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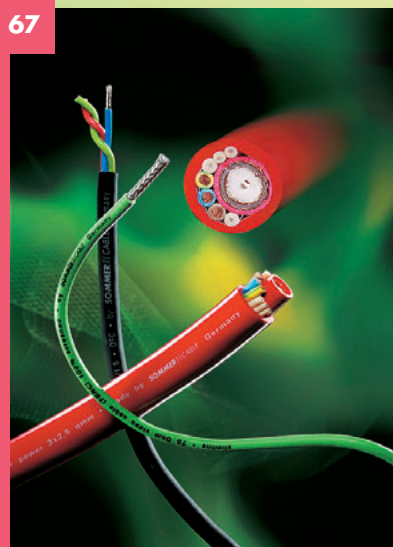
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In this catalogue we are happy to introduce you to the latest products developed by **SOMMER**. This includes items from our customers ideas.

Some highlights are eg. the super robust **TRANSFER**, the HDTV cable **VECTOR**, the new universal audio/video/media system box **SYSBOXX**, many new plug connectors, e.g. by **HICON**, or the official broadcast panels by our spin-off company **KID Broadcast**. These deserve our special recommendation.

Now we wish you lots of fun reading and discovering!

Yours truly,

Rainer Blanck

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SOMMER CABLE SAYS "HELLO"!

IS IT THE CABLE...?

Even if the musician, his instrument, the speakers, and the lighting are perfect, the transmission may still be bad... **could it be that the cable is at fault?** It could be! Like many musicians we took our first musical steps in small home studios or as a member of a village band – and even back then we were surprised at the results, when for example low budget jack plugs on the analog synthesizer were replaced by good metal plugs. Then suddenly, no humming, no crackling. Or when a bell wire was replaced with a real guitar cable... The question is, where do the clear highs and a "crisp" sound come from?

MUSICIANS HAVE BECOME CABLE SPECIALISTS...

Over the past years audio products have become more complex and performance-oriented. This is not an easy challenge for a cable manufacturer. Cables are no longer just important for a select group of people or for dreamers, but for the manufacturers of instruments, studio technology, and technical media units. Now even the amateur feels and hears the change in sound and no longer depends on phantasy, imagination, and subjective judgement.

For cable manufacturers this indeed is an important challenge. **All of a sudden "technical data" can also be heard.** And of course, it can be measured. For a company like **SOMMER CABLE** this creates a great opportunity. Our customers recognize and appreciate good quality. Our responsibility is not only to produce a good cable, but to give a **clear and detailed description** of our products. **SOMMER CABLE** believes that **"clarity is very important for quality assessment"**.

THE TEAM

FRIEDHELM SOMMER

is full of ideas.

He is the founder of SOMMER-AUTOMATIC GmbH and manages SOMMER-TECHNIK GmbH. He plays the cello and puts a lot of feeling into the music. He does not need any cables, but he hears very well and criticizes a lot!



RAINER BLANCK

musician & businessman...

is the General Manager at **SOMMER CABLE GmbH** and a hands-on kind of guy. In his spare time he is a studio musician, sings, and plays the electric guitar. Rainer managed SOMMER-AUTOMATIC GmbH for a number of years. Then he took on a new challenge as General Manager of **SOMMER CABLE**. He runs the company with a lot of enthusiasm and engagement. This ambitious businessman and musician made sure that **SOMMER CABLE** quickly advanced to become a market leader in the cable industry. He is very close to all of his employees and treats them like family. And his team thinks he is fantastic! He speaks English, and of course German.

PASCAL MIGUET

is a "sound fetichist".

He is authorized company and product manager as well as developer at **SOMMER CABLE** and your top address for technical questions and details. He manages the sales department, supports you in your sales activities and the implementation of our products. He will be glad to give you all the necessary information about merchandizing. Pascal has been working in the cable and audio business for about 17 years. He has the large sensitive ears typical for Frenchmen. He is really fussy when it comes to sound, loves to play the synthesizer and is an avid fisherman. His eMail address is: **pm@sommercable.com**. He speaks French, English, and the local slang.



THIERRY MIGUET

is "IT Manager".

He is not only the IT Manager, but also responsible for the smooth disposition of all **SOMMER** programs and logistic planning. If he is not traveling to see one of his favorite bands, he likes to program new tools to make life easier for us computer users. He dreams of banning all bad music to a planet with a name that no one can pronounce.

His eMail address is:
tm@sommercable.com
He speaks English, and of course German.

ANDREAS BAUER

is our "powerman".

He is an authorized company manager and head of the technical sales department. As a trumpet player he can set the tone, but first and foremost he is responsible for our international technical support and the export business. In his spare time he plays in an orchestra and is a passionate beekeeper. He speaks English, and of course German. His eMail address is:
ab@sommercable.com



JASMIN NEUBAUER

She is a whirlwind...

in our sales organization. With a major in "Marketing Research" she is an excellent addition to our Marketing Department and organizes our press releases, plans our fairs, and supports our catalogue and product management. Petite, determined, and alert, she can be found wherever fast solutions are needed throughout the company. In her spare time she loves to play handball. Her eMail address is
jn@sommercable.com

CONNY MAST

Fast and precise...

that is how she manages purchasing and distribution tasks. It is her job to make sure that all plugs are purchased at the right price and that the inventory is complete. She checks on this daily and also makes sure that the supplier invoices are correct. In her spare time she likes to relax and take care of the family.

eMail: **cm@sommercable.com**



AYLA SAMAN

is the "nice saleslady".

When it comes to orders she jumps into action. Ayla will be glad to answer all of your questions and make sure that your order is processed smoothly. She speaks excellent Turkish, English, German, and Italian. Her hobbies are swimming and her family. Her eMail address is:
as@sommercable.com



ELKE BLANCK

does not like to wait.

She makes sure that our bookkeeping is up to date and that we have enough liquidity to maintain our large inventory. This is only possible if our customers pay on time. She also keeps a close eye on that part. In private she is married to Rainer, loves to play handball, and laughs a lot. Her eMail address is **eb@sommercable.com**



SABINE STROBEL and JUTTA BÜRKLE

The ladies with the fast fingers...

make sure that your orders are processed as fast as possible. They accept your phone orders, give you information about prices and delivery times, and will answer any other questions you may have. At home her musician family keeps Jutta hopping. She likes to travel foreign countries, dances, and plays volleyball. Sabine is a devoted mom and wife and spends the bit of spare time she has swimming and taking long walks with the Berner Sennen half-breed. You can reach them under **+49 (0) 7082-49133-20**.



RAPHAELA GÖKSUN

the sacrificing one...

never leaves company grounds until the last order has been processed and the last purchase offer has been written. Not only our customers like her casual attitude and her temperamental nature. Raphaëla is responsible for ongoing sales and supports our sales department. Her hobbies are sports, dancing, and music. Her eMail address is
rg@sommercable.com

MARTIN ELSNER*the expert...*

has gained many years of experience in audio and studio technologies while working for Studiospares. He takes care of our technical support and is responsible for bid invitations. As an instructor for SAE he trains a lot of newcomers to the business. In private his life also revolves around music. You may run into him during his work as a sound technician in a club or studio near you. Martin Elsner likes soccer, computers, and as a Rhinelander he is currently learning the local dialect. But he already speaks German and English fluently. eMail: me@sommercable.com

MARTIN ZWER*the multi-talent...*

is responsible for the manufacture of our complex stagebox systems and our test laboratory. He is from Pegau, is a talented craftsman and a technical maniac, which is why we lovingly call him "Ossi-loscope"! His hobbies are live sound, fishing, and Cubase! His Mail-address is: mz@sommercable.com

PETRA SFERRAZZA*has a license to solder...*

and manages our in-house and external cable production. From multicore looms to high quality HiFi and microphone cables, all the way to complex stagebox systems, she can product just about everything. She also operates and monitors our mechanical stripping and crimping machines. Petra loves cats and her garden. Her eMail-address is: ps@sommercable.com

ANATOLE MUSARAGANYI*Charisma from Burundi...*

He is our new Export Manager who handles all requests coming in from foreign countries and the related paperwork. He speaks an incredible 5 languages: German, French, English, Suhaeli, and if you like he can say hello to you in his native tongue Kirundi. His hobby is Zook-music and at a height of 197cm it is not surprising that he likes basketball. His eMail-Adresse is: am@sommercable.com

**MARTIN MUSIALIK***our Swabian...*

also called "Doc", is the head of our onsite manufacturing department and responsible for the organization and quality of our system manufacture and confection. By now he enjoys cult status on the audio market and has a reputation of being a studio fuss-pot and sound-twister on the synthesizer. Hobbies: He spends most of his time with his children or in Pascal Miquet's home studio, because there is always something in need of repair and it is also the home of his Mini Moog. His eMail address is: mm@sommercable.com

**CHRISTIAN HERRMANN***the meticulous one...*

is from Leipzig and is a real fast one when it comes to special designs. He operates our Auto CAD System and, together with Martin Zwer, designs spiffy solutions for live & media technologies. He is a passionate drummer and loves brute electronic music. His eMail-address is ch@sommercable.com

**PETER RIECK***the obsessed one...*

knows everything. And that's how it should be, because he is our man for the development and manufacturing of professional audio technology. He has gained popularity and a certain degree of notoriety with his revolutionary technical developments and his addition to uncompromising quality. Under the synonym "PA-Peter" his contributions to www.pa-forum.de have reached cult status. Peter takes care of our branch facility in Bengen, near Cologne, where aside of managing a small store, he designs and manufactures sophisticated special systems. His PA- & Rock'n'Roll Hotline can be reached under **07082-49133-17**. Peter is an enthusiastic singer and drummer. eMail: pr@sommercable.com

**LUKASZ KUNICKI***the cool one...*

is currently being trained as an industrial clerk. He supports us when it comes to distribution and sales and is as ambitious as he is flexible. Born in Polen he speaks Polish fluently, but because he grew up in Karlsruhe he also speaks the local dialect very well. His hobbies are fishing and – despite the miserable results the Polish team achieved in the World Championships 2006 – soccer. His eMail address is lk@sommercable.com.

**SASCHA JANZEN***will make wishes come true...*

by handling many hundreds of packages each day. He is able to cope with the most difficult logistic problems in a relaxed, uncomplicated, and friendly manner. He always knows which cable drum was last used and how much cabling is left on it – of course, aided by our barcode identification. The entire SOMMER Team respects him immensely, because managing and handling more than 15.000 articles is not always easy.

**FLORIAN JOKISCH***Our "firefighter"...*

is responsible for our excellent logistics and that our shipping service runs smoothly. Like a firefighter he shows up just a the right time to make sure that hundreds of orders leave our premises every day and arrive at their destination undamaged. He loves to ride his motorcycle, plays the guitar, and likes snow boarding. eMail: fj@sommercable.com

**BENJAMIN KELLER and MARCO SIMON***"The dependable ones"...*

when it comes to logistics and inventory administration. Benjamin und Marco have been with **SOMMER CABLE** for a few years and have become experienced members of our team. They are very diligent, because they handle tons of products that come and go each day. They undertake painstaking effort in organizing and receiving products and make sure that all orders are packed as efficiently as possible. Marco – as does Benjamin – loves soccer and plays basket ball. Benjamin's foremost passion is the Karlsruher SC Soccer Team.

**BJÖRN MAGAS***jumps into action ...*

to put out any fire, because in private he also is an enthusiastic firefighter. Björn is the new, well liked employee in our logistic team and impresses with conscientiousness and energy. Despite having become a dad in 2006, he still has a little time left over for his hobbies, like computer games and writing for the local newspaper.

**RALF HÄFELING***Our "mole"...*

is our company handyman and takes care of all types of repairs, such as e.g. burst pipes, plans exhibition displays, or customizes furniture, he can do it all (except speak high German). The trickier the problem, the more he gets going and will not give up until it is solved to perfection. Ralf is a craftsman and specialist in wood working, but his family definitely comes first.

**STEFAN TINNEBERG***is the teeny...*

because Stefan was only 17 years old when he was hired and is one of the youngest trainees at **SOMMER CABLE**. He is being trained in inventory logistics and will soon support our warehouse professionals. He plays the bass and baseball (yes, that game is also played here in the south).

**RÜDIGER KÖNIG***His kingdom...*

is our machine park. He is a trained industrial mechanic. Sometimes he supports the shipping department when thing get hectic there. He is an avid mountain biker and swimmer.



THINGS WORTH KNOWING ABOUT SOMMER CABLE

PHONE – FAX – WEB

Phone/main +49 (0) 70 82/4 9133-0
 Phone/order +49 (0) 70 82/4 9133-20
 Tech. support +49 (0) 70 82/4 9133-10
 Fax +49 (0) 70 82/4 9133-11

We are here for you:
 Monday till Thursday 8:30 am to 5:00 pm
 and Fridays from 8:30 am to 4:30 pm.

You can reach us via eMail under
info@sommercable.com

You can also find us regularly at trade shows, such as e.g. **ProLight+Sound, Tonmeistertagung, AES, and IBC**, etc.

The exact dates and additional information are listed on our around-the-clock homepage
www.sommercable.com.

FAST DELIVERY



We have a very large inventory, making it possible for us to supply **96 % of all catalogue products immediately**. We can manufacture stageboxes, systems, and looms for you within a few days. Supply is made by a fast, dependable package delivery service (up to 32 kg). For larger supplies we use a shipping service company. This also applies for deliveries to foreign countries. Here we recommend that our foreign customers use those shipping companies that they usually work with.

A CAT IN A BAG



You will not have to buy it here.
 All **SOMMER CABLEs** can be bent and skinned for testing – Just order a sample of your desired cable from this catalogue.

OUR PRICES

Ask your local distribution – see last pages – for prices and delivery.

PAYMENTS

On **advance payments** we will allow a 3 % discount. You may also use your **Visa, Eurocard, or Mastercard**. We will require your credit card number, the name of your credit card company, the name of the credit card holder, and the expiry date.

Please make payments to any of our following banks:

HypoVereinsbank Karlsruhe
SWIFT: HYVEDEMM475
Bank code 660 202 86
Account 2 348 160
IBAN: DE49 6602 0286 0002 3481 60

or

Sparkasse Pforzheim
SWIFT: PZHS DE 66
Bank code 666 500 85
Account 905 968
IBAN: DE44 6665 0085 0000 9059 68

DISTRIBUTION PARTNERS SOMMER CABLE

Our distribution partners are listed on the back of the catalogue.



WHAT'S NEW AT SOMMER...?

Today we would like to introduce you to another company of the SOMMER Group: **SOMMER-TECHNIK GmbH**. They are involved in the development and production of fluid and vacuum technologies, decoilers, measuring systems, and pneumatic products. For more information see **www.sommer-technik.com** or refer to the current SOMMER-TECHNIK catalogue. Or call us at +49 (0) 70 82/4 91 33-30.

We are looking forward to hearing from you, maybe with a sample order. We wish you a lot of fun looking through our current catalogue.

With summery regards

Rainer Blanck

Cable production

HOW ARE SOMMER CABLE MADE ?



1

The starting point of each cable...

there is copper litz. Only few cable manufacturers can make the litz themselves. Most of them purchase it from specialized litz manufacturers. To avoid differences in quality within a cable series or to avoid shipping problems **SOMMER CABLE** has been working with the same dependable product supplier for years. The photograph on the left shows our Product & Sales Manager Pascal holding a coil of pre-stranded copper litz. It is used to "twist" the shielding for our microphone cable **STAGE 22 HIGHFLEX**.

SOMMER CABLE manufactures and uses individual litz wires measuring 0.05 to 0.40 mm, 0.30 to 1.80 mm, and 0.04 mm² to 95 mm² in diameter.

Many of these copper coils...

are mounted onto small rotors and then stranded into a wire by a "braider".

The stranded wires are then coated with an insulation made of PE, PVC, PP, or Hytrel, stranded in pairs, and again wound onto a drum.



2

Here a tin-plated wire for **SC-SOURCE MKII HIGHFLEX** is being made.



3

Now it gets exciting...

when the insulated wires are stranded with each other (see photograph on left). This process will decide if the result is a simple microphone cable, a DMX, a speaker cable, or even a complex multipair. The photograph shows our load multicore **SC-ATRIUM FLEX** being stranded. After this process is completed copper braided shielding or an AL/PT-foil may be applied. The photograph on the right shows a twisting machine used to manufacture copper spiral shielding, consisting of up to 96 individual wires with a diameter of 0.07 to 0.15 mm!



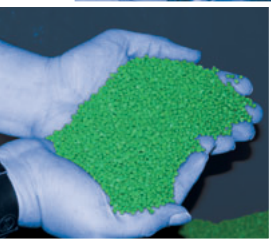
3



4

A hand full of granules...

will not yet make up an outer casing. Here you see Pascal holding our special temperature-resistant granules used to manufacture our notch-resistant S-PVC sleeve (see photograph on left). During the production process colored granules are constantly mixed in with the white base granules. The granules are melt down in the extruder, "pressed" by a special tool (see photograph on the right), and are then sprayed onto the stranded wire pairs.



4

You could get dizzy...

that is how fast the machines strand the wire pairs. The photograph to the right shows you a basket stranding machine with up to 28 coils, used in torsion-free stranding of our new multipair cable **SC-QUANTUM HIGHFLEX**. Torsion-free means that the cable loses its own bounce during the production process. The advantage is that such a cable can twist in any possible direction during mobile application. Over time it will not lead to knotting or ending up with that famous corkscrew effect.



5



6

And now comes the most difficult part...

for the entire cable: The jacket is sprayed on or "extruded", as the professional calls it. The photograph on the left shows Andreas in front of a jacket extrusion line, and at the top left you can recognize the hopper dispensing the granules.

To finish 3.000 m of cable it will take a lot of testing until the machine operates at high pressure and with the proper tolerances, and you can be sure that the first 200 to 500 meters have to be scrapped. Only one degree difference in temperature or a lapse in concentration can ruin the finish or impact on the function.

Note: The photograph on the right shows the extrusion control.



6

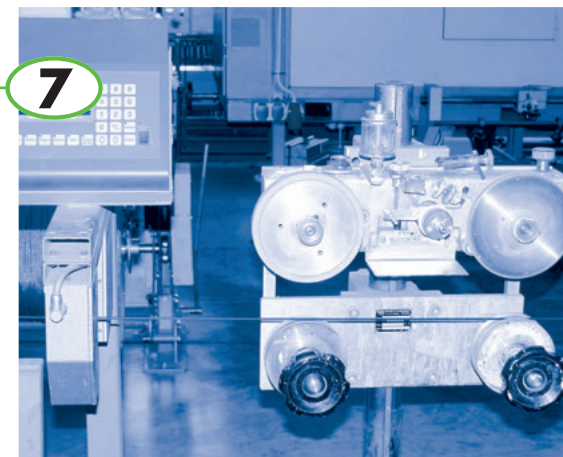
Cable production



7

During extrusion...

and stranding (the photograph on the left shows a stranding machine with 100 % reverse turning) several units will monitor the tolerances and electrical values for the cable (see photograph on right). In case of even the smallest deviation a siren will sound so loud that you will choke on your Morning Tea thus reminding each employee to watch for consistent quality.



7

No cable without it's very own company imprint...

that is what many of our customers believe and therefore they will have their company name imprinted on the cable during the production process. There are two possibilities: Inkjet printing (a unit sprays the image onto the cable) or via printing wheel or tampon printing machine.

A printing wheel (photograph on the left) must first be engraved and costs a little more money but it looks very professional. Also a logo can be included – just as shown on our **SOMMER CABLES**.



9

A cooldown...

for the cable, (here we mean its jacket,) is provided by a special water bath, which is constantly fed with fresh water using a pump system. It is important to prevent the cable from being crushed during winding and the jacket from sticking to the inside wiring. The next step is that **SOMMER CABLES** are rewound onto easy to handle 100, 200, 400, or 500 m rolls and sent immediately to the wholesaler or stored in our German distribution centre in Straubenhardt.

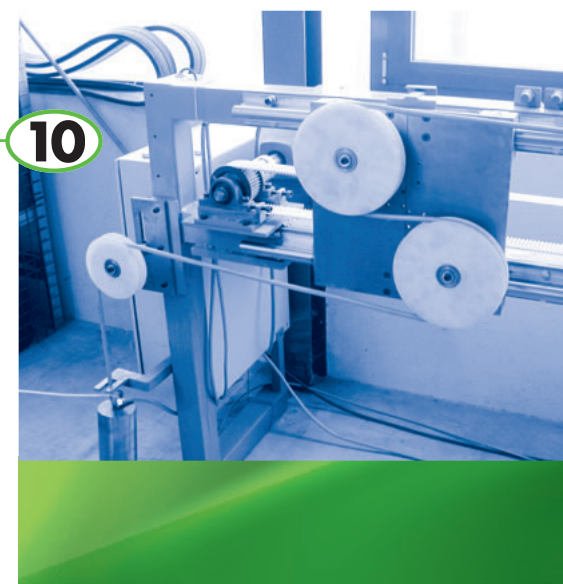


8

Checked and approved...

all of our cables after initial manufacturing or from a new development are thoroughly checked and approved. Before a cable is suitable for marketing for months it is bent, pulled, and folded in machines especially developed for testing purposes. This usually takes a very, very long time and that is why we have several of these units operating simultaneously.

The photograph on the right shows the poor old **MERIDIAN** being made to suffer on a so-called "bending change testing unit" (accord. to VDE 0472/Part 603). This process always creates a lot of laughter. Each cable is electrically tested before delivery and receives our CE and **SOMMER CABLE** sticker.



10



Musicians

SOMMER CABLE for the *musician*

A musician appreciates our cables for several reasons: He knows that all **SOMMER CABLEs** are designed for **longevity**. We use a **dense stranding technique** and **smooth, pure copper (OFC)**, this guarantees **high bending cycles** and **lossfree transmission**. The use of our cables avoids unpleasant surprises during live gigs. When comparing the price and performance you will immediately realise they are very **reasonably priced** and affordable.

SOMMER CABLE for the *HiFi freak*

Our product managers are all HiFi freaks themselves. They have been in the business for several years, with great **enthusiasm and passion**. **Being musicians, they take a practical approach to things** and cannot be fooled by "esoteric" statements or fashionable trends. For years we have been producing **linear speaker and phono connectors** for the high end HiFi market. We have achieved many compliments from users, HiFi magazines, and resalers regarding our **honest comprehensible price structure**.



Media planners



Photo by Karsten Rohrbach

SOMMER CABLE for the *media planner*

As a planner, **SOMMER CABLE** offers you the advantage of working with a **clearly structured catalogue**, showing relevant **technical data**. The catalogue data furnished by **SOMMER CABLE** is **structured for easy understanding** and explanation. This makes it easy to forward the information via fax or eMail to your customers. Furthermore the planning office can retrieve the **quotation text** for our **cables online**, and this will really save you a lot of work. **About 96% of all cables** are always **in stock**. This will save long delivery times and embarrassment if an order has been accepted. **Your customer will be very satisfied** with your service. Please send your request for a quotation to our eMail-address **ausschreibung@sommercable.com** or fax it to **+49(0)7082/491 33-11**.

SOMMER CABLE for the *music dealer*

We know how important overall support is, and we **support the dealers** with **promotional material, end customer catalogues, clearly structured displays, and effective packaging**. The music dealer will appreciate the **fast availability** of cables and the **courteous and committed support** of our employees. We offer **very good products** in **various qualities and price categories**. It is then possible for us to **respond to a large number of customer requests**.



Music dealers

Installers and ELA-technicians

SOMMER CABLE for the *installer* and *ELA-technician*

You are counting on **dependable and fast supply** and sometimes you need to have the impossible made possible. We offer you **a special service**: due to special contracts with our shipping companies, we need to receive your order before 3 pm then we can often **process it the same day**. This means that in 95 % of all cases you will receive your order **the next day** and a **pallet order within two days**. We do not only supply cables, but also other **useful accessories, tools, and the matching plug connectors**.

Installers prefer **SOMMER CABLE** because the **high quality jacket mixture** is perfectly suitable for **difficult temperature ranges and bad conditions**. This will guarantee that you have a cable with **longevity in your cable channel**, and you will be able to sleep soundly at night.

SOMMER CABLE for the *rental agent* and the *sound technician*

SOMMER CABLE does not only offer a **comprehensive standard supply of stagebox systems, premade cables, and multicore looms**, but we also manufacture **special customer-specific solutions** for every conceivable application. We can offer you – at a slight additional charge – the service of adding **transparent shrink hosing** onto your premade cables, so you can add your very own label. This can help to prevent your cables from disappearing during gigs. **For information** about special solutions our **qualified technical advisors** are at your disposal.

We offer cables with a **special stranding technique** and a **thick PVC jacket with a long life**, it is then **easy to wind**.



Rental agents and sound technicians Radio and broadcasting

SOMMER CABLE for *radio and broadcasting*

SOMMER CABLE is the **main supplier** for almost all **notable broadcasting and TV studios**. They all value **SOMMER CABLE's uncompromising quality** and the **extensive range of stock**.

Our cable manufacturer is very fast and flexible, this enables us in a short period of time to react to any changes on the market. All of our cables have been manufactured according to currently known **broadcast specifications** and have been tested in the **technical laboratories** of broadcast studios over long periods of time. **The results have been of very good quality**.



SOMMER CABLE for the *OEM-customer*

The manufacturer or OEM-customer will further **process** our **SOMMER CABLEs**. He assures that his cables will continue to maintain the same quality and standard over the years. They will be **perfectly balanced** so that the **machines used, can process the cables without any problems** and **no costly finishing work will be required**. **We can imprint the cable with your logo**. The cable specifications supplied are **in safe hands**. **Your developments** remain yours and **will not be passed on to third parties**. **We advise** our large customers **in sales and professional marketing**. If required, we can supply **reasonably priced information brochures**. **Design your promotional presence** together with our partner. We will not leave you standing in the rain after purchasing from **SOMMER CABLE**.

OEM-customer

Musicians, friends, field testers, and other great motivators... Or: Endorsements of another kind.

Professional musicians as field testers are taken very seriously at **SOMMER CABLE**, because we depend on their honest opinion. Famous musicians are at an advantage because they typically hang out with an entire team of highly talented technicians with very fast access to innovations, who voice suggestions for improvements

and of course also critique. In the end, all of it benefits the quality of our products and that is why we are very happy to have met these great people at gigs, through friends, and even personally. You will find that these people – if you should have the opportunity to get to know them personally – are very likable and

down-to-earth, and that we are a great match. At **SOMMER CABLE** we would like to say thank you to all these great musicians, photographers, bands, and managers for the uncomplicated cooperation. As a special service you can always download the current tour dates or read up on the latest news about

them on our website
www.sommercable.com.

On this page you can find a small excerpt about friends and users who are always willing to help us out with their expertise.

HELLMUT HATTLER & BAND



Hellmut is a very important man for us. He not only is a very talented bass player (many say he is the best bass player in Germany), but also a very likable fellow. He and his band HATTLER stand for sophisticated club music and he has very high demands when it comes to sound quality at live performances or the high fidelity sound character on sound media. Hellmut is a founding member of the German cult band KRAAN, which was a sensation especially in the seventies. Hellmut continues to prove his flexibility and musical versatility with band projects such as TABTWO or DEEP DIVE CORP.

COLOSSEUM

This incredibly good live band from England is listed in the rock encyclopedia as "the best band of all times", and the live album recorded in March of 1971 as the "most ingenious album in rock history". Different rock encyclopedias consider COLOSSEUM to be the dinosaurs of jazz rock, and that not only

because the band seems to unite the members of "who is who" of the British jazz, blues, and rock scene. This was the reason a murmur went through the music scene when Colosseum announced in 1994 that they would give ONE (!) concert at the Tent Music Festival in Freiburg. The success was overwhelming, which meanwhile resulted in some large concert tours throughout Europe. All those who have a chance to see COLOSSEUM live should not miss them!



FLORIAN SITZMANN

Florian Sitzmann lends his creative musical talents to both well known and not so well known musicians, for their albums, singles, DVD's, and live concerts. In many cases he is the producer in charge, in some the arranger, sound designer, and keyboarder. He also composes, sometimes acts as an orchestrator, and a conductor. By now his work can be heard on 200 albums and has

brought him together with many artists of different musical environments, including NENA, EDO ZANKI, ANDRE HELLER, SÖHNE MANNHEIMS, XAVIER NAIDOO, NINO DE ANGELO, and KOSHO. Currently the studied pianist Florian Sitzmann can mostly be seen at performances of the SÖHNE MANNHEIMS as well as concerts with CAE GAUNTT.



FETTES BROT

This band from way up north was the surprise of the year and presented Germany one chart breaker after another in 2006, including the hit "Emanuela", for which they even received the Golden Record Award. This German hip-hop band with the hip technician Olaf Heyer

is known to be down-to-earth, super nice, and "clean". This band is neither known for scandals nor riots, but only cheerful music, snappy rhymes, and cool northern humor that will even get us "southerners" laughing. Simply "nordic by nature".



RICHARD Z. KRUSPE

As a musician for the band RAMMSTEIN Richard Z. Kruspe surely is one of the most famous guitarists and song writers in Germany. In Studios in New York and Berlin he tests our guitar, multicore, and microphone cables. We hope that they will hold up to even the most extreme demands! Our subsidiary KID BROADCAST also manufactures the MIDI distribution system for RAMMSTEIN. That is why a nice looking logo was especially engraved on the front panel, so that no one dares to snatch it from stage. But seriously: Who would dare to rob this band? They use flame throwers!!



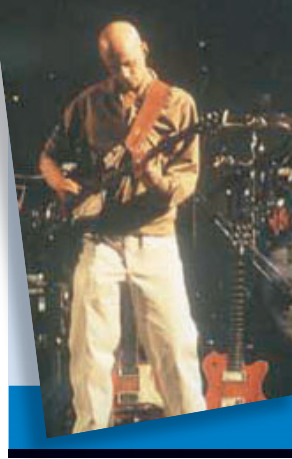
photo: Guido Karp / FansUNITED.com

BARBARA DENNERLEIN

Her CD's received awards, repeatedly the Jazz Awards and the price from German record critics, her CD "Take Off" (Verve/Universal) even reached 1st place in the jazz charts and was celebrated as the top-selling jazz album. Barbara Dennerlein is one of the few German artists with an international reputation. In her releases and her concerts she is a very competent representative for a new generation of jazz musicians and thus has become a protagonist of her instrument, the legendary Hammond B 3.

**CHRIS HEIL**

Chris is originally from Pforzheim and he is a well know producer, mixer, and sound engineer. He has been working in the audio industry for 26 years and has an extraordinary wealth of experience. He has recorded, mixed, and produced many famous musician such as DAVID BOWIE, BRYAN ADAMS, SCORPIONS, ACCEPT CLIFF RICHARD, ZUCCHERO, FAITHLESS, B.B. KING, PETER MAFFAY, FANTA 4, and many others at the Studios "N" in Cologne, the Union Studios in Munich, and the Dierks Studios. Chris lived in the States, Scandinavia, and England for years, has worked in famous studios and his experience and tips on upcoming innovations in studio technologies are of great help to us.

MARKUS BIRKLE

He is one of the co-founders of the bands NETZER and ORBIT EXPERIENCE and a member of the FANTASTISCHEN VIER, whom he accompanies as guitarist at live concerts. Fondly remembered are the legendary MTV-Spring Unplugged Concert with FANTA 4 and different live gigs in Moscow with ORBIT EXPERIENCE. Markus also is very down-to-earth and likeable, meaning he is a really great guy to be with and an excellent musician with a great musical spectrum.

PATRICE

Photo by Maria Fugaz

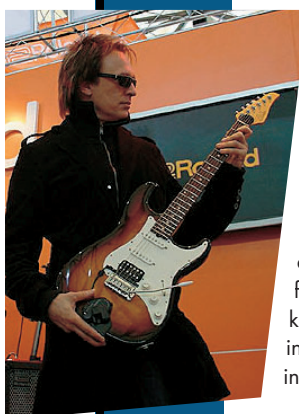
The Reggae man from Kerpen (exactly, the homeland of the famous racecar driver brothers) is the reason why many ladies get weak at every live gig to such an extend that concerts even had to be interRUpted. But compared to some other chart breakers Patrice is an excellent musician and entertainer, who has been successful in Germany for years and has filled large concert halls especially in France. Musically you have to always be prepared for changes with Patrice, and his live performances are capricious adventures in reggae, hip hop, soul, folk, and hard rock.

MEZZOFORTE

Here are the four founders of the band, Eythor Gunnarson (keyboards), Johann Assmundson (bass), Gulli Briem (drums), Fridrik Karlsson (guitar), as well as Oskar Gudjonsson (saxophone), Bruno Müller (guitar), and as of late our likeable friend Sebastian Studnitzky (trumpet/keyboards), who joined this world famous band from Iceland just last year. Mezzoforte plays jazz and funk fusion and has not only reached international popularity with the instrumental top ten hit "Garden Party", but also stands for high demands in sound quality and shows that perfectionism does not automatically exclude the pleasure of making music. Their live-DVD with the current band members is under way and tops off the 30th anniversary of this band.

**TOM HAPKE**

This excellent live and studio drummer also is a true multi-talent. His career as a drummer, studio musician, composer, and movie producer was accompanied by illustrious names such as JOE PORCARO, JENNIFER BATTEN, SCOTT HENDERSON, STEVE LUKATHER, LAITH AL DEEN, and many more. In 1992 he founded the TOM's Drum Institute in Altleiningen and published a number of textbooks, videos, and DVD's about drumming. His Website www.drums.de is a cult place for everyone who likes to drum and you absolutely should go there for a virtual visit.

**GUNDY KELLER**

is an absolutely exceptional guitarist, songwriter, and sound designer. He is considered a specialist for guitar synthesizers and effect units, and that is why another large manufacturer of music electronics also relies on his services as a field tester. And to ensure that more than a "flexible software" is attached to the hardware, he puts our super soft and flexible guitar cables to the test. Gundy runs a well known popular music school with 22 employees and in his fantastic recording studio "A-Town Recordings" in Aschaffenburg one production chases another.

EXPLANATION OF SYMBOLS

APPLICATION

stage

Cables for application especially on the stage, for open air festivals, or live events. These cables are easy to wind, simple to handle and will not knot, by using in correct way, so you can't trip when being laid out on stage. They are ideal for the professional and occasional musician.

mobile

Cables for mobile application distinguish themselves through the flexible PVC jacket, a fine-stranded wire construction, high bending cycles, and a low bending radius. They are easy to wind and suitable for outdoor application. For extreme outdoor applications (transmission vehicles, transmission of sporting events, etc.) we recommend the version with a **PUR** or **TPE**-jacket. This jacket used on **SOMMER CABLEs** is extremely resistant to notching, is halogen-free, and also resistant to heat.

studio

These cables are optimized for sound. The special stranding or wire stranding along with perfect shielding will provide enduring listening pleasure and perfect transmission. They are used in the studio setting, in broadcasting, and in transmission vehicles.

installation

Cables for installation are in the first place designed for longevity and safe transmission, especially for **ELA-technology**. They can be wired inside buildings over long distances, but also inside audio units (amplifiers, speakers, etc.) or control cabinets. If you have special fire protection requirements, please observe the **halogen-free/ PUR** and **FRNC** symbols.

ELA

These cables can be used to transmit and control 100 V technology. Basically almost all LF- and speaker cables in our program are suitable for use in ELA-technology. We use high quality materials for the insulation, such as PE, SPVC, PUR, Hytrel, and PP. The test voltage for our LF-cables is 1200 V, the operating voltage 300 V. The main problem in ELA-technology are the long distances to be covered. The user has to calculate them or can view them in Chart "TECHNICAL SUPPORT" > "ELA Technics" in the Internet under www.sommecable.com.

hifi

These cables are optimized for sound and were developed for true, i.e. electrically and acoustically linear transmission of audio signals. For example, you can connect amplifiers, speakers, CD-players, and other audio units. They are also recommended for the ambitious studio operator.

PROPERTIES

ANALOG

Analog cables are used to transmit low frequency audio signals, for the connection of microphones, speakers, and many other audio components.

DIGITAL

With this cable, primarily digital signals in an AES/EBU, S/P-DIF, and DMX-standard are transmitted, and they are stated with the respective required surge impedances of 50, 75, or 110 Ω. Please observe the surge impedance required for your peripheral, as stated in our data sheet. Almost all of our digital cables may also be implemented as a high quality analog cable. Digital cables are used to connect scanners, mixing boards, HiFi components, or a number of other studio units.

SDI/HD-SDI

Basically every 75 Ω cable is suitable for SDI – as long as a certain length is not exceeded. The deciding factor for the maximum length of this cable is the damping value for the respective frequencies, and those depend on the units used. HD/SDI-signals are used for production purposes, to transmit high resolution video signals (they are e.g. used for consumer HDTV-broadcasting). SDI- and HD-SDI-signals are only intended for production purposes, not for use in the home sector.

HDTV

Currently the buzz word in the television industry is "HDTV". Scart, cinch, or S-video connections are no longer used for transmission. The new connection systems are called HDTV (or DVI) and YUV. HDMI- and DVI-signals can be encoded with HDCP. The playback units and monitors then have to support HDCP. Alternately YUV can be used for simpler transmission, whereas HDCP-signals are not transmitted. YUV can be transmitted with 3 coax-cables, most often equipped with cinch or BNC-connectors. Caution: A YUV-signal is not compatible with an RGB-signal, despite the fact that the 3 sockets on the units are often identified in red/green/blue.

HALOGEN-FREE

In case of a fire, this cable will not develop any gases poisonous to humans, for example chloride. This is often a requirement in public buildings. But careful! A halogen-free cable is flammable, and normally a flame-resistant effect is required, known as FRNC (halogen-free and flame-resistant).

Low in fumes

When cables or wiring with insulation or jackets (e.g. made of PVC) containing chlorine burn, dense black fumes will be the result. Halogen-free cables or wiring will only develop approx. a tenth of the fume density in comparison to PVC cables or wiring – they are thus considered to be low in fumes.

FRNC

These cables comply with the generally valid fire protection guidelines, and they are halogen-free and flame-resistant. This guideline is classified. All cables in our catalogue and in the web with the FRNC-button have a FRNC (H) jacket with oxygen index 34 and the following properties:

Test according to DIN VDE0472 and IEC:

Fire load/flame adverseness:	Test type C according to VDE 0472 part 804 and IEC332-3
Halogen-free:	Corrosiveness of fumes accord. to VDE0472 part 813 and IEC 754-1
Smoke density:	according to VDE0472 part 816



EXPLANATION of testing procedures according to VDE 0472 part 804:

FRNC test type A

A cable sample, measuring 60 cm in length, is vertically suspended in the center of a metal box (height 1200 mm x width 300 mm x depth 400 mm). A gas burner with a defined flame is fixed, so that its axis is tilted by 45° in reference to the vertical. The flame hits the cable sample about 100 mm from the lower end. The flame hits, until the conductor or the top most metal shielding emerges, but no longer than 20 seconds. The test is successful if the test sample did not burn, or if the flame that resulted extinguishes itself and the damage caused by the heat of the flame did not reach the upper end of the test sample.

FRNC test type B

A cable sample, measuring 60 cm in length, is vertically suspended in the center of the metal box (height 1200 mm x width 300 mm x depth 400 mm). A gas burner with a defined flame is fixed, so that its axis is tilted by 45° in reference to the vertical. The flame hits the cable sample about 100 mm from the lower end for about 1-2 minutes, depending on the weight of the sample. The test is successful, if the test sample did not burn, or if the flame that resulted extinguishes itself and the damage caused by the heat of the flame did not reach the upper end of the test sample.

FRNC test type C

Cable samples, each measuring 360 cm in length, are fastened side by side to a ladder-like test rack. This test rack is inserted vertically into a kiln, at a distance of 150 mm to the back of the kiln. The cable samples are reached by the flame at a height of approx. 60 cm, at a temperature of approx. 800 °C, by a burner of approx. 250 mm in width. The exposure time is 20 minutes. The test is successful if the flame that resulted extinguishes itself and the damage caused by the heat of the flame did not reach the upper end of the test sample.

**PUR**

A PUR jacket is extremely tough, especially resistant to the cold (-40 °C), and still easy to wind even in minimal temperatures. At **SOMMER CABLE** we usually give our cables a halogen-free PUR jacket, which is, part from the advantages mentioned above, very tolerant to heat and sunlight. This jacket is a little more expensive than the standard PUR mixture, although in the meantime it is required and preferred by almost all broadcasting companies and professional installers.

E30

This seemingly unimpressive identification code stands for an important description of continued function in case of fire.

This fire protection class is based on **DIN VDE 0815/ DIN VDE 4102 (Part 12)**, representing improved performance in case of a fire when compared to e.g. common FRNC-cables. **E30** guarantees functionality for **30 minutes** in compliance with this norm.

Please note that it is not possible to manufacture all cable specifications accord. to **E30** or even **E90**, because the insulation on some cables does not comply with the norm stated above.

E90

This fire protection class is based on **DIN VDE 0815/ DIN VDE 4102 (Part 12)**, representing improved performance in case of a fire when compared to e.g. common FRNC-cables. **E90** guarantees functionality for **90 minutes** in compliance with this norm.

Approbation **E90** is first and foremost required for power and fire alarm cables. This norm rarely is applied to audio multipair cable connections, because the insulation walls on cables with small diameters are too thin.

TERRA

This cable has a special jacket mixture made of PE, suitable for in-ground installation. But note that a PE-jacket does not automatically make a cable suitable for in-ground installation, because this type of cable has to be specially designed to withstand the pressures under ground.

However, all cables with this symbol are suitable for in-ground installation.

AQUA

All cables identified with **AQUA** are watertight up to a water pressure of 20 bar. The special PUR-jacket minimizes water and other fluids from penetrating and prevents longitudinal dispersion in case of cable damages. The watertight jacket is also robust enough to handle the installation of high-pressure end sockets inevitably needed to prevent moisture from penetrating.

Penetrating water not only speeds up the oxidation process, but will, due to the capillary action, alter the damping and other relevant electrical values. Here video cables and other coaxial cable types, e.g. used on monitoring cameras or monitors, are especially jeopardized.

Starting at lengths of 2,000 m almost all our cables can be manufactured with this jacket. Prices and delivery times are available upon request.

Caution: Watertight does not mean "oceanic water tight" or "salt water tight"!

OFC

SOMMER CABLE mostly uses oxygenfree copper (OFC) or copper low in oxygen. For your information: copper has a specific resistance of 0.0178 Ω per meter, at a diameter of 1 mm². The purer the metal, the smoother it will be (high bending cycles!), and the more consistent this value will remain over the years.



The **Pur Master Blend** has a jacket mixture based on a polyurethane basis, especially developed for **SOMMER CABLE**. The jacket on the **PMB** is resistant to notching and cold temperatures (-40 °C), and free of adhesion with a surface that is easy to clean. **PMB** offers the toughness and temperature resistance of **PUR** and the flexibility of **PVC**. **PMB** is not halogen-free or flame-retardant.



A granular mix on a PVC-basis, also exclusively developed for **SOMMER CABLE**. S-PVC is a super soft **PVC** with the „feeling“ and flexibility of a soft rubber hose cable, but with significantly more resistance to notching and cold temperatures than most standard PVC-jackets.

While most jacket mixtures already start tearing in mobile application of -10 °C, the S-PVC withstands temperatures of -30 °C.



This is a special procedure used by **SOMMER CABLE** to compensate for the typical bounce created automatically during stranding of multipair cables.

Simplified this means: To manufacture a torsion-free cable expensive and complex stranding machines are required to counter-strand outer pairs and core.

The result being that a multipair cable can be wound a thousand times or be twisted into an "eight" without knotting or buckling.

All multipair cables identified with the **X-TORSION** logo are suitable for extremely high bending cycles (e.g. ground cables) and are recommended for professional broadcasting and event technology.

RoHS

The RoHS-Guidelines (Restriction of certain Hazardous Substances) issued by the European Union (EU) regulate the restricted use of hazardous substances. Since July 2006 the EU-Guideline 2002/95/EC has been prohibiting the use of cadmium (Cd), quicksilver (Hg), hexavalent chrome (Cr (VI)), polybromated biphenyl (PBBs), and polybromated diphenylether (PBDEs) as well as lead (Pb) in electrical and electronic units.

SOMMER CABLE has already converted all their cable, premade cable, and system production to comply with EU-Guidelines 2002/95/EC (RoHS) and 2002/96/EC (WEEE) prior to 2006.

VDE

For electro-technical products and products governed by the Unit and Product Safety Law (GPSG)

The VDE-symbol verifies conformity with the VDE-guidelines or European and International Harmonized Norms and confirms compliance with the protective requirements stated in the respective guidelines. The VDE-symbol stands for product safety regarding electrical, mechanical, thermal, toxic, radiological, and other dangers.

WEEE

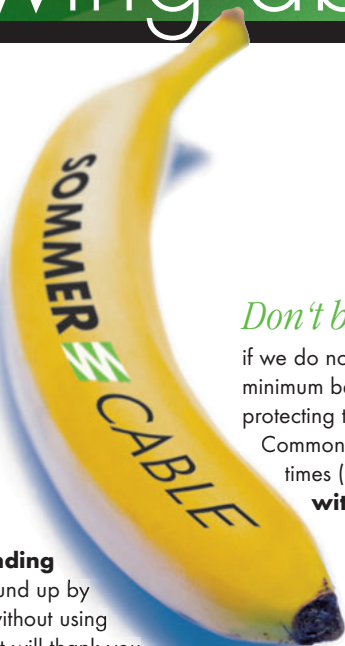
(Waste Electrical and Electronic Equipment – EU-Guideline) A guideline to reduce electronic waste from discarded electrical and electronic units. The goal is to avoid, reduce, and dispose the steadily increasing amount of electronic waste in an environmentally safe manner by placing additional responsibility for the products with the manufacturers.

Worth knowing about cables



Naturally you can wind up...

any cable. But you should not **use your arm or elbow for winding**. Every cable has a certain **bending cycle**, and with a little bit of feeling can be easily wound up by hand or be removed from the drum. Wind the cable without using force in **the direction of the bending cycle** and it will thank you with **longevity** and **consistent electrical values**.



Don't be cross with us...

if we do not state the **"minimum bending radius"**. What is the minimum bending radius? It is **the bending radius of the cable**, protecting the cable strands and the shielding from being damaged.

Common is a radius of about five times (for fixed installation) or ten times (for mobile use) the outer diameter. **All our cables are within this range.** Most are even more flexible.



For an eskimo everything is a little stiffer...

that's because of the cold. When the temperatures drop the oil contained in the PVC jacket of the cable will become a little harder. That's why the cable will be a little stiffer in winter, compared to summer. A good cable has a **temperature resistance of about -20 °C to +70 °C**. This is important, so it can be **wound or installed easily**, even if there are extreme differences in temperature. Our **PUR cables** are resistant to the cold up to -40 °C and windable up to -50 °C (according to VDE 0472/Part 610), longitudinally water tight and even halogen-free. Our **TPE cables** are resistant to the cold up to -45 °C, resistant to heat up to over 90 °C and halogen-free, too.

Why we and the cables are getting "older"?

A big secret...

because if a little talcum or sand is mixed in, you may save on PVC, but...

you will lose flexibility. If talcum is added, the jacket and insulation will soak up moisture like a sponge (e.g. during storage in a band bus, transmission vehicle, rehearsal room, or cellar, etc.) and will release it again after even having been **warmed up even slightly**. Together with the moisture the softener will also disappear and the cable will get porous and brittle, and the original protection of the jacket will be lost.

The secret lies in the combination of the jacket mixture.

Here, we leave nothing up to chance. Just getting the chemistry right, this requires a lot of experience, then testing and more testing.

The result is a cable of excellent quality.

SOMMER Company
Straubenhardt

How to get there ? – see
www.sommercable.com



Have you chosen wisely?

The red one? The green one? The black one? We have a little more to offer. To make **your choice of cables** easier, we choose for our program those cables, we feel are most essential.

The **clear layout of the catalogue** and the technical data will help you find what you require as quick as possible. And if you are still unsure about your choice, then our "selection helpers" will help you.

Special solutions according to your specifications are not a problem for us. The following standard cables are in stock.



Do you have a special wish?

We can create a cable according to your specifications.

We are very competent in the area of **specialty cables** for the audio market, mechanical engineering, and for telecommunications. **We can advise you regarding the development of your cable** or in the marketing of cables. We even manufacture small lot sizes according to your specifications, and we can add your brand name, **imprint, or logo**. Depending on the complexity, the delivery times for these special solutions are approximately 5-8 weeks.

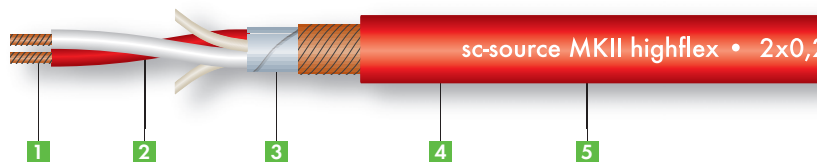
We manufacture cables with

- gold-plated, silver-plated, or tin-plated stranding
- Teflon insulation, PVC, PE, PP and VPE insulation
- PVC, PUR, HM2, PE, TPE, halogen-free and flame retardant jacket material, according to VDE 0472

The "perfect" cable...

or: now you can purchase experience!

It is our desire to develop the perfect cable for every application. It must suit exactly to your requirements, yet be affordable. We have shown you using a reference cable as an example what to look for when purchasing cables:



SC-SOURCE MKII HIGHFLEX

- 1** Super fine individual stranding (0.05 mm) made of oxygenfree copper (OFC) guarantees high flexibility and hundreds of thousands of bending cycles. Tight concentric stranding guarantees neutral and lossfree transmission even over longer distances.
- 2** A microscopically fine insulation made of polypropylen (PP) or high quality polyethylen (PE) guarantees low capacity and prevents feedover and "rattling noises". PP and our special PE are very resistant to heat and will not shrink during soldering.
- 3** For most of our **SOMMER CABLEs** we use double shielding made of a copper spiral, aluminized fleece, an AL/PT-foil, or a "semiconductor" (conductive PVC with carbon particles). This construction guarantees that even for rough applications there always is 100 % optical shielding, and that the cable is perfectly protected against interference.
- 4** The soft PVC jacket by **SOMMER CABLE** is almost free of chalk and is not stretched with sand or other materials, so that the cable does not "sweat out" the softener in extreme temperatures. This is very important, because **SOMMER CABLEs** are often used for fixed installation where longevity is expected. **SOMMER CABLEs** are perfectly balanced, so they can be processed on cutting machines without any problems.
- 5** Our **SOMMER CABLEs** have – except for a few exceptions – the wire diameter (mm² and AWG) and the wire construction imprinted, so that every user on stage or on the construction site knows immediately what kind of a cable he has. Upon special request and for certain quantities we also supply our cables without the imprint.



FAQ

WHY ARE SOMMER CABLE EMPLOYEES ALWAYS IN A GOOD MOOD?



We have often asked ourselves that same question. It probably is because we have a modern company structure. We have many very nice customers and colleagues who are all easy to get on with and to work with. Our boss pays us well and on time. In short: We love our job!

CAN A CABLE REALLY SOUND?



Not really. A cable is a passive element and should transmit the signal as true to the original and free of losses as possible. A good cable will not alter the signal, but

echo the music on your sound medium, not as opera music (how should it anyway? It did not even attend...). A neutral cable will not be able to improve the sound of a trumpet if it was not mixed very well on the compact disc.

So it would be a big mistake to expect that a cable can reproduce features not even present on the compact disc. But you can "tune" the HiFi system using a cable. If you know what the cable is capable of achieving electrically and in the way of sound (e.g. increase heights) then go ahead and experiment. Your dealer will be glad to advise you about the correct use of **SOMMER CABLES**.

WHAT IS A "SKIN EFFECT"?

If an alternating current runs through a conductor the current will constantly change direction and strength, creating a changing magnetic field. These changes in the magnetic field induce eddy currents into the copper conductor, counter-acting the current inside the conductor, while they maintain the same direction on the surface as

the current inside the conductor. Thus the current density exponentially decreases toward the center. The suppression of the current increased with the frequency of the alternating current and the diameter of the conductor, i.e. the conductor resistance increases due to the suppression within the respective frequency range. Some users say that in some cases this effect can be heard on audio cables with a large diameter, for smaller diameters however it is rather unlikely. On AES/EBU-cables this phenomenon should be avoided, because too high a skin effect can cause data loss.

WHAT IS THE DIFFERENCE BETWEEN A CAT5, 6, AND CAT7 CABLE?

The simple **CAT5** standard was designed for 100 Mbps LANs and has been available since the beginning of the nineties. This standard – as is common in the fast world of computer technology – soon reached its limits and was replaced by the **CAT5e** standard, which supports the operation of Full-Duplex Fast Ethernet and Gigabit Ethernet. The **CAT5** is a 100 MHz standard, just like big brother **CAT5e**.

In June of 2002 the **CAT6** standard was ratified by TIA/EIA, which delivers a significantly higher performance than the **CAT5e** standard, with a transmission capacity of 200 MHz. Of course, all **CAT6** components are downward compatible to CAT5e components.

The **CAT7** cable is designed for data transmission of up to 600 MHz. It is favored for use in building installation, because the wire pairs are individually shielded, with very low cross-talk.

WHAT IS THE DIFFERENCE BETWEEN AN UNBALANCED AND A BALANCED CABLE?

The unbalanced cable is mostly used to connect guitar and amplifier, HiFi-components, or as a simple control cable. It consists of a signal wire and shielding.



The balanced cable has two signal wires with the phase twisted by 180 °C (+/-). The opposite phase releases interference signals, which is why this type of cable is preferred for long transmission distances or sensitive, interference-prone components such as microphones, mixing boards, etc.



HOW IMPORTANT IS THE QUALITY OF THE SOLDER?

The quality of the solder and especially the quality of workmanship on the soldered spots should not be underestimated for the transmission of audio signals. Bad tin or a soiled solder bath can cause transmission resistances to increase. This is not only physically detectable, but in rare cases can also be heard.

So use high quality tin to work with (partially with silver), make sure to provide a clean working environment, and do not touch the wire insulation with the solder tip.

ARE ALL SHINY THINGS MADE OF GOLD?

Or: How important is the gold-plated contact on a plug connector really? But first: Pins made of genuine gold would not only be too expensive, but would not make any real technical sense. Gold is a heavy metal and would break without an alloy treatment after only a few plug cycles. Mostly nickel-plated pins or alloys are used in connection with silver or copper to affect the hardness and surface properties. Most plug connectors only have thin gold-plating and reasonably priced, sometimes only painted, cinch connectors, i.e. a real cheap plug connector cannot be gold-plated.

The good conductive values of gold can only be utilized if both socket and plug are gold-plated. If this is not the case, the harder alloy would simply scrape off the soft gold and oxides would build up. Contrary to public opinion the layperson cannot recognize the quality of the gold by the color, because very often more complex alloys are used on the plug connectors, depending on applications and plug cycles.

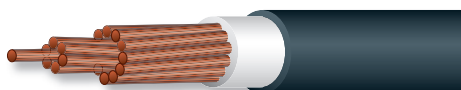
WHAT IS THE MAXIMUM TRANSMISSION LENGTH FOR CABLES IN AN SDI- AND HDTV-FORMAT?

That is hard to say, because it very much depends on the peripherals used and the quality of the interface installed. The question is comparable to one you would ask the filling station attendant: If I fill 10 liters of gasoline into my car, how far can I drive? The answer to the question would depend on the type of vehicle, and the same is true for HDTV-cables. Here too the hardware data has to be considered and used to calculate the transmission length.

An SDI-cable should be able to transmit 270 Mbit/sec. and the HDTV-cable is designed to transmit within a range of 1.5 Gbit, ensuring the resolution required for the PAL 625-line format. The range of the HD-SDI depends on the bitrate used (compressed or not compressed). At 1.485 Gb/s (not compressed) the damping value is drawn on at half the bit rate (720 MHz) and the cable length possible at a damping value of 20 dB or 30 dB is considered relevant parameter.

There is no doubt that the length of the guitar cable has an effect on the sound. But is the optimum cable length and the sound only determined by value of the cable?

It is not easy to answer this question, because not only a low capacity is important for the sound of a guitar cable, but the entire cable construction must be considered.



Concentrically stranded litz

A guitar cable can have an extremely low capacitive value and still sound "faint" or flat. This often is the case if the individual litz is stranded parallel instead of concentrically (as is the case e.g. at **SOMMER CABLE**). Parallel stranded litz does not only have too small a conductive surface, but it also breaks real fast. Too small a conductive surface is even noticeable on a bass cable: It transmits the typical deep sounds, but it will be missing the all important "attack" and the dynamics.

The insulation material on guitar cables with almost unbelievably low capacitive values is often very highly foamed. But highly foamed insulation material is very sensitive to pressure and already loses stability after having been wound a few

times (i.e. after each gig), thus again increasing the capacity. To avoid this effect **SOMMER CABLE** uses an especially robust and lacquered insulation material to finish off porous surfaces.

Cable manufacture has to find a compromise between good electrical values and a certain continuous stability for insulators and jacket. If merely the capacity was considered the cable would have to be 30 cm long, and that would not be very practical. The solution: Testing the sound or sound characteristics of different cables and selecting the shortest practical, available cable length for the selected version (mostly 3.0 m or 4.5 m) – just to be on the safe side.

Pascal Miquet




AUDIO TECHNOLOGY IN GENERAL

Professional sound technicians work with so-called balanced cable arrangements or signal processing. Many people do not know what this means. Reason enough to explain the principle.

Humming and interference noises

First and foremost musicians want to play music.

The switch is turned on, the guitar cable is plugged in and – then there is awesome humming. It is not very easy to explain how this humming, mostly caused by so-called ground loops, is created. For musicians and roadies it is important to get some idea of what causes these annoying by-products and what can be done about them.

Danger lurks on our pure, innocent sound signal wherever we go in this civilized world. **Humming motors, transformers, handys, electrical tooth brushes** – in short, a whole army of possible interferences. Today all kinds of external interferences affect each cable. They can reach us through the air waves in form of high frequency radio signals, but also through the normal power supply system in our house, for example fluorescent lamps or dimmers or the power supply on an amplifier.

For PA-systems sometimes it is difficult to avoid using long cable connections between stage and mixing board. Interference signals, i.e. from fluorescent lamps, can be picked up by these cables and will cause »buzzing«, or »crackling«.

A significant cause for these problems can be found in the supply voltage required for stereo components.

All active components, from effect unit to instrument amplifier, require and operating voltage of 230 V. If you have ever taken a look at a power cable you have noticed that it has three wires: Phase = carries the voltage, zero = grounding at the generating plant, protective conductor (PE) = grounding in the house (foundation earth).

On most units the conductive parts and surfaces as well as the ground connection for the cable is internally directly connected with the PE-contact, and thus with the protective conductor for the power outlet. The purpose of the protective conductor is to protect, to discharge the voltage, if there is a defect on the unit or the phase touches the housing. This should normally trip a safety breaker.

Even though all we want to do is make music, the subject of the power supply required unfortunately also concerns a number of legal guidelines that were not randomly created by some officials just to make our lives more difficult. The opposite is the case, because it could well be a matter of life or death!



The voltage of 230 V; 50 Hz commonly used in Germany will endanger you life if you come in touch with it. Even more dangerous is the operation of event systems, and especially lighting systems, which are powered by so-called three-phase current. Here we are looking at voltages of 380 V!!! They are guaranteed to be lethal and this fact is supported by accident statistics.

Everyone who makes music would like to show off his talents at public events. To do this you need technical equipment. And here the problem starts. Even a performance at the town hall in front of only 100 – 150 peoples is a public event.

Here are a few instructions and guidelines with the mere intent to protect the valued audience and the actors on stage from accidents. The organizer of the event is mostly called for to make sure that an escape route is available for use, the stage is constructed safely, and that appropriate technology interfaces are available. And now we have come full circle - back to the power supply.

Protective classes

All electrical units in Germany have to be equipped to protect the user against electrical shock. Even if there is a defect, the accessible housing parts shall never carry any electrical voltages. In Germany Protection Classes I, II, or III have to be fulfilled.

Protect. class	Meaning	Instructions	Symbol
I	Units and lighting with connections for protective conductors, to which all accessible metal parts have to be connected that can be energized immediately in case of a defect.	Connection to power system protection absolutely required. The symbol is displayed at the point of connection.	
II	On these units no metal parts shall be accessible that could be energized immediately in case of a defect (protective insulation or double insulation).	Lighting shall not have a protective conductor connection and shall not be connected to the power system protections.	
III	Lighting for operation with protective extra-low voltage (SELV), i.e. with a voltage less than 50 V, generated by a safety transformer accord. to DIN VDE 0551 (EN60742) or batteries.	The unit shall not have a protective conductor connection and shall not be connected to the power system protection.	

If you take a close look at the amplifier, the mixing board, or the keyboard you will find a number of manufacturer instructions regarding this subject next to the type label or in the vicinity of the fan unit plug.



The **CE-test symbol** also has been used for a number of years. It states that the manufacturer observes the generally applicable engineering guidelines and EMC-Guidelines for production. All units introduced on the market, i.e. that are sold and operated, have to carry this CE-test symbol.

What's behind it?

Not overly ambitious officers, not in this case!

Basically the EMC-Guidelines adopted on the European level is very positive. As described above our environment is full of electro-magnetic interferences, in part due to technical developments such as Wireless LAN and many thousands of handys.

EMC means **E**lectro-**M**agnetic **C**ompatibility, and the EMC-Guideline legally adopted in 1992 (EMCG 1992) obligates the manufacturer to produce his products to resist electro-magnetic interference. Furthermore, the manufacturer has to acknowledge the adherence to EMC and its technical guidelines in a Declaration of Conformity (VDE 0100; VDE 0800; etc.). Only then he is allowed to put a clearly visible CE-test symbol onto the unit.

That's great, because if the unit starts humming and crackling the manufacturer is at fault! ...Or is he not?

No, of course not! The manufacture is only responsible for the unit he supplies and will specifically state the environmental requirements and intended purpose in the respective documentation. Interfaces, environmental temperature, and other operating conditions must comply with manufacturer requirements, other measures are the sole responsibility of the operator. And if the manufacturer is clever, and many are just that, he will even list fault operating conditions and warn us of the situation under which humming and crackling will occur. So, the buck is again passed back to the operator, the user, the musician.

But there is no doubt that you can hit a tree if you drive your car. Of course, efforts are made to prevent just that by driving and operating a car in compliance with the technical specifications for the vehicle. Besides, we learned the traffic rules when we got our license and most of us drive accordingly. Those who drive through a red light or are caught driving 100 km/h, where only 60 are allowed, will have to suffer the consequences. In traffic we all know, hitting a tree is the result of faulty operation and a traffic ticket is documented proof that we have neglected to observe valid rules.

The same is true on stage: If the system hums or we suffer an electrical shock, this is either due to faulty operation or non-observance of the rules. And the consequences of an electrical shock can be much more severe than the 4 weeks without a license after we have ignored a red light.



If you are in doubt about whether the system you use frequently is free of faults, you definitely should consult an electro-technical specialist. The cost for such a service is far less than the consequent cost of a power failure in public. All who make music to earn a living have to have their electrical equipment checked periodically!

This short demonstration shows that the transmission quality of music systems does not only depend on brand names, and thus on the manufacturer. Each mixing board and each speaker system (PA) will only operate as properly as external conditions will permit. And because cables are needed for everything to work properly, all who are unhappy about humming and other interference noises should first check and possibly upgrade their multicore system, the stage cables for the instruments, and the power distribution.

Music is even more fun without humming!

How does the sound meet the speaker, or...

The proper cable!

Let's first start with the instrument, the guitar, the bass, and the keyboard. Single wire, shielded audio cables are mostly used on stage to connect instruments and amplifiers. External voltage will cause interference even with short cable length. The cable shielding consists of a wire mesh or foil that completely covers the actual conductor. The wire shielding protects a sound cable against interference caused by electrical and electro-magnetic fields. But the problem for a single-wire shielded cable is that we only have one pure signal cable (+), while the (-) phase is guided along the outside of the shielding. That works as long as the interference is low. The shielding simultaneously is the second conductor required for the power circuit.



For the transmission of audio signal with single-wire shielded cables fault-free transmission is limited to cables only a few meters long.

■ Unbalanced cable connections

Unbalanced cables are single-wire audio cables with an inside conductor and outside wire braiding. The plug only requires two contacts (phase and shielding).

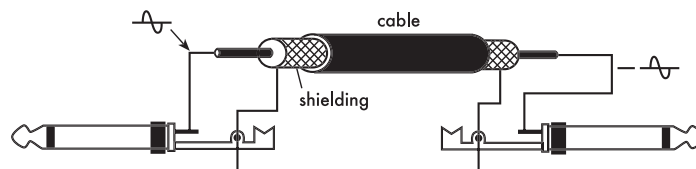


Fig. 1: Schematic view of an unbalanced audio cable

The phase ("hot") transmits the audio signal from source to user. The shielding serves as protection and signal return.

Application:

Unbalanced outputs	Unbalance inputs
Electrical guitars and basses	Instrument amplifiers
Keyboards, amplifier line-outs	Mixing boards line-ins (mostly)
Speaker connections	DI-boxes
Aux-send-paths (mostly)	Effect pedals
Direct-outs (mostly)	

Because sound cables are usually connected up to amplifier inputs, they will also amplify existing interference noises. For example, it is not a good thing if a sound cable is positioned next to a power cables. The electrical field of the power cable (230 V / 50 Hz) will leak a 50 Hz-humming voltage on our sound cable, which will be properly amplified at the amplifier input.

Another cause for humming can be found in the fact that each instrument cable works like a so-called R-C-element (R = resistance, C = capacity) and, in a certain combination, acts like an antenna. This especially occurs if the input resistance (impedance) on instrument outputs does not match that of the amplifier inputs. Some musicians have wondered why Radio Eriwan all of a sudden started broadcasting on their stereo system.

And finally, on a musician's system a number of units are interconnected with cables, like via a mixing board. With single-wire shielded cables, now all existing interference voltages are passed on and amplified via the ground, finally creating the much loved ground loop. Ungrounded, balanced cables are used to prevent these types of interferences.

■ Balanced cable connections

Balanced cables are made up of two conductors and shielding. The signal is exclusively transmitted by the two inner conductors ("hot" and "cold"), whereas the jacket only serves as shielding. The plugs used here are either XLR- or stereo jack plugs.

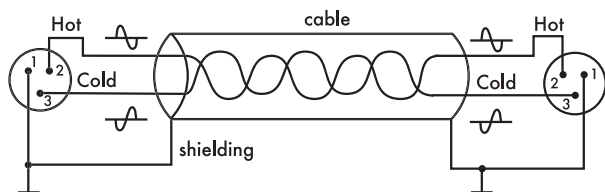


Fig. 2 Schematic view of a balanced audio cable

Application:

Balanced outputs	Balanced inputs
DI-boxes	Mixing board XLR-inputs
Stage microphone	Mixing board line-ins
Mixing board L/R hummung outs	Mixing board returns
Mixing board sub groups	Microphone pre-amplifiers
Mixing board matrix	Effect units
Mixing board monitor paths	
Aux paths	

Balanced cables are very save from electro-magnetic interferences and humming loops, even longer lengths.

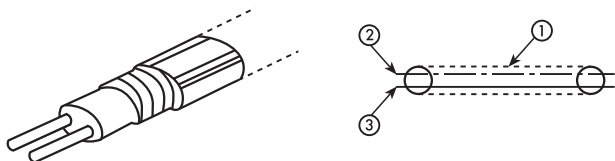


Fig. 3 Construction of a balanced audio cable

Balanced cables consist of shielding (1) and two conductors (Fig. 3). The signal acts independent of shielding of ground. Interferences on the ground wire do not affect the signal path, thus the term ungrounded. The two conductors are phased opposite.

This means that the signal in both conductors has a 180 degree phase angle. Due to this opposite phasing, the co-phasal electro-magnetic interference signals that affect the cable from the outside cancel each other out.

For ungrounded balanced transmission, however, it is necessary that the in- and outputs on the connected units are also balanced. This can be accomplished electronically, i.e. through the use of balanced input amplifiers with common mode rejection or output amplifiers with optimized unbalance of the output voltage (a-conductor to b-conductor).

We can assume that today electronically balanced in- and outputs are superior to most AF-transmitters, when it comes to transmission parameters such as frequency response, distortion factor, common mode suppression, and resistance to over-modulation. Nevertheless it is often necessary to use balanced cables without grounding.

Genuine ungrounded balanced cable routing is only possible through the use of sound transmitters. These transmitters are optimized to handle AF-signals, but despite the fact that a vast selection is available on the market many of them can only handle the ungrounded part.

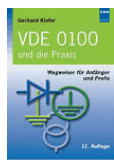
Those who want genuine transmission quality with best possible common mode rejection have to depend on toroidal core transformers.

Microphone cables to mixing board connections with very low voltage levels (milli-volt range) are extremely sensitive to interference. This is the reason why it is very important that they are always ungrounded-balanced.

For a return cable connection from mixing board to amplifier the danger of interference is not quite as high, because the signal voltage here can still amount to several volt. Therefore, an ungrounded balanced cable routing is not absolutely required.

But complete elimination of an interference risk is only possible with an ungrounded balanced layout of all cables.

Literature tips (German only):



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