

DBX PLATFORM GUIDE

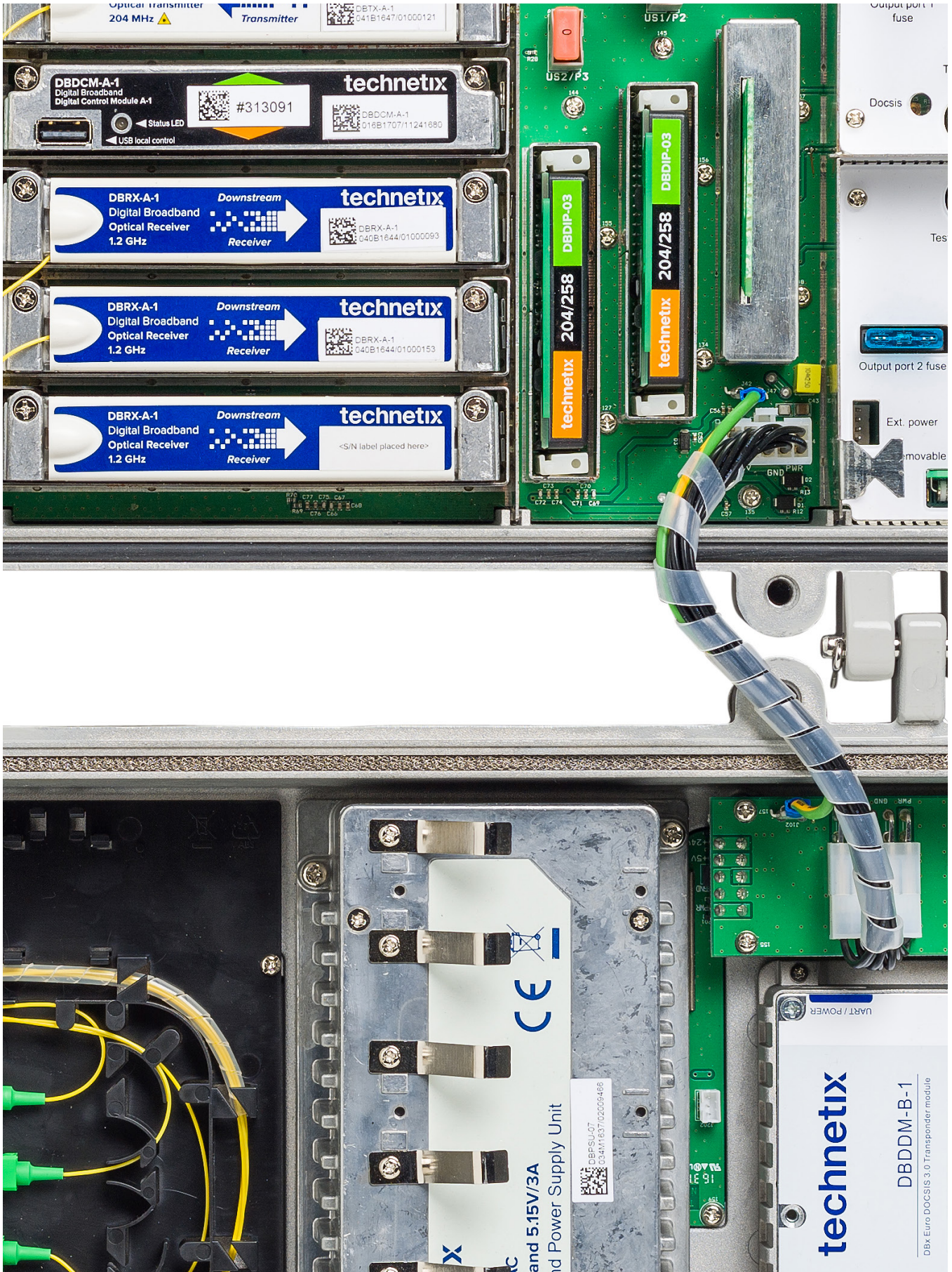


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TECHNETIX DBx ACCESS PLATFORM

Introduction

The Technetix DBx-1200 amplifier/node series is an innovative crossover design, which is a field upgradeable solution to provide deep fibre to the last amplifier (FTTLA/FTTC).

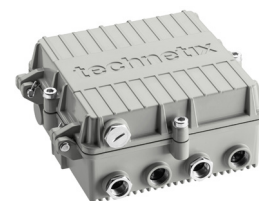
Designed using the latest GaN 2.5 (Gallium Nitride) technology with standard and high output power downstream modules, you can drive 4K QAM signals over long cable distances and cascades (up to N+4) while reducing power consumption.

The DBx range offers amplifiers/nodes for cabinet and strand (pole) mounting. The modular approach enables a flexible configuration of the platform, allowing hybrid mixtures of RF/optical for gradual migration to deep fibre.

The table below outlines the amplifier types and their possible configurations:

Type	Housing style	Active/passive RF outputs	Optical configuration
DBC-1200	Cabinet	1/2	1x1
DBC-1200S	Strand	1/2	1x1
DBD-1200	Cabinet	2/3	Up to 2x2 or hybrid RF mix
DBE-1200	Cabinet	4/4	Up to 4x4 or hybrid RF mix
DBE-1200S	Strand	3/3	Up to 3x3 or hybrid RF mix

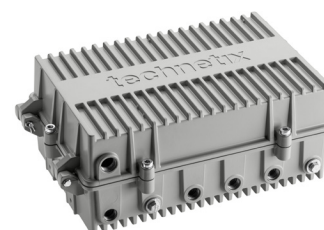
Migrating to deep fibre with DBx, be it in the form of RFoG, HFC deep fibre or FTTx, drives down Total Cost of Ownership (TCO) and enables compliance with the SCTE2020 initiative on waste disposal. Retaining the installed housing and output cables, you only replace the modules, keeping service downtime to a minimum.



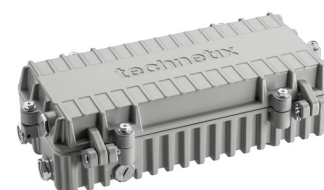
DBC-1200



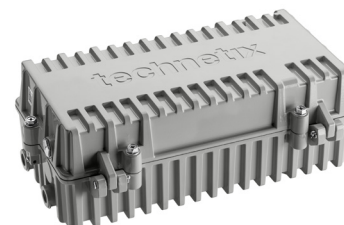
DBD-1200



DBE-1200



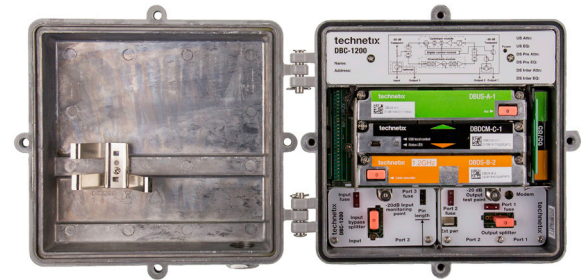
DBC-1200S



DBE-1200S

Platform features

- DOCSIS 3.1 compliant upstream and downstream
- Full modular design
- Power efficient
- Field upgradeable diplex filters offered in 42/54, 65/85, 85/102, 85/105, 204/258 MHz band splits
- Latest GaN technology with high output power
- Optional on-board EU/US DOCSIS 3.0 transponders



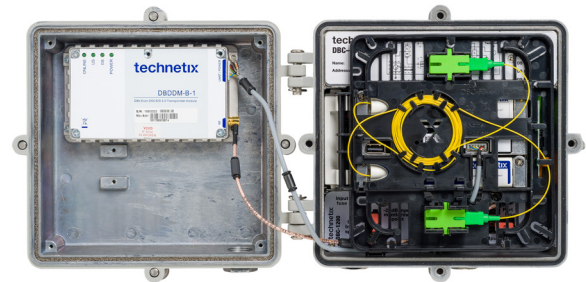
RF configuration

RF features

- Full digital control of equalisers and attenuators in both up-and downstream
- On-board ingress detection switches in upstream modules for each individual leg
- Wide selection of RF modules for all network applications

Optical features

- Upstream lasers in 1310, 1550 and CWDM/DWDM
- Wide range of optical input power in downstream receiver -6dBm to +1dBm including optical AGC
- Power efficient
- On-board ingress detection switches in upstream transmitter
- Redundant transmitters and receivers optional



*Optical 1x1 configuration

*with the DOCSIS3.0 transponder option installed

Business benefits

- Modular upgradeable solution to FTTC/FTTLA
- Lowest power consumption in the industry
- Latest GaN technology ensures a future proof solution for digital loading
- Wide range of RF and optical modules tailored to your network
- Future upgrades to include multi-diode receivers for RFoG networks and Remote PHY modules for Distributed Access Architecture (DAA)



DBx Access Platform - a modular platform allowing migration from RF amplifier to fibre node and further to Remote PHY and FTTx access gateway

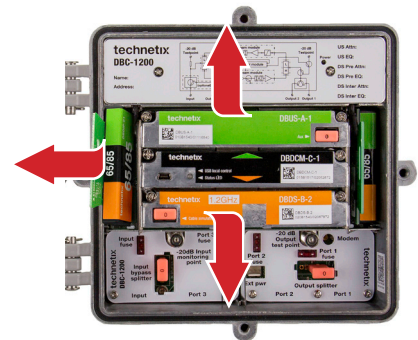
The following section demonstrates the upgrade of an amplifier to optical fibre node in less than 10 minutes:

01



Remove RF modules and input duplex filter (modules can be reused in other amplifiers). If an input splitter/tap is installed, this can be removed at this stage as well.

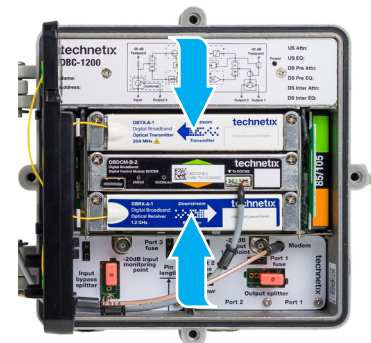
Note: all procedures can be executed while the amplifier is powered up.



02



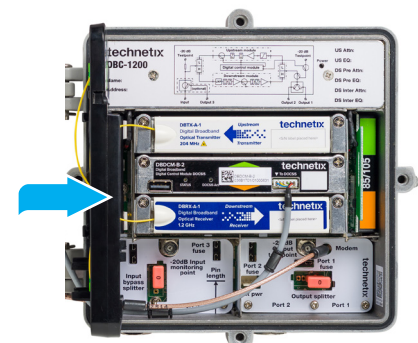
Insert the optical receiver module in the bottom slot (replacing the RF forward amplifier) and the upstream transmitter into the top slot (replacing the return amplifier).



03



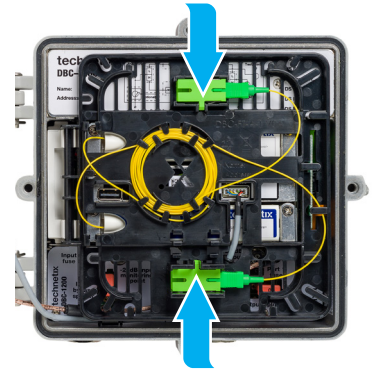
Install the fibre tray in the position of the input duplex filter and secure it with a screw.



04



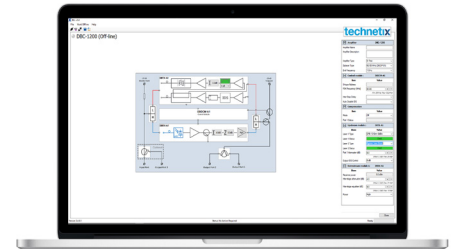
The incoming fibre needs to be inserted into the amplifier through the lid port ($\frac{5}{8}$ th thread). Ensure the cable is securely fitted inside clips.



05



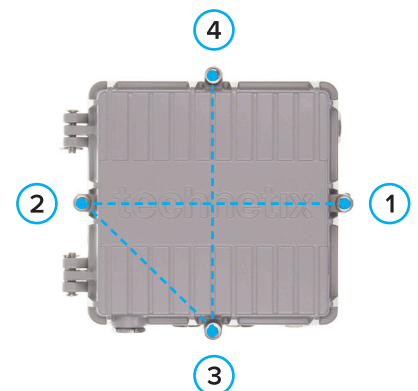
Connect USB cable to digital control module and configure settings using the DBx software. All settings for the optical module can be executed with the same configuration as an RF amplifier



06

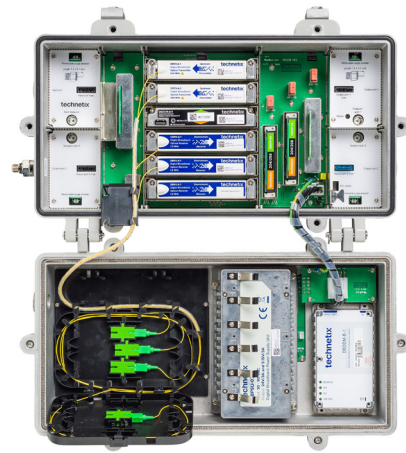


Close DBx amplifier lid, ensuring all bolts are secured correctly (in order shown to the right). The upgrade of the amplifier to an optical fibre node is now complete.



DBx platform grows with operators needs and different architectures

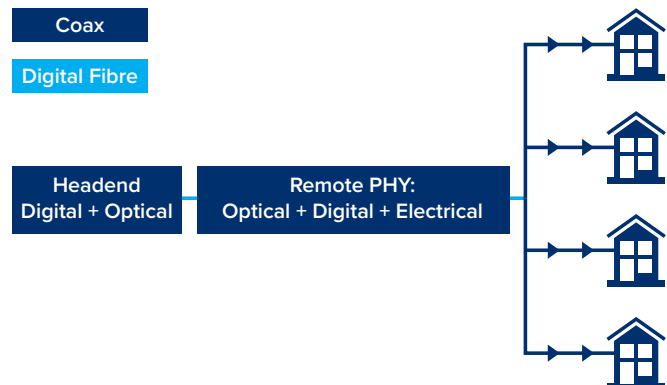
The requirement for increased speed and capacity has pushed the broadband cable industry into developing a faster and higher capacity network. The Technetix DBx platform is perfectly suited to adapt to these demands and gives operators the opportunity to evolve their business. Extended bandwidth, higher modulation schemes and innovative network designs have been incorporated into the current network, improving the longevity and flexibility of HFC networks.



DBx Remote PHY for Distributed Access Architecture

A DAA is designed to move several elements related to the Physical layer (PHY) from the headend to the access network. By pushing these elements deeper into the network to the Remote PHY device, the best possible quality signal can be generated.

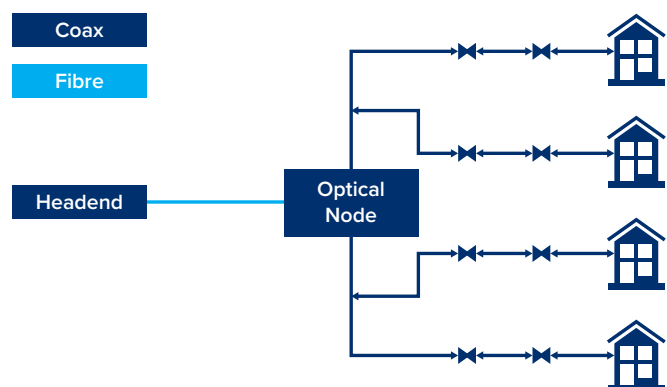
The DBx platform allows MSOs to introduce a Remote PHY setup in an existing DBx product benefiting from a DAA.



Full Duplex DOCSIS

Full Duplex DOCSIS is the method to achieve 10 Gbps at both download and upload. The concept of downstream and upstream disappears since the signals that go to the home and to the headend share the same band continuously, transforming the concept of the classic amplifier with diplexer filters.

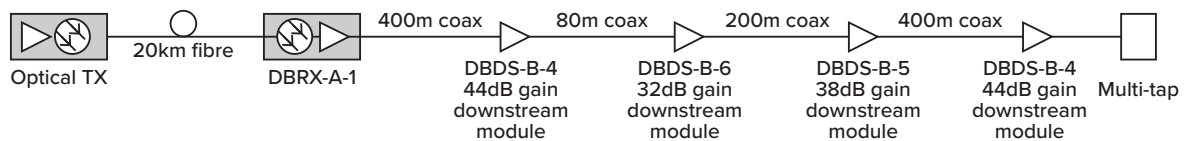
Evolving technologies do not mean the complete amplifier needs to be replaced. The DBx platform allows MSOs to replace the classic amplifier with diplexer filters and downstream and upstream modules without changing the cabinet.



DBx RF configurations

The DBx RF modules are designed around both star and cascade networks. Using dedicated downstream gain modules for cascade application allows you to customise your network. For exceptionally long cascade networks, dedicated flatness correction plug-in modules are available to optimise the overall frequency response. Fixed deviation in frequency response accumulates in cascade networks (despite the flatness deviation of the cascaded downstream modules of +0.4dB across the entire downstream frequency range) and it is recommended that the flatness correction plug-in is used for optimal network performance after five amplifiers.

The diagram below describes the use of the different gain downstream modules in an N+4 scenario:



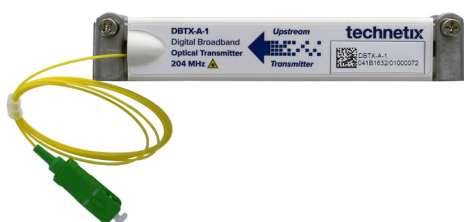
When installing high gain modules (i.e. 44dB) in shorter cable length applications, you have to attenuate more signal after amplification. Using lower gain modules keeps attenuation requirements to an absolute minimum, resulting in better network performance.

Our amplifier gain downstream modules are pre-aligned with 20dB coax, other amplifiers are aligned with 0dB coax and therefore, the flatness in frequency response is aligned further from the actual application. Our amplifiers are pre-aligned with coax, improving overall network performance.

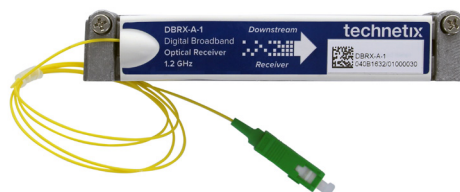
Category	Type	Description
Upstream modules	DBUS-A-1	Main module: 105MHz upstream amplifier 25dB gain and IDS
	DBUS-C-1	Main module: 204MHz upstream amplifier 26dB gain and IDS
	DBUS-D-1	Bridger module: 204MHz upstream amplifier 26dB gain and IDS
Downstream modules	DBDS-B-2-1	Main: 1.2GHz downstream amplifier 44dB
	DBDS-B-2-ET	Main: 1.2GHz downstream amplifier 44dB - ET: 25dB tilt
	DBDS-B-4-1	Main: 1.2GHz downstream amplifier 44dB
	DBDS-B-4-ET	Main: 1.2GHz downstream amplifier 44dB - ET: 25dB tilt
	DBDS-B-5-1	Main: 1.2GHz downstream amplifier 38dB
	DBDS-B-6-1	Main: 1.2GHz downstream amplifier 32dB
	DBDS-B-7-1	Main: 1.2GHz downstream amplifier 44dB - 52dBmV output
	DBDS-B-7-ET	Main: 1.2GHz downstream amplifier 44dB - ET: 25dB tilt 12C - 53dBmV output
	DBDS-F-1	Bridger: 1.2GHz downstream amplifier 44dB
	DBDS-F-2	Bridger: 1.2GHz downstream amplifier 44dB
	DBDS-F-5-1	Bridger: 1.2GHz downstream amplifier 44dB - 52dBmV output

DBx optical configurations

The optical transmitter and receiver modules are used in scenarios where the DBx is used as an optical fibre node. The optical receiver has a wide optical input range from -6dBm to +1dBm, suitable for any application. The receiver module is equipped with the latest GaN 2.5 technology for maximum output power.



DBTX-A-1

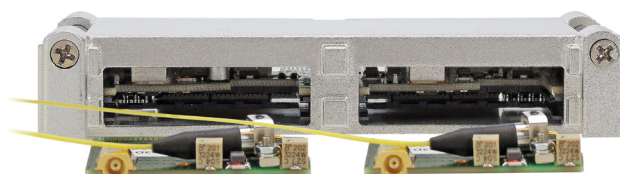


DBRX-A-1

The transmitter module can hold two laser boards with standard 1310nm/1550nm/CWDM/DWDM wavelengths in -3/0/3/6dBm output power. The laser boards are available in DFB and CWDM and by default, these are supplied with SC/APC connectors (available as small plug-in modules). The DBRX optical receiver can receive any type of optical signal from 1100 to 1650nm, in both CWDM and DWDM configuration.

Additional application boards are available including:

- Bypass board (DBLB-BP) in a 1x1 DBC configuration terminating the second port in the transmitter.
- Combiner board (DBLB-CB) in a DBD/DBE when using a hybrid RF/optical configuration combining the upstream feed of two downstream modules over one upstream laser.



DBx optical configuration options

# of DBRX-A-1	1	2	1	2	3	1-4
# of DBTX-A-1	1	1	1	2	2	2
DBC	1					
DBD	2	2	2	2		
DBE	3	4	3	4	4	4*
DBC-S	1					
DBE-S	3	3	3	3	3	

Numbers in table indicate number of usable active output ports in given optical configuration.

*Production 10/2016 or later.

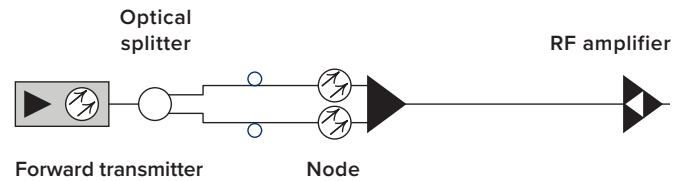
Optical redundancy

Redundancy is essential in many applications; MSOs want to provide a reliable and uninterrupted service to their customers, improving customer satisfaction and limiting expensive truck rolls. The DBx platform also offers redundant optical receiver and transmitter modules.

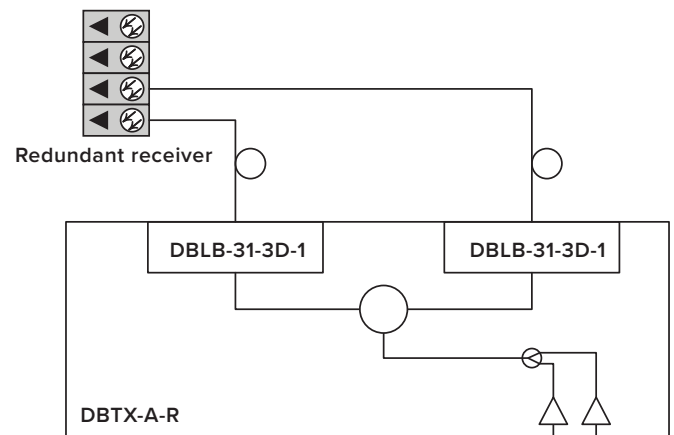
The redundant optical receiver module has two integrated laser diodes and an optical switch, enabling full downstream redundancy. When the light level drops below the minimum input range of -6dBm, the switch moves to the secondary input and the second laser diode becomes active, maintaining signal distribution. It can be switched back to the primary feed manually through software or automatically when the feed to the secondary diode drops.

The redundant transmitter holds two active lasers transmitting the upstream signal. The module distributes two signals over separate fibres to the headend (where the redundant receiver is installed) managing the redundancy for uninterrupted service.

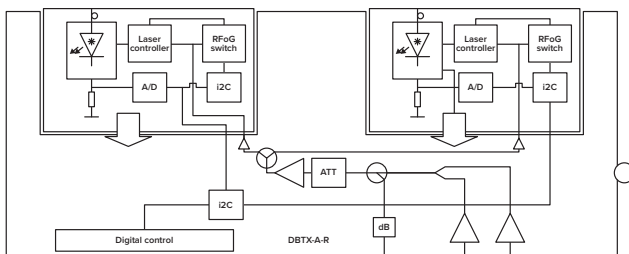
When used in conjunction with Technetix' DOCSIS 3.0 transponder, an SNMP trap is received as soon as the switch reacts and can quickly troubleshoot the problem restoring the primary feed. This maintains service continuity and ultimately increases customer satisfaction.



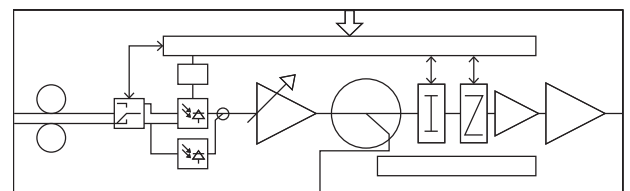
Path redundant downstream application



Redundant upstream application



DBTX-A-R-1 redundant transmitter block diagram



DBRX-A-R-1 redundant optical receiver diagram



Order Information

Optical modules

Order number	Modules	Description
19008435	DBRX-A-1	Optical 1.2GHz downstream receiver, 53dBmV output
19010802	DBRX-A-R	Redundant optical 1.2GHz downstream receiver, 53dBmV output
19008438	DBTX-A-1	Optical upstream transmitter module, holds up to 2 DBLB optical transmitters
19010803	DBTX-A-R	Redundant optical transmitter module, holds up to 2 DBLB optical transmitters

Optical plug-in boards for DBTX

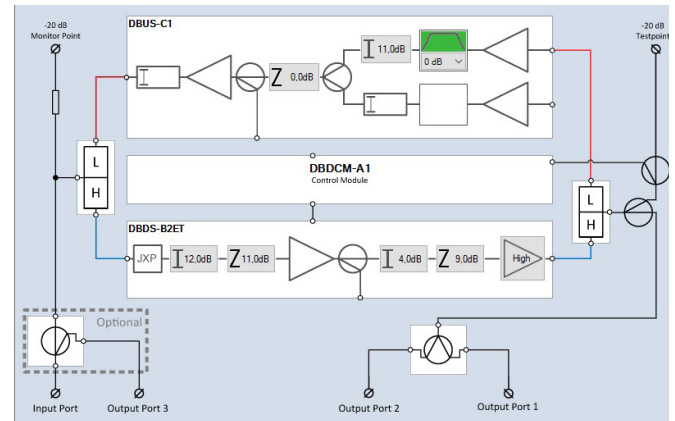
Order number	Boards	Description
19010322	DBLB-31-3D-1	Optical 204MHz transmitter plug-in, 1310nm, DFB, 3dBm output, SC/APC
19010323	DBLB-55-3D-1	Optical 204MHz transmitter plug-in, 1550nm, DFB, 3dBm output, SC/APC
19010324	DBLB-C27-3D-1	Optical 204MHz CWDM transmitter plug-in, 1271nm, DFB, 3dBm output, SC/APC
19010325	DBLB-C29-3D-1	Optical 204MHz CWDM transmitter plug-in, 1291nm, DFB, 3dBm output, SC/APC
19010326	DBLB-C31-3D-1	Optical 204MHz CWDM transmitter plug-in, 1331nm, DFB, 3dBm output, SC/APC
19010327	DBLB-C33-3D-1	Optical 204MHz CWDM transmitter plug-in, 1331nm, DFB, 3dBm output, SC/APC
19010328	DBLB-C35-3D-1	Optical 204MHz CWDM transmitter plug-in, 1351nm, DFB, 3dBm output, SC/APC
19010329	DBLB-C43-3D-1	Optical 204MHz CWDM transmitter plug-in, 1431nm, DFB, 3dBm output, SC/APC
19010330	DBLB-C45-3D-1	Optical 204MHz CWDM transmitter plug-in, 1451nm, DFB, 3dBm output, SC/APC
19010331	DBLB-C47-3D-1	Optical 204MHz CWDM transmitter plug-in, 1471nm, DFB, 3dBm output, SC/APC
19010332	DBLB-C49-3D-1	Optical 204MHz CWDM transmitter plug-in, 1491nm, DFB, 3dBm output, SC/APC
19010333	DBLB-C51-3D-1	Optical 204MHz CWDM transmitter plug-in, 1511nm, DFB, 3dBm output, SC/APC
19010334	DBLB-C53-3D-1	Optical 204MHz CWDM transmitter plug-in, 1531nm, DFB, 3dBm output, SC/APC
19010335	DBLB-C55-3D-1	Optical 204MHz CWDM transmitter plug-in, 1551nm, DFB, 3dBm output, SC/APC
19010336	DBLB-C57-3D-1	Optical 204MHz CWDM transmitter plug-in, 1571nm, DFB, 3dBm output, SC/APC
19010337	DBLB-C59-3D-1	Optical 204MHz CWDM transmitter plug-in, 1591nm, DFB, 3dBm output, SC/APC
19010338	DBLB-C61-3D-1	Optical 204MHz CWDM transmitter plug-in, 1611nm, DFB, 3dBm output, SC/APC
19010339	DBLB-BP-1	Bypass laser board for DBTX-A-1 (second slot if no laser installed)
19010340	DBLB-CB-1	Combiner board to combine two upstream RF signals into a single laser

Intelligent digital controls

Monitoring and control

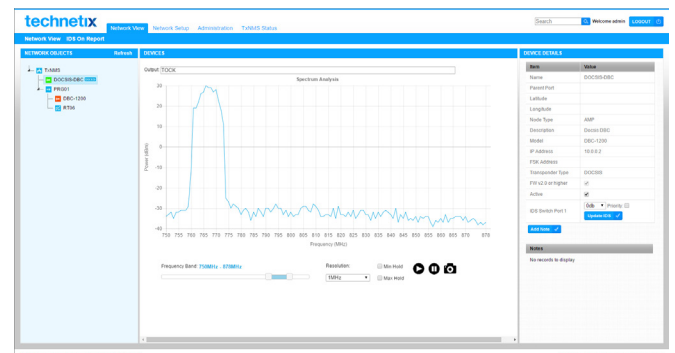
The DBx platform offers flexibility with electronically adjustable equalisers and attenuators in both upstream and downstream amplifiers. The downstream modules have both pre-stage and inter-stage equalisation and attenuation to compensate cable loss prior to the amplifier and to also provide a boost for the output cable. These values can be adjusted locally with our BLx software or remotely with the DOCSIS 3.0 transponder.

The BLx software has a user-friendly interface; by using the amplifier block diagram or the menu on the right of the screen, the amplifier can be adjusted locally to the correct settings and configuration. The diplex split type and end frequency can be specified in software. The FSK settings can also be adjusted locally or remotely.



TxNMS software

The TxNMS software is available as a stand-alone management system to control both the DBx ingress detection switches and DOCSIS 3.0 transponder. It is also available as an API for NMS (Network Management System) integration. When the FSK module is installed in the DBx series, the TxNMS software can remotely switch the on-board 'ingress detection switches' using an FSK carrier generated by the PRG-122 headend controller. 0dB, 6dB or 40dB attenuation can be remotely applied in the upstream when ingress is detected and can also identify where the issue has occurred for quick repair and service restoration.



DBDCM-A-1 FSK control module

The DBDCM-A-1 module has an embedded FSK tuner, which can be used for remote single-directional communication with an amplifier. A dedicated headend controller (PRG-122), set on a requested frequency, enables the TxNMS software to detect ingress switches in upstream modules with 6 or 40dB, determining the source of ingress and specifying location for truck rolls.

The FSK commands can also be used to adjust temperature compensation methods. The FSK module supports three types of temperature compensation:

Automatic Temperature Compensation (ATC)

The ATC function of the amplifier is installed in the digital control module. The DBx amplifiers have been tested in all thermal circumstances within range and corrections to temperature deviations were calculated and installed in a fixed temperature table within the digital control module; ensuring the optimum corrections can be made when the temperature fluctuates within an amplifier. When not using AGC/ALSC, this function is automatically active.

Automatic Gain Control (AGC)

AGC functionality is an internal feature that maintains a controlled signal amplitude at its output despite variation in amplitude of the input signal. The average or peak output signal level is used to dynamically adjust the input-to-output gain to a suitable level, enabling the circuit to work with a greater range of input signal levels.

The AGC corrects both the internal temperature variation and the variation on the input of the amplifier. This is done by measuring the output level from the amplifier via one pilot frequency. If the level deviates from the set target, the AGC edits the internal attenuation switches until the output level is close enough to the target level.

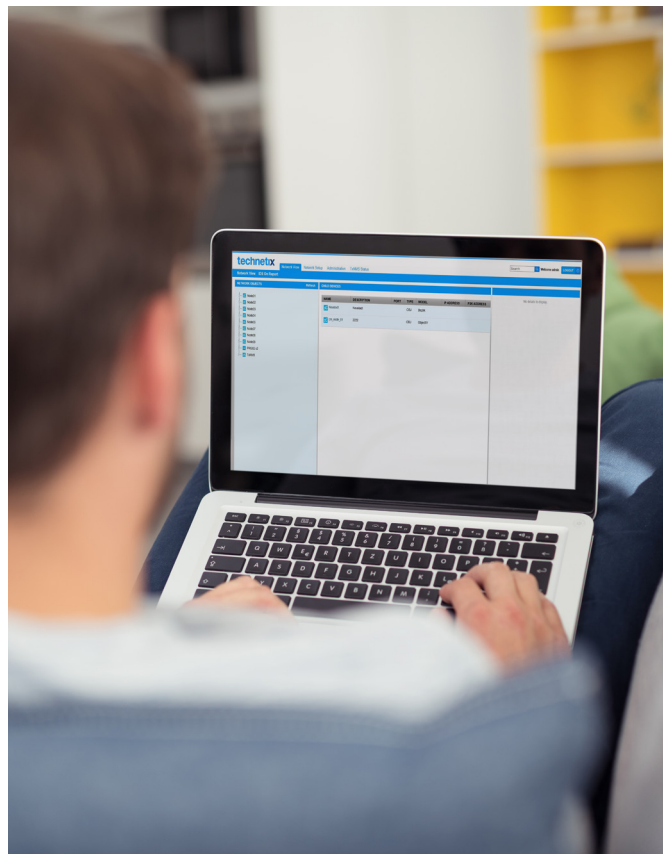
Automatic Level Slope Control (ALSC)

The most advanced option for correction is the ALSC. In addition to the AGC, the ALSC uses equalisers to correct the difference in attenuation between high and low frequencies.

The ALSC function in the DBx amplifier range measures the deviation of the set-point against the pilot. The amplifier uses this information to identify the scenario and establish the best course of action.

The gain over temperature is corrected by the ALSC, it also carries out cable compensation next to temperature corrections. Temperature compensation is therefore a pre-described offset for gain. The pre-described offset is based on temperature measurements in a climate chamber.

ALSC measures the actual output level on a pre-described time schedule and this can be indicated as a closed measurement loop.



DOCSIS 3.0 transponder

The DOCSIS 3.0 transponder option offers full remote control of the amplifier through DOCSIS commands. The DOCSIS 3.0 transponder is available in Euro and US DOCSIS, enabling remote monitoring of the RF parameters, AGC/ALSC levels and amplifier temperature. The DOCSIS transponder can send SNMP alarms based on applied thresholds; it also comes with an on-board spectrum analyser. This is the ultimate by-directional communication and monitoring addition to the DBx platform. The DOCSIS 3.0 transponder is connected to the dedicated DBDCM-B-2 DOCSIS control module in the amplifier and the modem connection port. The on-board ingress detection switches can also be switched remotely with the DOCSIS transponder without additional headend equipment.

Features:

- DOCSIS 3.0 compliant transponder module
- Remote monitoring and control of any DBx-1200(s) amplifier
- RF parameters such as gain, tilt and ingress detection switches
- AGC/ALSC levels
- RF levels
- Temperature, voltage
- Alarm settings and generation (SNMP alarms)
- Optical received power
- Amplifier configuration
- SNMP interface to network management system
- Usable with 42/54, 65/85, 85/102 and 204/258 MHz band splits
- Downstream frequency range 108-1002 MHz
- Upstream frequency range 5-83 MHz
- Firmware remotely upgradeable
- Manage optical redundancy



DBDDM-A-1 DOCSIS Transponder



DBDDM-B-1 Euro DOCSIS Transponder

DOCSIS 3.0 transponder metrics

The following metrics can be read and set (where applicable) from the DBx device through the DOCSIS transponder SNMP interface.

Note: not all settings can be changed directly via SNMP. Technetix BLL software is required to obtain full control over the amplifier via the DOCSIS transponder.

RF:

- Attenuator settings
- Equaliser settings
- Ingress detection switches
- Upstream amplifier on/off switch for the upstream module(s)
- Hi/low power level of the end amplifier stage in the downstream module(s)
- AGC levels for the downstream module
- ALSC levels for the downstream module
- Actual downstream power level at a given frequency

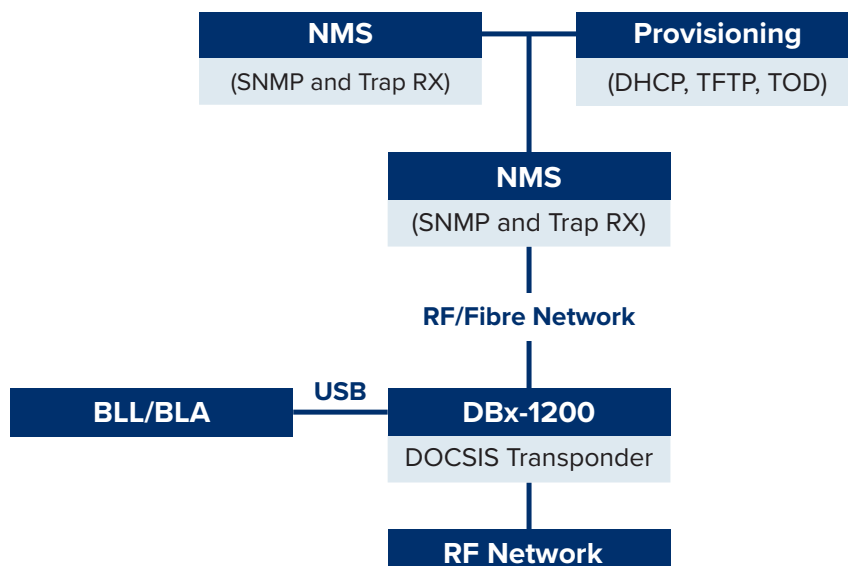
Optical:

- Receive power of the optical receiver module(s)
- Transmit power of the optical transmitter module(s)

Miscellaneous:

- Amplifier temperature
- Alarm level for device temperature
- Voltage from +5 and +24VDC power supply
- Alarm levels for power supply voltages

System level diagram:



Order information

RF amplifier configurations

Order number	Item code	Description
19007129	DBC-CONFIG3A2	DBC1200 cabinet RF amplifier, 1.2GHz 65/85MHz, single output, FSK
19008111	DBD-CONFIG4A1	DBD1200 cabinet RF amplifier, 1.2GHz 65/85MHz, dual active output, FSK
19011056	DBECONFIG5NOW	DBE1200 cabinet RF amplifier, 1.2GHz 65/85MHz, triple output, FSK
19010461	DBCCONF3SUS2	DBC1200S strand-mount RF amplifier, 1.2GHz, 85/102MHz, single output, FSK
19010205	DBECONFIG5US1	DBE1200S strand-mount RF amplifier, 1.2GHz, 85/102MHz, triple output, FSK

Order number	Optical node configurations	Description
Enquire	DBC1200 set - 1x1 optical, 1310nm, 204/258 MHz	DBC1200 optical fibre node set. 1x1 optical configuration, 1x forward receiver, 1x1310nm transmitter, 204/258 diplex filters, including power supply and fibre management tray.
Enquire	DBD1200 set - 1x1 optical, 1310nm, 204/258 MHz	DBD1200 optical fibre node set. 1x1 optical configuration, 1x forward receiver, 1x1310nm transmitter, 2 active output ports, 204/258 diplex filters, including power supply and fibre management tray
Enquire	DBD1200 set - 2x2 optical, 1310nm, 204/258 MHz	DBD1200 optical fibre node set. 2x2 optical configuration, 2x forward receivers, 2x1310nm transmitters, 2 active output ports, 204/258 diplex filters, including power supply and fibre management tray
Enquire	DBE1200 set - 1x1 optical, 1310nm, 204/258 MHz	DBE1200 optical fibre node set. 1x1 optical configuration, 1x forward receiver, 1x1310nm transmitter, 3 active output ports, 204/258 diplex filters, including power supply and fibre management tray
Enquire	DBE1200 set - 2x2 optical, 1310nm, 204/258 MHz	DBE1200 optical fibre node set. 2x2 optical configuration, 2x forward receivers, 2x1310nm transmitters, 3 active output ports, 204/258 diplex filters, including power supply and fibre management tray
Enquire	DBE1200 set - 3x3 optical, 1310nm, 204/258 MHz	DBE1200 optical fibre node set. 3x3 optical configuration, 3x forward receiver, 3x1310nm transmitters, 3 active output ports, 204/258 diplex filters, including power supply and fibre management tray
Enquire	DBE1200 set - 4x4 optical, 1310nm, 204/258 MHz	DBE1200 optical fibre node set. 4x4 optical configuration, 4x forward receivers, 4x1310nm transmitters, 4 active output ports, 204/258 diplex filters, including power supply and fibre management tray
Enquire	DBC1200-S set - 1x1 optical, 1310nm, 204/258 MHz	DBC1200-S optical fibre node set. 1x1 optical configuration, 1x forward receiver, 1x1310nm transmitter, 204/258 diplex filters, including power supply and fibre management tray.
Enquire	DBE1200-S set - 1x1 optical, 1310nm, 204/258 MHz	DBE1200-S optical fibre node set. 1x1 optical configuration, 1x forward receiver, 1x1310nm transmitter, 3 active output ports, 204/258 diplex filters, including power supply and fibre management tray
Enquire	DBE1200-S set - 2x2 optical, 1310nm, 204/258 MHz	DBE1200-S optical fibre node set. 2x2 optical configuration, 2x forward receivers, 2x1310nm transmitters, 3 active output ports, 204/258 diplex filters, including power supply and fibre management tray
Enquire	DBE1200-S set - 3x3 optical, 1310nm, 204/258 MHz	DBE1200-S optical fibre node set. 3x3 optical configuration, 3x forward receiver, 3x1310nm transmitters, 3 active output ports, 204/258 diplex filters, including power supply and fibre management tray



RF and optical modules

Category	Order number	Type	Description
Upstream modules	19005030	DBUS-A-1	Main module: 105MHz upstream amplifier 30dB gain and IDS
	19008429	DBUS-C-1	Main module: 204MHz upstream amplifier 26dB gain and IDS
	19008430	DBUS-D-1	Bridger module: 204MHz upstream amplifier 26dB gain and IDS
Downstream modules	19010385	DBDS-B-2-1	Main: 1.2GHz downstream amplifier 44dB cascade
	19010383	DBDS-B-2-ET	Main: 1.2GHz downstream amplifier 44dB - ET: 25dB tilt
	19010384	DBDS-B-4-1	Main: 1.2GHz downstream amplifier 44dB - I2C
	19008327	DBDS-B-4-ET	Main: 1.2GHz downstream amplifier 44dB - ET: 25dB tilt - I2C
	19008867	DBDS-B-5-1	Main: 1.2GHz downstream amplifier 38dB - I2C
	19008869	DBDS-B-6-1	Main: 1.2GHz downstream amplifier 32dB - I2C
	19009835	DBDS-B-7-1	Main: 1.2GHz downstream amplifier 44dB - I2C - 53dBmV output
	19010488	DBDS-B-7-ET	Main: 1.2GHz downstream amplifier 44dB - ET: 25dB tilt I2C - 53dBmV output
	19007923	DBDS-F-1	Bridger: 1.2GHz downstream amplifier 44dB
	19008325	DBDS-F-2	Bridger: 1.2GHz downstream amplifier 44dB - I2C
	19009834	DBDS-F-5-1	Bridger: 1.2GHz downstream amplifier 44dB - I2C - 53dBmV output
Digital control and monitoring	19005026	DBDCM-A-1	Control module: AGC/ALSC, FSK, USB-A
	19005027	DBDCM-B-2	Control module: AGC/ALSC, DOCSIS transponder compatible, USB-A
	19005029	DBDDM-A-1	DOCSIS 3.0 transponder, requires DBDCM-B-2
	19010542	DBDDM-B-1	EuroDOCSIS 3.0 transponder, requires DBDCM-B-2
Optical modules	19008435	DBRX-A-1	Optical 1.2GHz downstream receiver, 53dBmV output
	19010802	DBRX-A-R	Redundant optical 1.2GHz downstream receiver, 53dBmV output
	19008438	DBTX-A-1	Optical upstream transmitter module. Holds up to 2 DBLB optical transmitters
	19010803	DBTX-A-R	Redundant optical transmitter module. Holds up to 2 DBLB optical transmitters
	19010322	DBLB-31-3D-1	Optical 204MHz transmitter plug-in, 1310nm, DFB, 3dBm output, SC/APC
	19010323	DBLB-55-3D-1	Optical 204MHz transmitter plug-in, 1550nm, DFB, 3dBm output, SC/APC
	Enquire	DBLB-Cxx-3D-1	Optical 204MHz CWDM transmitter plug-in, DFB, 3dBm output, SC/APC
	19010339	DBLB-BP-1	Bypass laser board for DBTX-A-1 (second slot if no laser installed)
	19010340	DBLB-CB-1	Combiner board to combine two upstream RF signals into a single laser

Accessories

Category	Order number	Type	Description
DBx fibre tray	19010835	DBC-FT-A-1	Fibre management for DBC cabinet
	19010836	DBD-FT-A-1	Fibre management for DBD cabinet
	19010837	DBE-FT-A-1	Fibre management for DBE cabinet
	19010838	DBCS-FT-A-1	Fibre management for DBC strand mount
	19010839	DBES-FT-A-1	Fibre management for DBE strand mount
Diplex filters	19008513	DBDIP-01(-W)	65/85MHz diplexer
	19008514	DBDIP-02(-W)	85/105MHz diplexer
	19008515	DBDIP-03(-W)	204/258MHz diplexer
	19008516	DBDIP-04(-W)	42/54MHz diplexer
	19009966	DBDIP-05(-W)	85/102MHz diplexer
Power supplies	19005023	DBPSU-04	35W power supply 65VAC without PFC
	19008569	DBPSU-05	35W power supply 230VAC without PFC
	19005025	DBPSU-06	35W power supply 65VAC without PFC for DBC-1200S
	19008330	DBPSU-07	90W PSU for DBE-1200(S)
	19011295	DBPSU-08	35W power supply 65VAC without PFC 2-wire powering power passing
Optical accessories	Enquire	DB-MU-C-xxxx	CWDM multiplexer mini-CWDM-style up to 1:4
	Enquire	DB-DM-C-xxxx	CWDM de-multiplexer mini-CWDM-style up to 4:1
	Enquire	DB-MU-D-xxxx	DWDM multiplexer mini-CWDM-style up to 1:4
	Enquire	DB-DM-D-xxxx	DWDM de-multiplexer mini-CWDM-style up to 4:1
Other	19008482	DBTM-T-1	75Ω terminating module



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