

A16 Ultra

renowned technologie - new design



SonicCore
DSP Audio Technology | GmbH

A16 Ultra

The **A16 Ultra**, following in the tradition of the successful A16 converter, is a very compact multi-channel 24bit/96kHz AD/DA-converter offering uncompromising audio quality. It combines the qualities that made its forerunner so popular with today's latest audio technology.

The **A16 Ultra** simultaneously converts 16 analog audio channels to digital and 16 digital channels to analog. The digital interfacing is provided through two ADAT or two Z-Link interfaces. An additional slot is reserved for possible future options, which might become available at a later stage.

An automatic memory function stores the current settings when you switch the unit off, so you can get back to work quickly and easily when you resume your session.

Not only because of its audiophile quality, but also because of its flexibility and expandability, the **A16 Ultra** will prove itself daily to be a perfect fit for your professional studio.



Controls

The front panel contains the power switch, two buttons (Synchronization and Sample Rate) and 11 light emitting diodes (LEDs) to indicate the device status. It also contains the 16 five-segment level indicators for precise analog input calibration.

When switched on, the green power LED indicates that the unit is operational.

ADAT and Z-Link interfaces "A" correspond to analog channels 1-8; ADAT and Z-Link interfaces "B" correspond to analog channels 9-16.

The analog inputs and outputs are balanced and can be configured, by group, to professional or consumer levels with 4 DIP switches (rear of the unit).

The Synchronization button selects the clock source for the sample rate. In Master mode, the Sample Rate button selects the desired sample rate. In Slave mode, the sample rate is indicated here, and the Sample Rate button is used to switch between S-Mux and normal operation. In normal operation, all sample rates less than 50kHz are indicated.

A16 Ultra as Word Clock Master

When the **Master LED** is green, the **A16 Ultra** is operating in **Master** mode.

The sampling frequency used by the analog-to-digital (ADC) and digital-to-analog (DAC) converters is derived from a highly stable internal clock generator. Using the Sample Rate button, the sample rate can be set to 32kHz, 44.1kHz, 48kHz, 88.2kHz or 96kHz. A sample clock signal is available at the Word Clock Out BNC connector on the rear of the unit. This signal is used to synchronize additional external devices to the sample clock.

If the unit is operating in Master mode at 88.2kHz or 96kHz, the ADAT interfaces switch automatically to S-Mux. In this case, ADAT A corresponds to analog channels 1-4, and ADAT B to channels 9-12.

A16 Ultra as Slave: ADAT and Word Clock

The **ADAT LED** lights in **green** to indicate that the **A16 Ultra** is in **ADAT Slave** mode. If this LED lights in **red**, it is an indication that no ADAT signal is present at the ADAT inputs (possibly because the optical cable is not connected).

The Word Clock LED lights green to indicate that the A16 Ultra is synchronized to the clock signal present at the Word Clock IN (BNC) connector. If this LED lights red, it is an indication that no Word Clock signal is present at the Word Clock input.

A special situation arises in Slave mode, if the incoming samplerate at the ADAT or Word Clock inputs ranges between **38kHz - 50kHz**:



The ADAT signal itself provides no indication on whether it is transmitting a "true" 48kHz 8-channel signal or a multiplexed 96kHz 4-channel signal. Therefore this setting must be selected manually. Pushing the Sample Rate button switches between Normal and S-MUX operation. The Sample Rate LEDs alternate between 48 kHz and 96 kHz accordingly. When the 96kHz LED is lit, the A16 Ultra is operating as an ADAT slave in S-MUX mode. Similar behavior applies with an ADAT or Word Clock input signal frequency of 44.1kHz.

In contrary to the ADAT signal, a Word Clock input signal can have a frequency of 88.2kHz or 96kHz. When these frequencies are detected at an input, the A16 Ultra unit switches automatically into the S-MUX mode.

A16 Ultra as Z-Link Slave

The **Z-Link LED** lights **green** to indicate, that the **A16 Ultra** is connected to a computer, which has been assigned to control the **A16 Ultra** as master. In this case the sample rate is selected remotely via the computer.

In **Z-Link mode**, up to two ADAT-compatible devices interfaced via the optical connectors can be accessed via the PC without the need for recabling. The Sample Rate button is used to determine, whether these devices can be accessed or not. The level indicator array provides a simple text display and briefly shows either "**ANLG**" or "**ADAT**". Pushing the button **once** causes the current setting to be displayed, while pushing it **twice in rapid succession** ("double-clicking") causes the setting to change.

ANLG: is similar to the normal A16 Ultra operating mode. Additionally, the analog input signals are sent to the ADAT out connectors (after being converted by the ADC). This allow i.e. during recording session via the **A16 Ultra**, to hook up an original ADAT-XT tape in order to make backup recordings.

ADAT: indicates, that the **A16 Ultra** now is configured as a Z-Link <-> ADAT Interface. This configuration can be used i.e. to transfer an ADAT recording from tape to the computer. The signals being transferred are simultaneously available via the ADAT outputs and - via the **A16 Ultra** DACs - as analog signals.

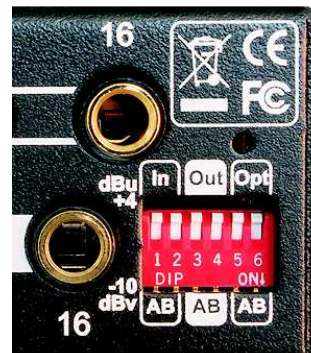
If a sample rate of **88.2kHz** or **96kHz** is selected while in Z-Link mode, the ADAT interfaces are automatically switched into the S-MUX operation mode.

Option

The Option LED is reserved for future A16 Ultra expansion options and non-functional until then.

Level

The A16 Ultra is equipped with balanced inputs and outputs. The A16 Ultra can be adapted to various standards via the DIP switches on its rear panel. The analog inputs can be set in groups for an input sensitivity of either **-10dBv** or **+4dBu**. The same applies to the analog outputs.



The functions of the DIP switches are as follows:

Name	UP	DOWN	Function
IN-A	Prof (+4dBu)	Consumer (-10dBv)	Level (Gain) for input group A
IN-B	Prof (+4dBu)	Consumer (-10dBv)	Level (Gain) for input group B
OUT-A	Prof (+4dBu)	Consumer (-10dBv)	Level (Output) for output group A
OUT-B	Prof (+4dBu)	Consumer (-10dBv)	Level (Output) for output group B
OPT-A			Reserved for future expansions
OPT-B			Reserved for future expansions

Since the maximum signal or numerical value which can be faithfully converted constitutes the practical upper limit for all AD/DA converters, this limit is represented as **0 dBFS** (Full Scale) in the level display and signifies that the analog input signal is just barely at the level at which numerical overload is about to occur. However the **red LED** lights starting at a level of **-0.5 dBFS**, thus providing a warning of impending overload before it actually occurs.

In any digital system, it is desirable to use as many "bits" as possible in order to keep the noise component of the signal to a minimum (each bit used corresponds to approximately **6 dB** additional signal-to-noise ratio).

The level at each of the 16 inputs is displayed via a 5-segment peak indicator. The **yellow** and **red LEDs** are equipped with a peak-hold function for improved readability. The LEDs light in succession at the following signal levels: **-60 dBFS; -12 dBFS; -6 dBFS; -3 dBFS** and **-0,5 dBFS**.

As a basic rule of thumb for optimal recordings, input signal levels should be adjusted so that the **red LEDs** never or only very seldom light - that is, as high as possible without causing overloading. This ensures that all bits will be used and that the noise floor will be as low as possible.

General Tips / Troubleshooting

Mute Function

An important feature of a studio-grade AD/DA converter is the ability to instantly mute itself, if errors occur in the digital data stream. This can happen very easily in practice - for example, when more than one digital device in the system is accidentally operated as master. Such errors are especially hazardous to high-quality monitor loudspeakers, which can quickly be destroyed by the resulting high-energy impulses.

The A16 Ultra mutes its inputs upon detecting a digital carrier signal with an incorrect sample rate. On the other hand, an input signal from an unsynchronized source does not cause muting, and the signal is allowed to go through. Because the **A16 Ultra** works with any phase at its inputs, clicks and pops occur only occasionally, when an "extra" sample is inserted or when one is left out. This can occur, if the A16 Ultra and the computer to which it is connected are both operating as sync master.

All of the LEDs associated with the **Synchronization** button are **dual-color LEDs**. **Green** indicates that the sync source signal is of good quality and that the high-jitter-tolerance / low-jitter PLL is locked to the sync signal. **Red**, on the other hand, generally indicates a problem with the digital connections.

S-MUX

The ADAT signal, as specified by Alesis, is defined only for sample rates between roughly **37 kHz** and **50 kHz**. In order to permit the transfer of 96 kHz data streams via the optical cable, a transfer format with the name S-MUX was developed, in which the eight channels of a standard ADAT interface are used as four pairs, each of which can transfer one channel at the higher sample rate. Unfortunately, the fact that an ADAT signal is being used in S-MUX mode cannot be ascertained from the signal itself. This means that this mode must be selected deliberately and manually by the user.

Inappropriate S-MUX activation can result in the generation of unwanted high-frequency signals. S-MUX is therefore always automatically switched off whenever the sync source or the sync frequency is changed.

What happens if the transfer mode and the sample rate is chosen incorrectly?

- Normal source (i.e. 44.1 kHz) with A16 Ultra S-MUX 88.2 kHz:

Pairs of channels get "mixed" and image frequencies are produced in the range **22-44 kHz** (or **24-48 kHz**). These higher frequencies generally inaudible - could quietly cause overheating damage to the high-frequency drivers of a monitor system.

S-MUX source (i.e. 96 kHz) with A16 Ultra normal 48 kHz:

Each single signal is "spread" across two channels. Frequencies which above **24 kHz** (or **22 kHz**) will be imaged into the audible spectrum (this is normally referred to as aliasing). This effect is rarely audible within most of the audio material, as the high frequency content normally is minimal.

Synchronization

ADAT inputs may operate in an arbitrary phase relationship to the device Word Clock. In addition, each device may have a different phase offset.

In order to ensure that groups A and B are played back correctly in-phase, the start of every received ADAT signal must be offset by no more than **+/- 25%** of a Word Clock period with respect to the reference clock (internal or sync source). If the phase difference is larger than this, the signal will nevertheless still be correctly received, but may be shifted by one sample.



For proper operation of SonicCore boards we therefore took care, that all ADAT outputs are correctly phased anytime- even those of multicard systems!

Auto Synchronization

Whenever a signal is present on the ADAT A or Z-Link A interface, the **A16 Ultra** will synchronize itself to this signal, regardless of whether a signal is also present on interface B. When a signal is present on interface B and no signal is detected on interface A, the **A16 Ultra** will synchronize itself to the interface

Z-Link

If only one Z-Link interface is connected, the other half of the converter remains in ADAT mode. Since the converter always derives its sync clock from the Z-Link data stream when in Z-Link mode, any device which is connected to the ADAT interface must be operated as a sync slave.

The Z-Link connectors must be driven by phase-aligned signals.



In a DAW-system composed of multiple S/TDM-interconnected Scope boards inside a single computer, the correct phase alignment of the Z-Link signals is managed automatically.

If the two Z-Link streams are not properly phase-aligned, the **A16 Ultra** mutes itself completely.

Analog connectors

The stereo phone jacks of the analog inputs and outputs are connected as follows:

Tip is hot (+), ring is cold (-)

(see the table 'Inputs and Outputs' on the next page)

Power Supply

The **A16 Ultra** is delivered with the proper AC power adaptor and should be used exclusively with this adapter.

In case of loss or damage please use only an 12 VAC 1.5A Power supply in connection with your **A16 Ultra**.

The **green Power LED** signals that the **A16 Ultra** is ready for operation. If this LED does not light, check whether the AC adaptor is being supplied with power. The **A16 Ultra** contains no internal user-replaceable fuses. It is protected internally against thermal and electrical overloading and shuts itself down automatically when necessary to avoid damage. When the problem has been solved, the **A16 Ultra** will automatically switch itself on again.

Inputs and Outputs

To avoid hum due to ground loops we recommend an ungrounded (earth lift) wiring scheme.

We also recommend use of balanced lines with the A16 adjusted to +4dBu for optimal AD/DA quality.

Balanced to Balanced (lifted ground)					
balanced output		Cable		balanced input	
stereo phone plug	XLR			stereo phone plug	XLR
Sleeve	Pin 1	Shield (GND)		not connected	not connected
Tip	Pin 2	Signal 1 (+)		Tip	Pin 2
Ring	Pin 3	Signal 2 (-)		Ring	Pin 3

Balanced to Balanced					
balanced output		Cable		balanced input	
stereo phone plug	XLR			stereo phone plug	XLR
Sleeve	Pin 1	Shield (GND)		Sleeve	Pin 1
Tip	Pin 2	Signal 1 (+)		Tip	Pin 2
Ring	Pin 3	Signal 2 (-)		Ring	Pin 3

Unbalanced to Balanced (lifted ground)					
unbalanced output		Cable		balanced input	
mono phone plug				stereo phone plug	XLR
Sleeve		Shield (GND)		Ring	Pin 3
Tip		Signal 1 (+)		Tip	Pin 2

Unbalanced to Balanced					
unbalanced output		Cable		balanced input	
mono phone plug				stereo phone plug	XLR
Sleeve		Shield (GND)		Sleeve and Ring	Pin 1 and Pin 3
Tip		Signal 1 (+)		Tip	Pin 2

Balanced to Unbalanced (lifted ground)					
balanced output		Cable		unbalanced input	
stereo phone plug	XLR			mono phone plug	
Sleeve	Pin 1	Shield (GND)		Tip	
Tip	Pin 2	Signal 1 (+)		Sleeve	
Ring	Pin 3	Signal 2 (-)			

Balanced to Unbalanced					
balanced output		Cable		unbalanced input	
stereo phone plug	XLR			mono phone plug	
Sleeve and Ring	Pin 1 and Pin 3	Shield (GND)		Sleeve	
Tip	Pin 2	Signal 1 (+)		Tip	

A16 Ultra technical specifications

Sample rates 96 kHz, 88.2 kHz, 48 kHz, 44.1 kHz, 32 kHz (master)
30 kHz-100 kHz (Word Clock - Slave)
38 kHz-50 kHz (ADAT - Slave)
76 kHz-100 kHz (ADAT - Slave S - MUX)

Channels 16 inputs and 16 outputs

Analog inputs Stereo phone jacks (6,3 mm)

Balanced Input sensitivity + 4 dBu (nominal)
Maximum Input level +20 dBu (0 dBFS)
Input impedance 20 kOhm

Analog outputs Stereo phone jacks (6,3 mm)

Balanced Output level + 4 dBu (nominal)
Maximum output level +20 dBu (0 dBFS)
Input impedance 600 Ohm

Converter performance

Digital - Analog 24 bits / 128 x oversampling / 96 kHz
Frequency response
< + / - 0.15 dB (20 Hz - 20 kHz)
Dynamic range 110 dBA
THD + N 100 dBA / 0,001 % typ.
Channel separation 105 dB @ 997 Hz typ.

Analog - Digital **24 bits / 96 kHz**
Frequency response
< + / - 0.1 dB (20 Hz - 20 kHz)
Dynamic range 99 dBA
THD + N 93 dBA / 0,0028 % typ.
Channel separation 102 dB @ 997 Hz typ.

Digital inputs and outputs

ADAT EIAJ connector 8 chan, 24 bits, 2 in, 2 out

Z-Link 2 standard 1394 connectors. 8 chan, 24 bits, 96 kHz capable

Synchronisation Word Clock In 75 Ohm, BNC
Word Clock Out 75 Ohm, BNC

General specifications

Supply voltage 12V AC

Power consumption 1.5A

Dimensions 44.3 x 483.0 x 189,5 mm (1U)

Weight 3 Kg

For further information, please consult your SonicCore dealer or visit our Web site at www.soniccore.de

SonicCore GmbH
Siegdammm 32
53721 Siegburg
Germany
Email: info@SonicCore.de
Tel : (++49) 2241-301 9595
Fax: (++49) 2241-301 9596

Technical specifications are subject to change without notice. Mentioned product names are registered trademarks of the respective owners.

© 2007 SonicCore GmbH

Warranty Regulations

The hardware described within this documentation and the warranty regulations are governed by and granted according to German Law.

SonicCore GmbH ("SonicCore") warrants, that the described product has been free of failures within parts or components of the hardware and was found to be fully functional. Any single unit was checked by Quality Assurance Department several times and with various measures, before this product has been delivered to you. Therefore please carefully read the following information, which is important in the case of probable damages or malfunctions:

If goods are being found defective, missing features described within the present documentation or becoming defective due to eventual fabrication deficiency or material defects within the first six months after purchase, then SonicCore shall at its sole discretion and evaluation replace or repair the defective parts or goods at no costs. Multiple repairs shall be permissible. In case the malfunction or physical failure can not be fixed, customer receives the right to refrain from the purchase with refund of the amount originally paid for the defective product. In case testing shows no physical damages, customer will be charged for testing procedure and services.

Within the time frame of 6 to 24 months customer has to provide proof, that the claimed malfunction or defective part or component has already been defective upon first delivery. In this case SonicCore will execute required repair or replacement at no cost upon acceptance of customer's proof by SonicCore. In any other cases a service and repair fee will be charged. Please note, that we can not guarantee the success of repair services - especially after the warranty period.

Any deficiencies caused by transportation have to be declared within a 14 days period after receipt of goods by written notice. Please note, that any warranty repair at no cost ruled by the above regulations requires registration of name and address either via returning the registration card coming with the product or by sending the proof of purchase together with the defective product.

To return defective goods, please contact the retailer where you purchased the product. As an alternative you can also contact SonicCore directly to receive a RMA number for the defective product. PLEASE NOTE: It is mandatory to return the product with the referring RMA number to avoid delays in repair.

If possible, please also add a description of the failure occurred to enable us executing the repair as soon as possible.

The hardware described within this documentation is herewith certified to conform to the requirements set forth in the guidelines for electromagnetic acceptability (89/336/EWG)



SonicCore GmbH
Fon ++49 2241 3019595
Fax ++49 2241 3019596
Email Info@SonicCore.de

SonicCore GmbH, August 2007

Gewährleistungsbestimmungen

Für die Hardware des beschriebenen Produktes gelten die gesetzlichen Bestimmungen zur Produktmängelhaftung der Bundesrepublik Deutschland.

Die SonicCore GmbH ("SonicCore") gewährleistet für das beschriebene Produkt, dass es bei der Herstellung frei von Material- und Herstellungsmängeln ist. Hierfür wurde jedes einzelne Gerät von unserer Qualitätssicherung vielfach und sorgfältig getestet, bevor es ausgeliefert wurde. Bitte beachten Sie daher bei etwaigen Mängeln die nachfolgend aufgeführten Hinweise.

Innerhalb von 6 Monaten nach Erwerb wird SonicCore bei physikalischen Mängeln an der Hardware diesen Mangel kostenfrei für Sie beheben. Die Behebung erfolgt in der Regel durch Reparatur oder Instandsetzung. Kann auch nach dreimaliger Reparatur der aufgetretene Mangel nicht behoben werden, besteht ein Anspruch auf Wandlung oder Rücktritt vom Kauf. Kann bei der Überprüfung kein physikalischer Mangel festgestellt werden, ist die Überprüfung kostenpflichtig.

Im Zeitraum von 6 bis 24 Monaten nach Erwerb hat der Erwerber den Nachweis zu führen, dass der aufgetretene Mangel bereits bei Auslieferung vorhanden war. In diesem Fall wird die Reparatur oder Instandsetzung nach Vorlage der entsprechenden Nachweise ebenfalls kostenfrei durchgeführt. In allen anderen Fällen ist die Instandsetzung kostenpflichtig. Für den Erfolg durchgeführter Reparatur- oder Instandsetzungsmaßnahmen kann insbesondere nach Ablauf der Gewährleistung keine Gewähr übernommen werden.

Transportschäden an Produkten sind innerhalb von 14 Tagen nach Erhalt SonicCore schriftlich zur Kenntnis zu geben. Für den Anspruch auf die Durchführung einer Instandsetzung aus Gewährleistung ist das Produkt unter Angabe von Name und Wohnsitz zu registrieren oder bei Einsendung eine Kopie des Kaufbelegs beizufügen.

Bei Rücksendungen kontaktieren Sie bitte den Händler, bei dem Sie das Produkt erworben haben zur weiteren Bearbeitung. Alternativ können Sie auch bei SonicCore vor Rücksendung eines defekten Produktes eine RMA Nummer erhalten, die bei der Rücksendung unbedingt anzugeben ist, um Verzögerungen in der Bearbeitung zu vermeiden. Fügen Sie nach Möglichkeit eine detaillierte Fehlerbeschreibung bei, damit eine Reparatur auch in Ihrem Interesse zügig durchgeführt werden kann.

Bei Schäden durch Mißbrauch, Unfall, Fahrlässigkeit, eigenmächtigen Eingriffen, Änderungen oder Modifikationen am Produkt einschließlich der Betriebssoftware sowie mechanischer oder elektronischer Bauteile, Siegelbruch oder bei Schäden, die auf Nichtbeachtung der in dieser Anleitung gegebenen schriftlichen Anweisungen für ordnungsgemäßen Einbau, Wartung und Benutzung zurückführbar sind, entfällt jeglicher Gewährleistungsanspruch.

The hardware described within this documentation is herewith certified to conform to the requirements set forth in the guidelines for electromagnetic acceptability (89/336/EWG)



SonicCore GmbH
Fon ++49 2241 3019595
Fax ++49 2241 3019596
Email Info@SonicCore.de

SonicCore GmbH, August 2007

front



back



Haftungsausschluss

SCOPE Platform (SP), SCOPE home / project / professional sowie das Zubehör für die vorgenannten Produkte (SyncPlate, home ADAT Expansion, Z-Link Plate, "Classic" 20 I/O Plate, PLUS Plate) sind Produkte der SonicCore GmbH in Siegburg.

(c) SonicCore 2007 - alle Rechte vorbehalten.

Die nachfolgende Dokumentation wurde erstellt von SonicCore GmbH (SonicCore), und beschreibt den jeweils aktuellen Stand der Produktentwicklung. SonicCore behält sich vor, gegebenenfalls Änderungen an der Dokumentation vorzunehmen, sofern dies notwendig erscheint. Eine Verpflichtung zur Veröffentlichung oder Benachrichtigung von Anwendern der vorliegenden Dokumentation besteht nicht.

Wir weisen ausdrücklich darauf hin, dass die vorliegende Dokumentation typographische Fehler oder technische Ungenauigkeiten enthalten kann.

SonicCore übernimmt keinerlei Gewähr, weder ausdrücklich noch implizit, für den Inhalt der vorliegenden Dokumentation. Die Gewährleistung für das beschriebene Produkt ist in den Gewährleistungsbestimmungen eingehend beschrieben.

In keinem Fall haftet SonicCore für jegliche Form von Datenverlust oder Datenfehlern im Rahmen der Nutzung des Produktes oder vorliegender Dokumentation. Insbesondere schließt SonicCore jegliche Haftung für Folgeschäden aus (wie z.B. verlorene Gewinne, entgangene Preisnachlässe, Produktionsausfälle sowie alle sonstigen Folgeschäden), welche sich aus der Nutzung des Produktes oder der Verwendung der vorliegenden Dokumentation ergeben.

In der vorliegenden Dokumentation etwaig verwendete Bezeichnungen von Marken- oder Produktnamen Dritter unterliegen gesetzlichen Bestimmungen des Patent- und Markenrechts und sind das Eigentum der jeweiligen Rechteinhaber. Dies gilt auch dann, wenn im Text der entsprechende Hinweis nicht explizit angebracht ist. In keinem Fall gewährleistet SonicCore, dass die vorliegende Dokumentation und die hierin enthaltenen Informationen frei von Rechten Dritter sind.

Die vorliegende Dokumentation darf ohne vorherige schriftliche Einwilligung der SonicCore GmbH weder in Teilen oder zur Gänze kopiert, übersetzt oder auf elektronische Medien übertragen werden.

Produkt und zugehörige Dokumentation unterliegen den AGB (Allgemeine Geschäftsbedingungen) der SonicCore GmbH zum jeweils aktuellen Stand.