Manual

MEG101AE-R3
Quadband VDSL Extender Kit
VDSL Point to Point Solution
Consisting of 1xTransmitter and 1xReceiver

MEG101RAE-R3
Quadband VDSL Receiver
Part of VDSL Point to Multipoint Solution used with VDSL Quadband Switches MEG801AE-R2 or MEG2401AE-R2

MEG101TAE-R3
Quadband VDSL Transmitter

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MEG101AE-R3 works as a transparent Ethernet and/or telephony point to point bridge. MEG101AE-R3 uses QAM-based 4-band VDSL technologies, which supports max distances:

1.9km(6333ft) at 5M up- and downstream
1.3km(4333ft) at 15M up- and downstream
800m(2666ft) at 25M up- and downstream

These distances may and will vary depending on your wires. Keep in mind that every interconnect of your wire will result in less reach. Also watch out for cables not being truly isolated, running high power current nearby, getting wet or being very old.

Avoid using telephony RJ11 ribbon cables. These cables are built with using very low diameter stranded cables. Using them will mean that bandwidth is lower and reach is shorter!

The front-panel provides LED indications of system and interface status. The built-in POTS splitter allows a standard POTS phone to be connected. Full or half-duplex mode of LAN operations is automatically sensed and configured.

The Transmitter provides DIP Switches for setting the VDSL Link Speed and Interleave. Default setting is to detect speed automatically. For getting LAN links with a more consistent latency it may be useful to set lower VDSL Link rates. DIP Switch settings are:

	DIP Switch Settings (Transmitter)	
	1	**2**
VDSL Link Rate 5 Mbps	ON	ON
VDSL Link Rate 15 Mbps	ON	OFF
VDSL Link Rate 25 Mbps	OFF	ON
VDSL Autospeed (Default)	OFF	OFF
	3	**4**
Interleave 0ms	OFF	OFF
Interleave 100ms	OFF	ON
Interleave 150ms	ON	OFF
Interleave 300ms	ON	ON

Note: Changing the DIP Switch Setting requires repowering the Transmitter and the Receiver!
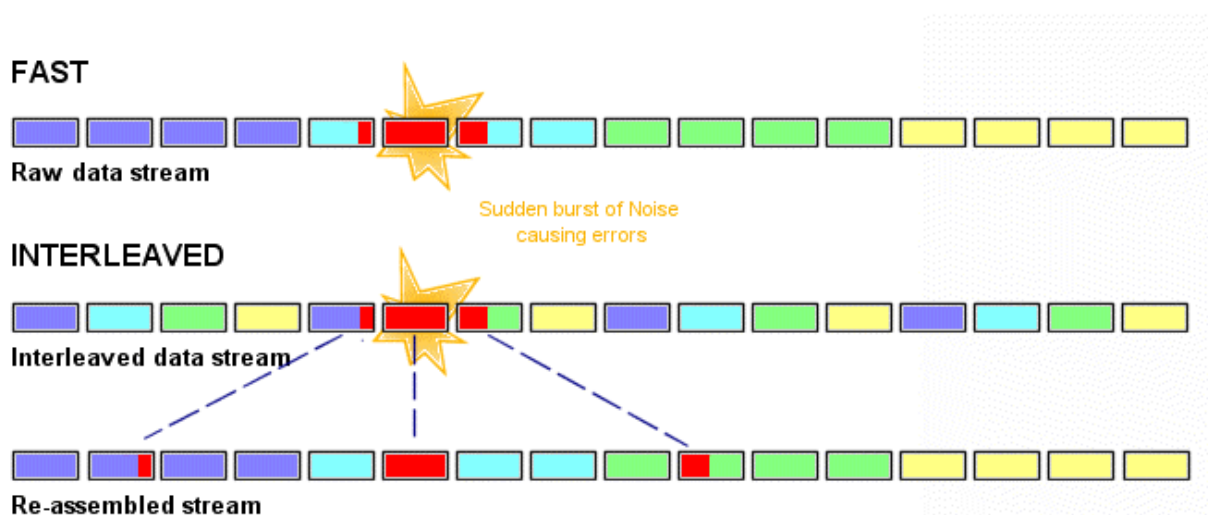
The Receiver is not configurable and supports auto-speed and plug & play operations.

Interleave

This feature is used to protect the transmission and the stability of the connection against crosstalk issues. Crosstalk is coming from signals on other cables. With the Interleave feature your connection and transmission is getting more reliable.

Without Interleave through noise caused by crosstalk you may loose a certain amount of data. This leads to a re-request of data, which slows down your overall bit rate and net bandwidth. With a lot of lost data packets you may also loose synchronization between transmitter and receiver.

Interleaving is a method of taking data packets, chopping them up into smaller bits and then rearranging them so that once contiguous data is row spaced further apart into a non contiguous stream. Data packets are re-assembled into the right order of data by the receiver.

FAST

Raw data stream

Sudden burst of Noise
causing errors

INTERLEAVED

Interleaved data stream

Re-assembled stream

If your line is particularly susceptible to bursts of noise then interleaving should improve your VDSL experience. Noise on the line caused by crosstalk will not damage a complete block of data, but parts of data blocks, which can be re-assembled by CRC.

With the DIP Switches you set up the Interleave Delay. This defines the relative spacing of subsequent data. This means that with more Interleave Delay you get higher latency but better network and transmission stability.

MEG101RAE-R3 works together with the VDSL Quadband Switches MEG801AE-R2 and MEG2401AE-R2. Using these makes this system an ideal solution for delivering cost-effective, high-performance broadband/multimedia services to Multi-Dwelling Units (MDU) and Multi-Tenant Units (MTU) environments such as hotels, campus, hospitals and telecom.

The switches provide an RS-232 Console Interface for configuring your VDSL system. You need a serial crosscable and a Terminal program to use the serial port with 9600bps 8N1. The default login of the VDSL Quadband Switches is admin (Username) and 123 (Password). The Quadband switches provide Webbased Management and full SNMP.

For a fully functional VDSL system using the VDSL Quadband Switches you need only VDSL Receivers (MEG101RAE-R2) and one or more switches (MEG801AE-R2 or MEG2401AE-R2).

Using any non R2 or R3 equipment of MEG series with R2 or R3 equipment of MEG series is not possible (For example MEG801AE-R2 and MEG101RAE does not work)

Connecting the VDSL Routes to MEG801AE-R2 is very easy since every VDSL Port is accessible with an standard RJ-11 socket. The 24 Port version (see above) provides Telco (RJ-21) connections. You may need Telco cables and a Patch panel to connect.

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Installing the Modem
Hardware Installation

You may install the Modem on any level surface (e.g, a table or shelf). However, please take note of the following minimum site requirements before you begin. Stick the 4 plastic feet at the bottom to avoid scratches.

Pre-installation Requirements

Before you start the actual hardware installation, make sure you can provide the right operating environment, including power requirements, sufficient physical space, and proximity to other network devices that are to be connected. Verify the following installation requirements:

The standard power supply coming with MEG101TAE-R3 and MEG101RAE-R3 is intended for use in Central Europe only (220V). It supplies 5V@1A. For use in USA, Japan, Australia and UK please use Black Box power supply PS649-R3 for the Transmitter and the Receiver. PS649-R2/4 is available to power 4 of these units with one power supply.

The Modem should be located in a cool dry place, with at least 10cm/4in of space at the front and back for ventilation.
Place the Modem out of direct sunlight, and away from heat sources or areas with a high amount of electromagnetic interference.
Check if network cables and connectors needed for installation are available

DIN RAIL Mounting sets are available for MEG101RAE-R3 (Receiver) or MEG101TAE-R3 (Transmitter). Mount the VDSL Modem to MEG101-DIN and then to DIN-RAIL MC2

General Rules

Ethernet Port (RJ-45)
All network connections to the Modem Ethernet port must be made using
Category 5, 5e or 6. No more than 100 meters of cabling may be used between
the HUB or Computer. The Ethernet port is Auto-MDI/MDIX capable,
so you can always use a 1:1 straight through Ethernet cable.

VDSL Port (RJ-11 or Terminal Block)
All connections to the VDSL RJ-11 Port or terminal block must use 24~26 Gauge phone
wiring. We do not recommend using 28 Gauge or above phone line. The active
pins are the two middle pins 2 and 3. To have a clear setup we recommend to have the
VDSL line 1:1 straight through. So, for your notice only, this VDSL device works crossed
and straight through.

VDSL Port RJ-11 Pin out (6 pin wide, 4 pins existing, 2 pins active)

Pin#	FUNCTION
1	Unused
2	**TIP**
3	**RING**
4	Unused

Alternatively to the RJ11 Port you are welcome to use the Terminal Block. Choose to use
either or, do not use both in parallel. The Terminal Block allows you to use simple wires
without crimping a connector to it.

Phone Port (RJ-11)
Here you can connect FXS/FXO equipment. This means that on the Transmitter
side you can connect your PBX and on the Receiver side you can connect an
analog telephone. Digital Interfaces like Uk0 or Up0 may work, but there is no
guarantee. We experienced that one or two ports of your Siemens, Avaya or
Alcatel PBX may work fine. ISDN 2-wire works very fine. So you can extend the
incoming line from your provider and connect your NTBA to the Receiver. ISDN
4-wire (ISDN BRI or S0) will not work.

Phone Port RJ-11 Pin out (6 pin wide, 6 pin existing, 2 pins active)

| Pin#	FUNCTION
1	Unused
2	Unused
3	**POTS**
4	**POTS**
5	Unused
6	Unused

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Connecting the Modem

The Modem has one Ethernet port which supports connections to Ethernet
devices like NICs, Switches, bridges or routers. You can also connect to another
MEG101AE-R3´s Ethernet port for daisy chaining.

The RJ-11or terminal block line port is used to connect to the "other side" through your
telephony wall socket (outlet). For making connections you can alternatively use
Patchpanels or anything else (like terminal strips). You just need to be sure that
you have a good electrical connection. So keep in mind that using stranded wires
for use in Krone strips is not ideal.

**Avoid using telephony RJ-11 ribbon cables. These cables are built with using very
low diameter stranded cables. Using them will mean that bandwidth is lower and
reach is shorter!** For making use of Coax Cabling an adapter MEG5911 is available.

Please note that connections are only operable between Transmitter and
Receiver or between the switch (MEG801AE-R2/MEG2401AE-R2) and a Receiver.
Connecting two Transmitters or two Receivers by the Line Port will not work.
Use only one line port at the transmitter and one line port at the receiver at a time.
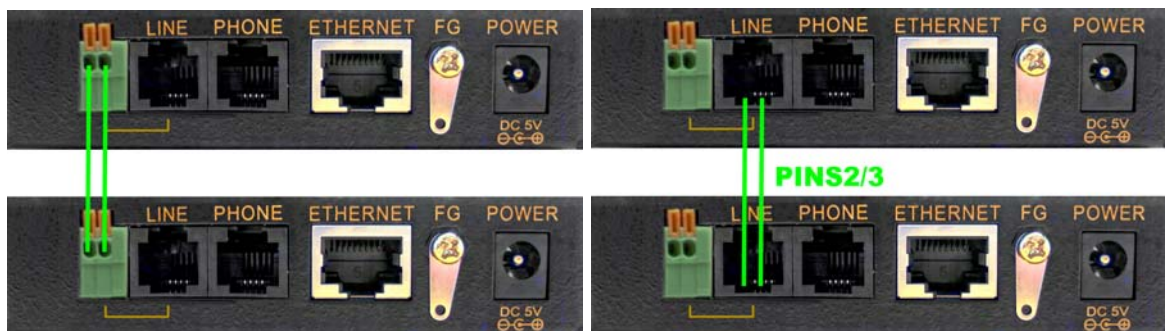
The RJ-11 Phone port of the Transmitter can be connected to a PBX (ab) or your
incoming 2-wire ISDN connection. The RJ-11 Phone port of the Receiver can be
connected to an analogue telephone, an analogue Modem or your NTBA.

Safety and Warranty Rules and Warnings

ALWAYS CARE FOR SEQUENCE FOR INSTALLATION AND POWER UP !!!

ALWAYS USE THE CORRECT POWER SUPPLY AND CABLES.

DO NOT open the unit or device. Opening or removing the covers can expose you to dangerous high voltage points or other risks. ONLY qualified service personnel can service the device.

Use ONLY the dedicated power supply for your device. Connect the power cord or power adapter to the right supply voltage (e.g. 110V AC in North America or 230V AC in Europe).

DO NOT use the device if the power supply is damaged as it might cause electrocution. If the power supply is damaged, remove it from the power outlet. DO NOT attempt to repair the power supply.

Place connecting cables carefully so that no one will step on them or stumble over them. DO NOT allow anything to rest on the power cord and DO NOT locate the product where anyone can work on the power cord.

DO NOT install nor use your device during a thunderstorm. There may be a remote risk of electric shock from lightning.

DO NOT drill screws or nails into the device.

DO NOT expose your device to dampness, dust or corrosive liquids.

DO NOT use this product near water (e.g. in a wet basement or near a swimming pool).

Connect ONLY suitable accessories to the device. Make sure to connect the cables to the correct ports. Carefully distinguish between Network and VDSL cables!

DO NOT obstruct the device ventilation slots, as insufficient airflow may harm your device.

DO NOT store things in the device.

DO NOT use the device outdoors. Operating Temperature is 0 to 50 Celsius, but the chassis is not waterproof.

Be careful when unplugging the power due to transformer may be very hot.

Keep the device and all its parts and accessories out of children's reach.

Clean the device using a soft and dry cloth rather than liquid or atomizers. Power off the equipment before cleaning it.

Not caring for those rules listed above means loosing warranty!

Hardware Description

Front Indicators
PWR (Power LED)
Steady Green
It will light up (ON) to show that the product is powered up.
E (Ethernet LED)
Steady Green or Flashing
It will light up when there is an active and valid Ethernet Link.
It will flash when there is Activity, meaning Ethernet packets going through.
LINE SPD (5/125/25) (VDSL LED)
It will show you that a connection to the corresponding VDSL device has been
successfully established. The corresponding LED (5, 15 or 25) will tell you what
the transfer speed is. This depends on the length and the quality of the wire.

Rear Panel
Line For connecting to the the "the other side".
Phone For connecting FXS/FXO equipment
Ethernet For connecting to your Ethernet device.
FG (Frame Ground) For grounding, may be of interest when the grounding
potential is different between the sides. Do not connect FG of Side A and B by a third wire
in these cases.

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Troubleshooting

The Modem can be easily monitored through its comprehensive panel indicators.
These indicators assist the network manager in identifying problems the device
may encounter. This section describes common problems you may encounter
and possible solutions

Symptom: Power indicator does not light up (green) after powered on.
Cause: Defective External power supply
Solution: Check the power plug by plugging in another suitable power supply. Check the
power cord with another device. If this fails to resolve the problem, have the power supply
replaced.(PS649-R2)

Symptom: Link indicator does not light up (green) after making a connection.
Cause: Network interface, network cable, or switch port is defective.
Solution: Power off and re-power the VDSL Modem. Verify that the switch and attached
devices are powered on.
Be sure the cable is plugged into both the switch and corresponding device. Check LED
activity on your switch or corresponding Ethernet Device. Verify that the proper cable type
is used and its length does not exceed specified limits (100 Meter). Check the Modem on
the attached device and cable connections for possible defects. Replace the defective
Modem or cable if necessary.

Symptom: VDSL Link cannot be established
Cause: VDSL auto speed failure, or phone cable length is over specification with the limit
of 1.9km or not a 24 gauge phone wire or different grounding potentials.
Solution: Please make sure phone wire must be connected between Transmitter and
Receiver when both are power on. Use middle Pins of the RJ-11 line port. Avoid using
RJ-11 telephony ribbon cables. The Transmitter will do auto speed function depending on
phone wire length, therefore if the transmitter can't detect the receiver over
VDSL line while both power on, this will cause the link to fail. Please check phone cable
and the length not to be over 1.9km. Try to ground Transmitter and Receiver properly. Try
to increase Interleave and try again after repower.

What does not or may not work with MEG101/801/2401 series products?

⇨ Jumbo Frames, max. Frame Size is 1536 bytes
⇨ Transmission of non-standard protocols
⇨ Setting to 5 Mbps Link Rate with very short cables
⇨ Setting to 25 Mbps Link Rate with very long cables
⇨ Routing just with using the VDSL Extender Set
⇨ PoE to provide power or to get power from modems
   (If you require this, call Black Box for information on MPG101AE-R2)
⇨ Using with Black Box DTX5000 System
⇨ ISDN BRI/PRI/S0 or E1/G703 transmission by POTS port
⇨ Digital 2 wire phone connections like Up0E

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What can I do if my line is too long?

Often there are different routes to get to the "other side". Try to find out if there is another one. If not, Black Box has other xDSL devices that will make you happy.

Please check MDS932AE-10BT-R2, MDS952AE-10BT and/or MDS5110AE, MDE5210E/MDE5211E to be an alternative for your application by calling your Black Box office . Check www.blackbox.eu for mailadresses, phone and fax-numbers.

Firmware Upgrade

The MEG101RAE-R3 and MEG101TAE-R3 units can not be firmware upgraded. The switches MEG801AE-R2 and MEG2401AE-R2 can be firmware upgraded by TFTP or RS232. Check the manual of the switches on how to do that.

Tech Support

It is our main philosophy to service you and your needs. If you have any questions please feel free to contact Black Box Free Tech Support. Check www.blackbox.eu for phone numbers of your local office.

D Data   **V** Voice   **H** Hotline

Black Box Worldwide Offices

As well as the Black Box International Subsidiaries listed below, we also have a worldwide network of distributors ensuring efficient shipment of stock and delivery of the right local technical and language support that you need.

Australia	España	Österreich
Belgium + Luxemburg	France	Puerto Rico
Brasil	Italia	Suomi
Canada	Japan	Sverige
Chile	México	Schweiz
Danmark	Nederland	United Kingdom
Deutschland	Norge	United States of America

Product Features & Specification

=> Supports plug & play, you don't need to change any setting
=> Compliant with IEEE802.3 10BASE-T standard.
=> Compliant with IEEE802.3u 100BASE-TX standard.
=> Compliant with ETSI, ITU, ANSI standards
=> Max distance 5M/5M distance up to 1.9km(6333ft)
   15M/15M distance up to 1.3km(4333ft)
   Max speed 25M symmetrical and distances up to 800m(2666ft).
=> QAM-based-4Band VDSL Technology operating at the following
   dynamically assigned and used frequencies within this range:
   900 kHz ~ 3.9MHz and 4MHz ~ 7.9MHz
=> Supports 1 * RJ-11 connector for Ethernet over VDSL.
=> Supports 1 * RJ-11 connector for telephone/PBX connection.
=> Supports 1 * RJ-45 port for 10/100Mbps Ethernet with Auto MDI/MDIX.
=> Supports Auto-speed and full duplex for VDSL port.
=> Supports long packet size up to 1536 bytes
=> Voice and Data work on the same 2 wire telephone line.
=> Supports flow control IEEE802.3x for Full Duplex & Back Pressure
   for Half Duplex.
=> Supports Surge protection.
=> Provides LED indication Power, Link/Active Status for Ethernet port
   and Link for VDSL port.
=> External switching power adapter Input: AC 85-240 volts/50-60Hz;
   Output: DC 5V/1A or above.
=> Metal case design
=> Power Consumption: Transmitter: 2.15W / Receiver: 2.75W.
=> Operating Temperature: 0°C ~ 50°C (32F ~ 122F)
=> Storage Temperature: -20°C ~ 65°C (-4F ~ 149F)
=> Humidity: 10 to 90% (non-condensing)
=> Weight: 0.68kg
=> Dimensions: 95 x 110 x 24 mm (3.74" x 4.33" x 0.94").