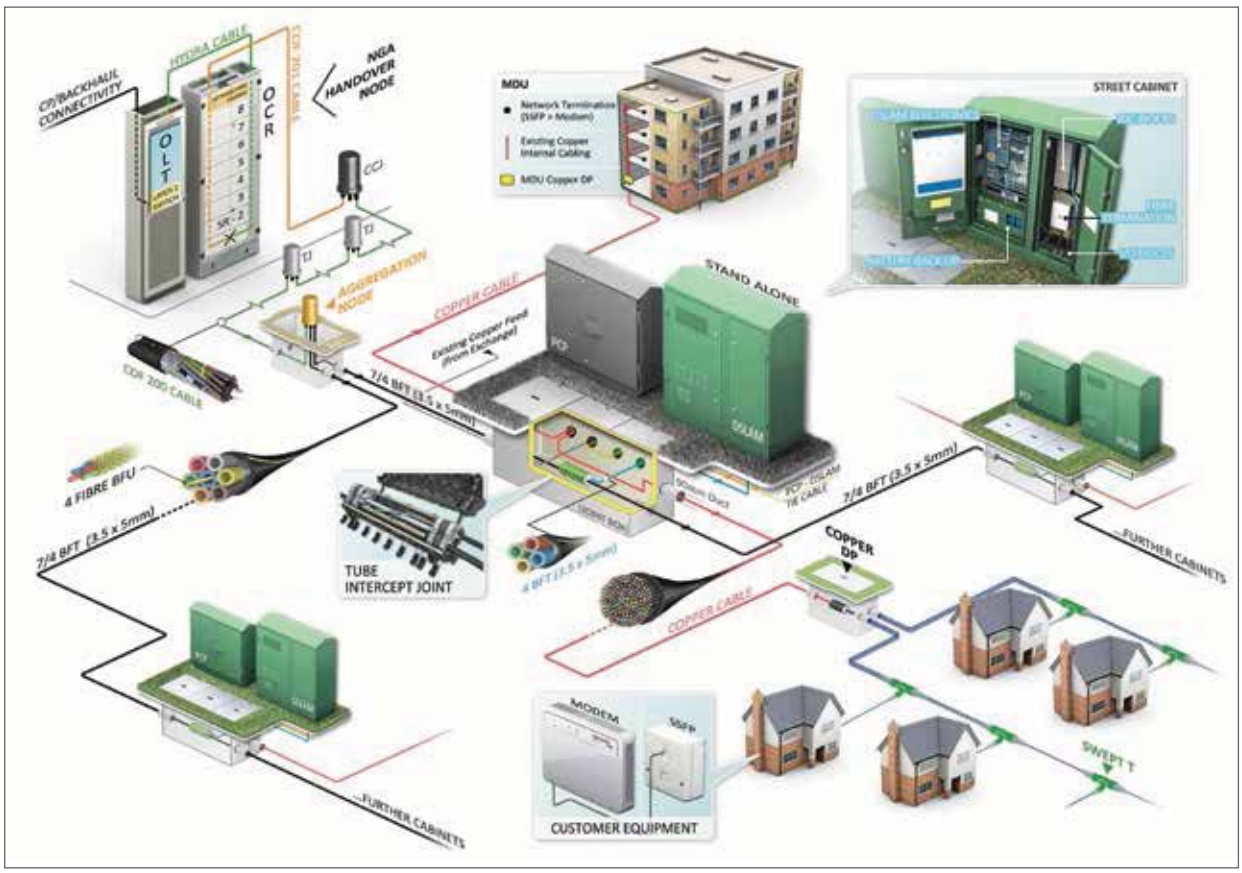
The currently deployed PON networks are TDM PON systems. TDM PON has several flavours including:

- ATM PON (APON)
- Broadband PON (BPON)
- Ethernet PON (EPON)
- Gigabit PON (GPON)
- 10G EPON
- XG-PON

Fibre to the Home with 1 x 32 way splitter (FTTH)



Fibre to the Cabinet/Curb (FTTC)



Notes

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MA5776 07.18 V27