

RANGE PRO II X

range-x pro v2

professional
ADAT-cable extender
preliminary manual



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1 Description

„Range-x pro II“ is a professional cable extender for ADAT®- and MIDI-signals, which has four ADAT-inputs and four ADAT-outputs. These channels can be configured in several transmissions configurations, such as 16/16 (send/receive) or 24/8 (send/receive). Transmitting of up to 16 mono channels in full-duplex is possible. A unidirectional transmission of 32 channels is possible as well. Sample frequencies of 44.1 kHz, 48 kHz, 88.1 kHz und 96 kHz are supported. All ADAT-streams in one direction are synchronous to phase and bits.

Two „range-x pro“-devices are connected via a custom Ethernet cable (Cat5-Patch cable, max. 70m) with a NEUTRIK EtherCon RJ45-plug.

The audio inputs and outputs are optical TOSLINKs. MIDI is connected via standard DIN-plug (5 pol.).

Overview

- Up to 32 mono channels, 24 Bit single direction @ 48kHz
- Send/Receive Channels can be configured
- 16 mono channels, 24 Bit voll duplex @ 48kHz
- 8 monochannels, 24 Bit voll duplex @ 96 kHz
- MIDI, voll duplex
- transmission distance up to 150 meters (400 ft.)
- Standard Cat5-Patchkabel
- Internal Phase-Locked-Loop

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2 Getting started

„range-x pro“ is used like an optical cable, and is therefore simply inserted in the transmission way. You only have to consider, that ADAT input 1 is always used, because this input is used as the sync input. Therefore all inputs (input 1, 2, 3 and 4) must have the same bit-rate and phase. Hence, the optical cables should have an identical length and should be derived from the same source device.



figure 1: device front view

In figure 2 you can see the status LEDs. The power-LEDs light red, if the power supply is connected correctly.

Both sync-LEDs blink as long as the box tries to sync, or if no input signal can be detected at the digital input. The LEDs stop blinking and start lighting, if a valid ADAT signal could be detected and syncing is possible. Only when both (for full-duplex operation) sync-LEDs light constantly, an error-free transmission of audio and MIDI is possible.

In order to transmit MIDI-Data, the switch (DIPSWITCH 6) on the device rear front must be set to "on" (see. figure 4). If MIDI-transmission is activated, the midi-activity LED blinks when MIDI-data is received or transmitted. The MIDI-send LED signals that MIDI-Insertion is activated



figure 2: Status-LEDs

On the rear front (see figure 4) you can find the connections for the power-supply (7.5V – 9V / min. 500mA), the EtherCon RJ45-plug and the Dip-Switch

You must consider the transmission direction at parallel transmission of audio and MIDI. MIDI-Data can only be transferred in the direction of the ADAT-input 1. For more details please read chapter 2.1 *MIDI-Transmission*.

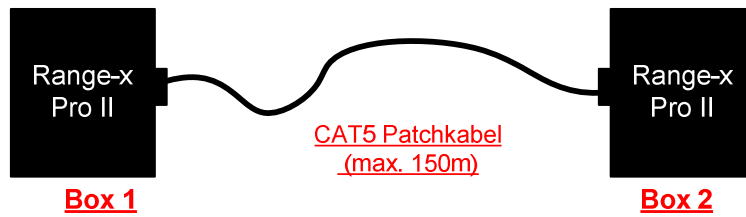


figure 3: allowed wiring Cat5-Patchkabel



figure 4: device rear view

As an example, a typical transmission way is shown in figure 5. Here, sixteen mono channels are transmitted via one CAT5 cable in two directions. In this configuration the version 2 is compatible to earlier range-x pro versions. Please make sure that both ADAT-Streams have the same bit-rate and phase. The internal PLL only syncs on the data stream at input 1. If the two inputs have not the same phase, an error-free transmission of data from input 2 cannot be guaranteed.

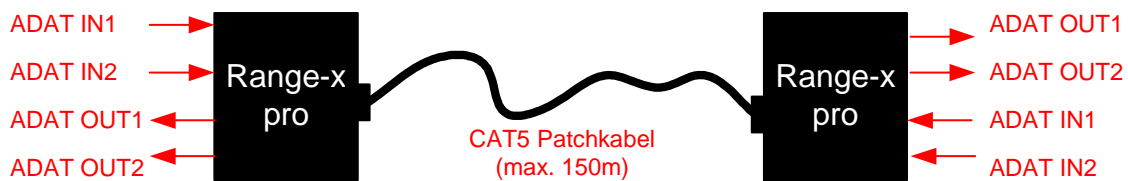


figure 5: Typical transmission way (16 channels, full-duplex)

2.1 MIDI-Transmission

MIDI-Transmission can be activated by a setting DIP-Switch 6 to "On" (top position of switch). If MIDI-Transmission is active, MIDI-data is inserted in the appropriate User-Bit of the ADAT-Stream 1. The USER-Bits of the other ADAT-inputs are not touched.

Because the ADAT-signal from input 1 is used as a transport stream, MIDI-data can only be transported in the direction of the appropriate ADAT-Stream. (see figure 7). For a

bidirectional transfer of MIDI-Data, at least ADAT-input 1 of each device must have a valid ADAT-stream (see figure 8).

In figure 6 the possible settings for MIDI-Insertion are shown.



figure 6: Dip-Switch setting for MIDI-Insertion

Remark: Inserted MIDI-Data is not deleted from the data stream at the receiver and is therefore still present in the outgoing ADAT stream.

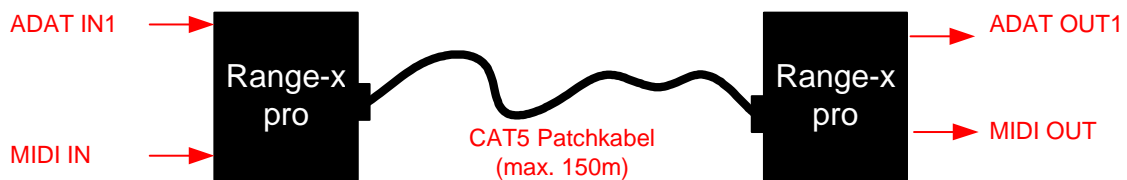


figure 7: Unidirectional transmission of audio und MIDI

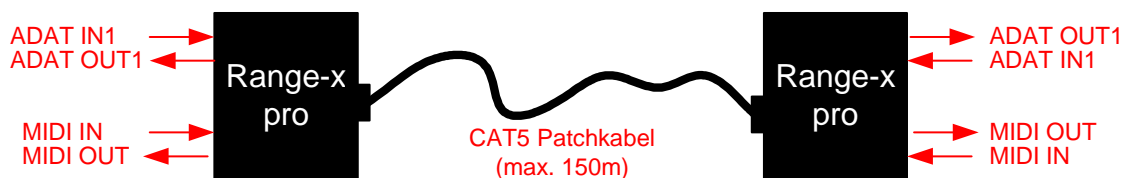


figure 8: Bidirectional MIDI-Transmission

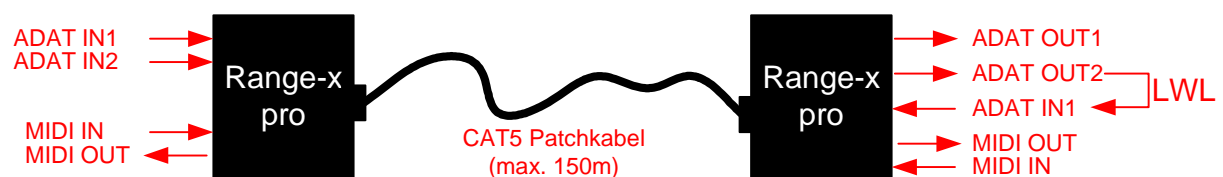


figure 9: Bidirectional MIDI-Transmission, LWL-Loop

Using „range-x pro“ only for MIDI-Transmission, the ADAT-Signal from output 2 (OUT2) can be looped with an optical cable (see figure 9).

Remark: The ADAT-Signal from OUT1 must not be looped, because MIDI-Data is already present in this ADAT-Stream and would interfere the MIDI-transmission in the counter direction.

Remark: In order to transfer MIDI with full-speed, the ADAT sampling frequency must be 48 kHz. Otherwise data loss or errors are likely.

2.2 Channel Configuration

The send or receive channels of range-x pro v2 can be configured on your demands. For a unidirectional transmission a maximum of 32 mono channels can be transmitted. If you need a duplex transmission you can either configure the range-x pro v2 in a 16/16 configuration or a 24/8 or 8/24 configuration. The different configuration modes are to be explained in the following figures. As one can see the channel settings of the second range-x box are inverted to the ones of range-x box 1.

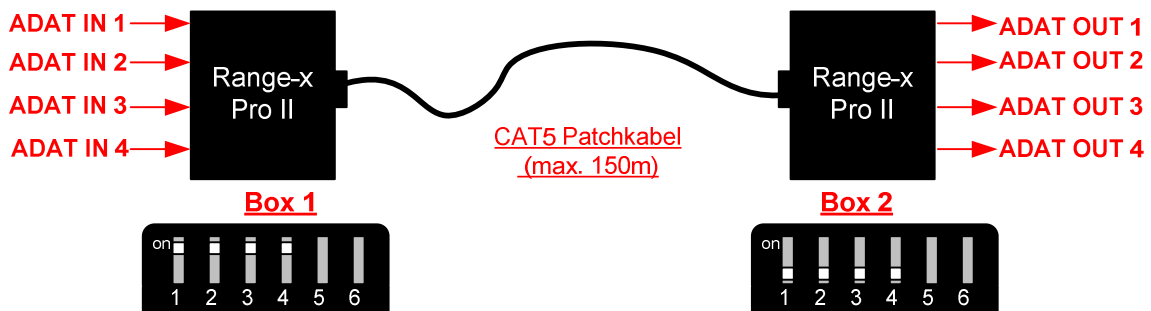


figure 10: 32 send/receive channel configuration

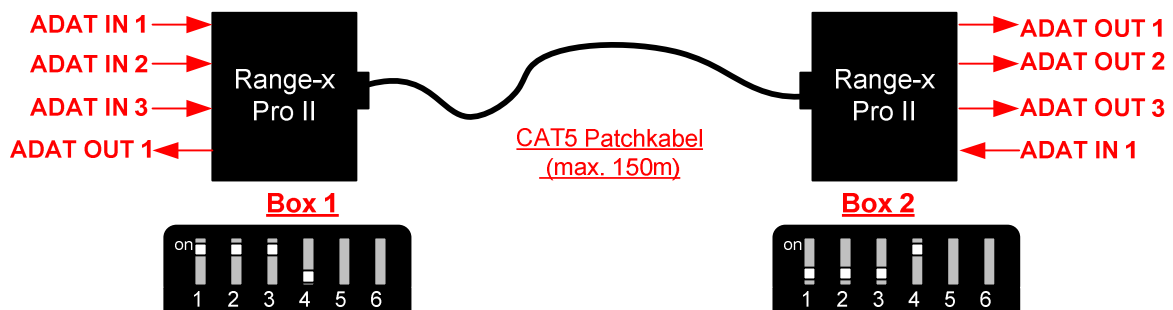


figure 11: 24/8 send/receive channel configuration

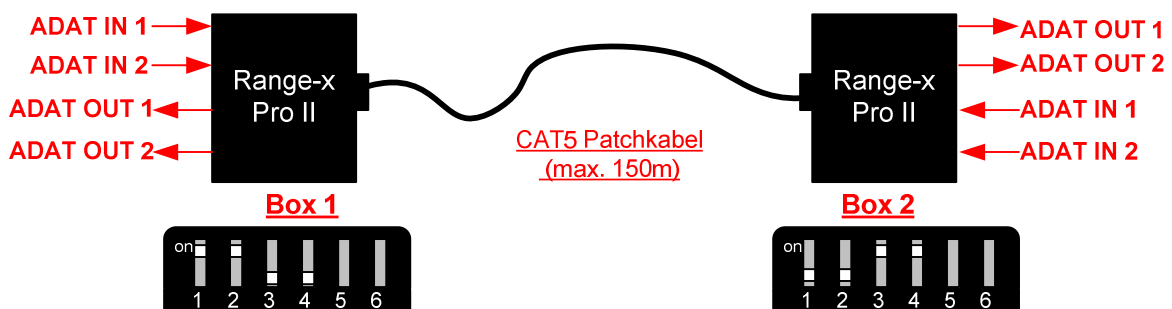


figure 12: 16/16 send/receive channel configuration

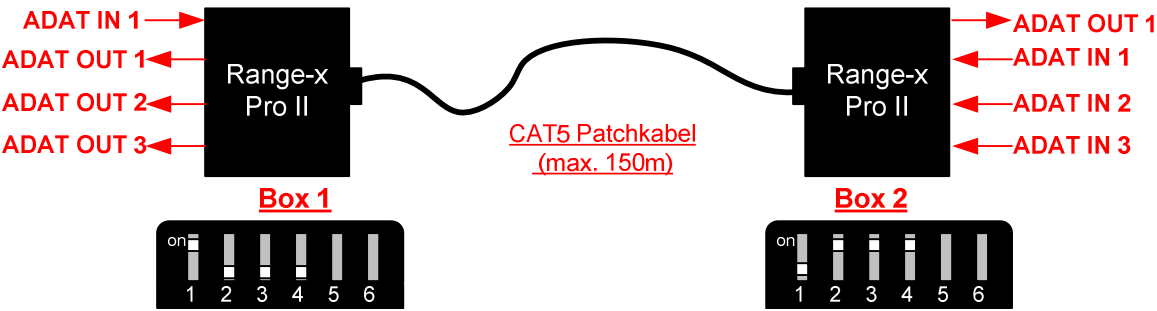


figure 13: 8/24 send/receive channel configuration

3 Technical data

operating power : 7.5V to 9V
 operation current : max. 500mA at 7.5V
 operation temp. : +15°C bis +40°C
 distance : ca. 150 m (CAT5 Patch cable)

audio inputs : ADAT TOSLINK, 24-Bit
 audio outputs : ADAT TOSLINK, 24-Bit
 sample frequencies : 44.1 kHz, 48 kHz, 88.2kHz and 96kHz

dimensions:



safety precautions:

- Use only DC power-supplies, which conform to protection class 2 VDE0551. Pay attention to a correct polarity of the power supply (s. figure 14).
- Never expose the device to the direct sun or other heat. Excessive heat can lead to malfunction of the device.
- The device is manufactured for indoor use only.
- Never start working with the device at once, when coming from a cold to a warm room. The device could be destroyed by condense water at worst case. Let the device adapt to room temperature.

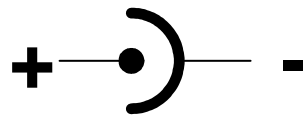


figure 14: Polarity of the DC-Adaptor

4 FAQ

- 1. The power supply is connected, but the power-LED does not light?**
Check the polarity of the power supply (see figure 14). Did you choose the right voltage range? The minimum and optimal input voltage is 7.5V DC. If you work with a 32/0 channel setting a power supply of 9V is recommended.
- 2. The ADAT-Sync-LED blinks, although an ADAT-signal is present.**
range-x pro only supports sample frequencies of 44.1 kHz, 48 kHz, 88.2 kHz and 96 kHz. range-x pro can not sync on a wordclock of 32 kHz. The ADAT-Signal must be connected to input 1.
Only ADAT-Signals can be detected and transmitted, SPDIF-Signals are not supported.
- 3. The rangeX-Sync-LED does not light, although a CAT5-cable is connected.**
The rangeX-Sync-LED only lights or blinks, if data is received via CAT5. E.g. for unidirectional transmission, the ADAT-Sync-LED only lights at the sender and the rangeX-Sync-LED does not. At the receiver only the rangeX-Sync-LED lights and the ADAT-Sync-LED does not.
- 4. The rangeX-Sync-LED blinks, although an ADAT-Signal is present and a CAT5-Kabel is connected.**
Only cable lengths (CAT5) of up to 150 meters are supported. If you use a longer cable or the cable is defect, sync problems are likely. If possible, check your wiring with a shorter cable or a second one. See also point 9.
- 5. Transmission of 16 channels is not working properly.**
When working with more than one ADAT-input you must make sure, that the other ADAT-inputs have the same wordclock and phase like the main input (input 1). In general this is the case, if streams come from the same source device and if the optical cable are identically long. If difference in phase is too big compared to ADAT-input 1, errors in one or all other (2-4) ADAT streams are possible.
- 6. Transmission of 32 channels is not working, but other settings work correctly.**
In the 32 channel mode we recommend to use a 9V power supply. By using a 7.5V power supply some power supplies deliver a slightly less voltage due to the higher current requirement.
- 7. Although MIDI-Transmission is activated, no MIDI-Data is transmitted.**
Check MIDI-wiring!
MIDI-transmission must be activated at both devices.
Did you choose the right transmission direction? By Using an unidirectional wiring scheme, transmission of MIDI-data is only possible in one direction.
Audio sampling frequency must be 48 kHz, otherwise errors are likely.
- 8. Bidirectional MIDI-Transmission is not working.**
For bidirectional MIDI-Transmission, ADAT-input 1 on each device must have a valid ADAT-stream. This can be achieved by optical looping of (OUT2 -> IN1) or by an independent ADAT-Signal. The ADAT-Signal from OUT1 must not be looped.
- 9. Everything is wired correctly, but the transmission is not working properly.**
The used cable must be a CAT5-Patch cable. You cannot use Crosslink-cables. Transmission distance is limited to 150 meters. If you use a longer patch cable, an error-free operation can not be guaranteed. A (possible not visible) damage of

the CAT-cable can lead to malfunction too. Checking of the cable by a continuity tester (DC) is not sufficient!