# S-Series SCO Combiner

## Instruction Manual

### Read this before handling or powering up the instrument!

### Contains important safety precautions


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# Introduction

This document covers the S-Series SCO 4-Input Port Combiner.

It contains **safety precautions** that you should observe before and during operation of the instrument.

# About this document

## Intended audience

Engineering personnel engaged on work relating to the design, development and testing of RF devices and sub-systems and modules. It is assumed that you are familiar with the terms commonly used in RF measurements.

## Associated publications

| If you want to… | Refer to… |
|---|---|
| View operating information for the SGA Signal Generator in **html Help** format | **S-Series SGA Signal Generator Help**<br>Part no. 47090/067<br>On the CD-ROM and at www.aeroflex.com/ |
| View operating information for the SGA Signal Generator in **pdf** format. | **S-Series SGA Signal Generator Operating Manual**<br>Part no. 467090/068<br>On the CD-ROM and at www.aeroflex.com/ |
| View operating information for the SVA Vector Analyzer in **html Help** format | **S-Series SVA Vector Analyzer Help**<br>Part no. 47090/126<br>On the CD-ROM and at www.aeroflex.com/ |
| View operating information for the SVA Vector Analyzer in **pdf** format. | **S-Series SVA Vector Analyzer Operating Manual**<br>Part no. 467090/127<br>On the CD-ROM and at www.aeroflex.com/ |
| View operating information for the SGD Digital Signal Generator in **html Help** format | **S-Series SGD Digital Signal Generator Help**<br>Part no. 47090/131<br>On the CD-ROM and at www.aeroflex.com/ |
| View operating information for the SGD Digital Signal Generator in **pdf** format. | **S-Series SGD Digital Signal Generator Operating Manual**<br>Part no. 467090/132<br>On the CD-ROM and at www.aeroflex.com/ |

# Contents

# SAFETY AND OTHER PRECAUTIONS

These terms have specific meanings in this document:

**WARNING** information to prevent personal injury.

**CAUTION** information to prevent damage to the instrument.

## Hazard symbols

The meaning of hazard symbols appearing on the instrument and in the documentation is as follows:

| Symbol | Description |
|---|---|
|  | Refer to the documentation when this symbol is marked on the instrument. Familiarize yourself with the nature of the hazard and the actions that may have to be taken. |
|  | Toxic hazard |

## General conditions of use

This product is designed and tested to comply with the requirements of IEC/EN 61010-1 ‘Safety requirements for electrical equipment for measurement, control and laboratory use’, for Class 1 portable equipment and is for use in a pollution degree 2 environment. The instrument is designed to operate from an installation category I supply.

The instrument should be protected from the ingress of liquids and precipitation such as rain, snow, etc. When moving the instrument from a cold to a hot environment, it is important to allow the temperature of the instrument to stabilize before it is connected to the supply to avoid condensation forming. The instrument must only be operated within the environmental conditions specified in the data sheet, otherwise the protection provided by the instrument may be impaired.

This product is not approved for use in hazardous atmospheres or safety-critcal applications.

**WARNING**

## Suitability for use

This instrument has been designed and manufactured by Aeroflex to perform measurements on RF and microwave components and systems.

If the instrument is not used in a manner specified by Aeroflex, or if it is damaged, the protection provided by the instrument may be impaired.

Aeroflex has no control over the use of this instrument and cannot be held responsible for events arising from its use other than for its intended purpose.

**WARNING**

## Using strap handles

The SCO is provided with a strap handle for carrying the SCO on its own. Do not use this handle to lift the SCO when it is attached to other S-Series instruments. Do not use any other strap handles for lifting S-Series instruments that are attached together.

**WARNING**

## Heavy instrument

The weight of this instrument may exceed the 18 kg (40 lb) guideline for manual handling by a single person (see page 9). To avoid the risk of injury, an assessment should be carried out prior to handling, which takes account of the load, workplace environment and individual capability, in accordance with European Directive 90/269/EEC and associated national regulations.

**WARNING**

## Toxic hazards

Some of the components used in this instrument may include resins and other materials that give off toxic fumes if incinerated. Take appropriate precautions, therefore, in the disposal of these items.

**WARNING**

## Tilt facility

When the instrument is in the tilt position, it is advisable, for stability reasons, not to stack other equipment on top of it.

**WARNING**

## Electrical hazards

Do not remove instrument covers as this may result in personal injury. There are no user-serviceable parts inside.

Refer all servicing to qualified personnel. See list of Service Centers at rear of manual.

**CAUTION**

## Initial visual inspection

After unpacking the equipment, inspect the shipping container and its cushioning material for signs of stress or damage. If damage is identified, retain the packing material for examination by the carrier in the event that a claim is made. Examine the equipment for signs of damage; do not connect the equipment to a supply when damage is present.

# Précautions

Les termes suivants ont, dans ce manuel, des significations particulières:

**WARNING** contient des informations pour éviter toute blessure au personnel.

**CAUTION** contient des informations pour éviter les dommages aux équipements.

## Symboles signalant un risque

La signification des symboles de danger apparaissant sur l'équipement et dans la documentation est la suivante:

| Symbole | Nature du risque |
|---|---|
|  | Reportez-vous au manuel d'utilisation quand ce symbole apparaît sur l'instrument. Familiarisez-vous avec la nature du danger et la conduite à tenir. |
|  | Danger produits toxiques |

## Conditions générales d’utilisation

Ce produit a été conçu et testé pour être conforme aux exigences des normes CEI/EN61010-1 “Règles de sécurité pour appareils électriques de mesurage, de régulation et de laboratoire”, pour des équipements Classe I portables et pour une utilisation dans un environnement de pollution de niveau 2. Cet équipement est conçu pour fonctionner à partir d’une alimentation de catégorie I.

Cet équipement doit être protégé de l’introduction de liquides ainsi que des précipitations d’eau, de neige, etc. Lorsqu’on transporte cet équipement d’un environnement chaud vers un environnement froid, il est important de laisser l’équipement se stabiliser en température avant de le connecter à une alimentation afin d’éviter toute formation de condensation. L'appareil doit être utilisé uniquement dans le cadre des conditions d'environnement spécifiées dans la fiche technique, toute autre utilisation peut endommager les systèmes de protection.

Ce produit n’est pas garanti pour fonctionner dans des atmosphères dangereuses ou dans les applications de securité critiques.

**WARNING**

## Utilisation

Cet équipement a été conçu et fabriqué par Aeroflex pour effectuer des mesures sur des composants et des systèmes RF et hyperfréquences.

La protection de l'équipement peut être altérée s'il n'est pas utilisé dans les conditions spécifiées par Aeroflex, ou il est endommagé.
Aeroflex n'a aucun contrôle sur l'usage de l'instrument, et ne pourra être tenu pour responsable en cas d'événement survenant suite à une utilisation différente de celle prévue.

WARNING

## Utiliser les poignées sangle

Le SCO est muni d'une poignée sangle pour porter le SCO seulement. Ne pas utiliser ce poignée pour soulever le SCO quand il est attaché à d'autres instruments S-Series. Ne pas utiliser n'importe quel autre sangle poignées pour le levage d’instruments S-Series qui sont attachés ensemble.

WARNING

## Equipement lourd

Le poids de cet appareil peut être supérieur à la limite de 18 kg (40 lb), fixée pour le transport par une seule personne (voir la page 9). Afin d’éviter tout risque de blessure, il est nécessaire de faire, avant le transport, une évaluation de la charge, des contraintes de l’environnement et des capacités de l’individu, en conformité avec la Directive Européenne 90/269/EEC ainsi que les recommandations Nationales concernées.

WARNING

## Danger produits toxiques

Certains composants utilisés dans cet appareil peuvent contenir des résines et d’autres matières qui dégagent des fumées toxiques lors de leur incinération. Les précautions d’usages doivent donc être prises lorsqu’on se débarrasse de ce type de composant.

WARNING

## Position inclinée

Lorsque l’appareil est dans une position inclinée, il est recommandé, pour des raisons de stabilité, de ne pas y empiler d’autres appareils.

WARNING

## Sécurité électrique

Ne démontez pas le capot de l'instrument, car ceci peut provoquer des blessures. Il n'y a pas de pièces remplaçables par l'utilisateur à l'intérieur.

Faites effectuer toute réparation par du personnel qualifié. Contacter un des Centres de Maintenance Internationaux dans la liste jointe à la fin du manuel.

**CAUTION**

## Inspection visuelle initiale

Lors du déballage de l’instrument, examinez l’emballage ainsi que les matériaux de protection afin de détecter tout signe de contrainte ou de dommage. Dans ce cas, gardez l’emballage pour le faire examiner par le transporteur et présenter une éventuelle réclamation. Détectez également tout signe de dommage sur l’équipement; ne pas mettre sous tension un équipement présentant des dommages.

# Vorsichtsmaßnahmen

Diese Hinweise haben eine bestimmte Bedeutung in diesem Handbuch:

**WARNING** **dienen zur Vermeidung von Verletzungsrisiken.**

**CAUTION** **dienen dem Schutz der Geräte.**

## Gefahrensymbole

Die Bedeutung der Gefahrensymbole auf den Geräten und in der Dokumentation ist wie folgt:

| Symbol | Gefahrenart |
|---|---|
|  | Beziehen Sie sich auf die Bedienungsanleitung wenn das Messgerät mit diesem Symbol markiert ist. Machen Sie sich mit der Art der Gefahr und den Aktionen die getroffen werden müssen bekannt. |
|  | Warnung vor giftigen Substanzen |

## Allgemeine Hinweise zur Verwendung

Dieses Produkt wurde entsprechend den Anforderungen von IEC/EN61010-1 “Sicherheitsanforderungen für elektrische Ausrüstung für Meßaufgaben, Steuerung und Laborbedarf”, Klasse I transportabel zur Verwendung in einer Grad 2 verunreinigten Umgebung, entwickelt und getestet. Dieses Gerät ist für Netzversorgung Klasse I zugelassen.

Das Gerät sollte vor dem Eindringen von Flüssigkeiten sowie vor Regen, Schnee etc. geschützt werden. Bei Standortänderung von kalter in wärmere Umgebung sollte das Gerät wegen der Kondensation erst nach Anpassung an die wärmere Umgebung mit dem Netz verbunden werden. Das Gerät darf nur in Umgebungsbedingungen wie im Datenblatt beschrieben, betrieben werden; ansonsten wird der vom Gerät vorgesehene Schutz des Anwenders beeinträchtigt.

Dieses Produkt ist nicht für den Einsatz in gefährlicher Umgebung (z.B. Ex-Bereich) und für sicherheitskritische Anwendungen geprüft.

**WARNING**

## Eignung für Gebrauch

Dieses Gerät wurde von Aeroflex entwickelt und hergestellt um Messungen an HF- und Mikrowellenkomponenten und -Systemen durchzuführen.

Sollte das Gerät nicht auf die von Aeroflex vorgesehene Art und Weise verwendet werden, oder wenn es beschädigt ist, kann die Schutzfunktion des Gerätes beeinträchtigt werden.

Aeroflex hat keinen Einfluß auf die Art der Verwendung und übernimmt keinerlei Verantwortung bei unsachgemässer Handhabung.

WARNING

## Mit Bandhenkel

Die SCO ist mit einem Bandhenkel zum Tragen nur des SCO gestellt. Verwenden Sie nicht dieses Handle auf das SCO heben, wenn es um andere S-Series Geräte angeschlossen ist. Verwenden Sie keine andere Bandhenkel zum Heben S-Series Instrumente, die aneinander angebracht sind.

WARNING

## Schweres Gerät

Das Gewicht dieses Geräts kann über der 18 kg (40 lb) Grenze für Transport durch eine einzelne Person liegen (siehe Seite 9). Zur Vermeidung von Verletzungen sollten vor einem Transport die Arbeitsumgebung und die persönlichen Möglichkeiten im Verhältnis zur Last abgewogen werden, wie in der EU-Regelung 90/269/EEC und nationalen Normen beschrieben.

WARNING

## Warnung vor giftigen Substanzen

In einigen Bauelementen dieses Geräts können Epoxyharze oder andere Materialien enthalten sein, die im Brandfall giftige Gase erzeugen. Bei der Entsorgung müssen deshalb entsprechende Vorsichtsmaßnahmen getroffen werden.

WARNING

## Schrägstellung

Bei Schrägstellung des Geräts sollten aus Stabilitätsgründen keine anderen Geräte darauf gestellt werden.

WARNING

## Elektrische Schläge

Öffnen Sie niemals das Gehäuse der Geräte das dies zu ernsthaften Verletzungen führen kann. Es gibt keine vom Anwender austauschbare Teile in diesem Gerät.

Lassen Sie alle Reparaturen durch qualifiziertes Personal durchführen. Eine Liste der Servicestellen finden Sie auf der Rückseite des Handbuches.

CAUTION

## Sofortige visuelle Überprüfung

Nach dem Auspacken des Gerät es ist die Verpackung und das Ausfütterungsmaterial auf Druckstellen und Beschädigung hin zu überprüfen. Bei Feststellung von Beschädigung sollte die Verpackung, für den Fall daß Ansprüche an den Spediteur entstehen, sichergestellt werden. Begutachten Sie anschließend das Gerät auf Anzeichen von Beschädigung und verbinden Sie dieses nicht mit dem Netz falls solche vorhanden sind.

# Precauzioni

Questi termini vengono utilizzati in questo manuale con significati specifici:

**WARNING** **riportano informazioni atte ad evitare possibili pericoli alla persona.**

**CAUTION** **riportano informazioni per evitare possibili pericoli all'apparecchiatura.**

## Simboli di pericolo

Il significato del simbolo di pericolo riportato sugli strumenti e nella documentazione è il seguente:

| Simbolo | Tipo di pericolo |
|---|---|
|  | Fare riferimento al manuale operativo quando questo simbolo è riportato sullo strumento. Rendervi conto della natura del pericolo e delle precauzioni che dovrete prendere. |
|  | Pericolo sostanze tossiche |

## Condizioni generali d'uso

Questo prodotto è stato progettato e collaudato per rispondere ai requisiti della direttiva IEC/EN61010-1 'Safety requirements for electrical equipment for measurement, control and laboratory use' per apparati di classe I portatili e per l'uso in un ambiente inquinato di grado 2. L'apparato è stato progettato per essere alimentato da un alimentatore di categoria I.

Lo strumento deve essere protetto dal possibile ingresso di liquidi quali, ad es., acqua, pioggia, neve, ecc. Qualora lo strumento venga portato da un ambiente freddo ad uno caldo, è importante lasciare che la temperatura all'interno dello strumento si stabilizzi prima di alimentarlo per evitare formazione di condense. Lo strumento deve essere utilizzato esclusivamente nelle condizioni ambientali descritte nella scheda tecnica, in caso contrario le protezioni previste nello strumento potrebbero risultare non sufficienti.

Questo prodotto non è stato approvato per essere usato in ambienti pericolosi o applicazioni safety critical.

**WARNING**

## Caratteristiche d'uso

Questo strumento è stato progettato e prodotto da Aeroflex eseguire misure su componenti o sistemi RF e microonde.

Se lo strumento non è utilizzato nel modo specificato da Aeroflex, o è danneggiato, le protezioni previste sullo strumento potrebbero risultare inefficaci.

Aeroflex non può avere il controllo sull'uso di questo strumento e non può essere ritenuta responsabile per eventi risultanti da un uso diverso dallo scopo prefisso.

**WARNING**

## Utilizzando le maniglie cinghia

La SCO è dotato di una maniglia cinturino per il trasporto della SCO per conto suo. Non utilizzare questa maniglia per sollevare la SCO quando è collegato ad altri S-Series strumenti. Non usare nessun altra cinghia maniglie per il sollevamento S-Series strumenti che sono collegati tra loro.

**WARNING**

## Strumento pesante

Il peso di questo strumento può superare i 18 kg (40 lb) raccomandati come limite per il trasporto manuale da parte di singola persona (vedi pagina 9). Per evitare rischi di danni fisici è bene quindi considerare il carico complessivo, le condizioni del trasporto e le capacità individuali in accordo con la direttiva comunitaria 90/269/EEC e con eventuali regolamenti locali.

**WARNING**

## Pericolo sostanze tossiche

Alcuni dei componenti usati in questo strumento possono contenere resine o altri materiali che, se bruciati, possono emettere fumi tossici. Prendere quindi le opportune precauzioni nell'uso di tali parti.

**WARNING**

## Posizionamento inclinato

Quando lo strumento è in posizione inclinata è raccomandato, per motivi di stabilità, non sovrapporre altri strumenti.

**WARNING**

## Pericoli da elettricità

Non rimuovete mai le coperture perché così potreste provocare danni a voi stessi. Non vi sono all'interno parti di interesse all'utilizzatore.

Tutte gli interventi sono di competenza del personale qualificato. Vedi elenco internazionale dei Centri di Assistenza in fondo al manuale.

**CAUTION**

## Ispezione visiva iniziale

Dopo aver sballato lo strumento, ispezionare l'imballo e verificare che non vi siano segni di urti o deformazioni. Nel caso si dovessero riscontrate dei danni, conservare l'imballo per un'eventuale contestazione al cordiere.

Verificare che lo strumento non abbia segni di danni, nel caso si dovessero riscontrate tali segni, non dare alimentazione in quanto vi potrebbero essere dei danni interni.

# Precauciones

Estos términos tienen significados específicos en este manual:

**WARNING** **contienen información referente a prevención de daños personales.**

**CAUTION** **contienen información referente a prevención de daños en equipos.**

## Símbolos de peligro

El significado de los símbolos de peligro en el equipo y en la documentación es el siguiente:

| Símbolo | Naturaleza del peligro |
|---|---|
|  | Vea el manual de funcionamiento cuando este símbolo aparezca en el instrumento. Familiarícese con la naturaleza del riesgo y con las acciones que deban de tomarse. |
|  | Aviso de toxicidad |

## Condiciones generales de uso

Este producto ha sido diseñado y probado para cumplir los requerimientos de la normativa IEC/EN61010-1 “Requerimientos de la normativa para equipos eléctricos de medida, control y uso en laboratorio”, para equipos clase I portátiles y para uso en un ambiente con un grado de contaminación 2. El equipo ha sido diseñado para funcionar sobre una instalación de alimentación de categorías I.

Debe protegerse el equipo de la entrada de líquidos y precipitaciones como nieve, lluvia, etc. Cuando se traslada el equipo de entorno frío a un entorno caliente, es importante aguardar la estabilización el equipo para evitar la condensación. Solamente debe utilizarse el equipo bajo las condiciones ambientales especificadas en la hoja técnica, en caso contrario la propia protección del equipo puede resultar dañada.

Este producto no ha sido aprobado para su utilización en entornos peligrosos o la seguridad de las aplicaciones críticas.

**WARNING**

## Idoneidad de uso

Este equipo ha sido diseñado y fabricado por Aeroflex para realizar medidas en RF y microondas en componentes y sistemas.

Si el equipo fuese utilizado de forma diferente a la especificada por Aeroflex, o está dañado, la protección ofrecida por el equipo pudiera quedar reducida.

Aeroflex no tiene control sobre el uso de este equipo y no puede, por tanto, exigirsele responsabilidades derivadas de una utilización distinta de aquellas para las que ha sido diseñado.

WARNING

## Usando cinta maneja

La SCO está provisto de un asa cinta para la realización de la SCO por su propia cuenta. No la utilice para levantar el SCO cuando se une a otros instrumentos de la S-Series. No utilice ninguna otra correa maneja para el levantamiento de instrumentos de la S-Series que están unidas entre sí.

WARNING

## Instrumento pesado

El peso de este equipo podrá ser superior a la recomendación de 18 Kg (40 lb), lo que debe tenerse en cuenta. si va ser transportado manualmente por una sola persona (vea la página 9). Para evitar el riesgo de lesiones, antes de mover el equipo deberá evaluar la carga, el entorno de trabajo y la propia capacidad, de acuerdo con la Directiva Europea 90/269/EEC y el Reglamento Nacional Asociado.

WARNING

## Aviso de toxicidad

Alguno de los componentes utilizados en este equipo pudieran incluir resinas u otro tipo de materiales que al arder produjeran sustancias tóxicas. Por tanto, tome las debidas precauciones en la manipulación de esas piezas.

WARNING

## Tener en cuenta con el equipo inclinado

Si utiliza el equipo en posición inclinada, se recomienda, por razones de estabilidad, no apilar otros equipos encima de él.

WARNING

## Nivel peligroso de electricidad (tensión de red)

No retire las cubiertas del chasis del instrumento, ya que pudiera resultar dañado personalmente. No existen partes que puedan ser reparadas en su interior.

Deje todas las tareas relativas a reparación a un servicio técnico cualificado. Vea la lista de Centros de Servicios Internacionales en la parte trasera del manual.

**CAUTION**

## Inspección visual inicial

Tras desembalar el equipo inspeccione tanto la caja como el material de amortiguamiento para verificar si han sido forzados o dañados. Si encuentra daños, retenga el embalaje para que, en caso de reclamación, pueda ser inspeccionado por el transportista. Examine el equipo para verificar que no ha sufrido daños. No conecte el equipo a al alimentación cuando esté dañado.

# Chapter 1
# INTRODUCTION AND OVERVIEW

The S-Series SCO Combiner is a high performance four input-port combiner/switch module that complements the SGA signal generator for all multisource applications.

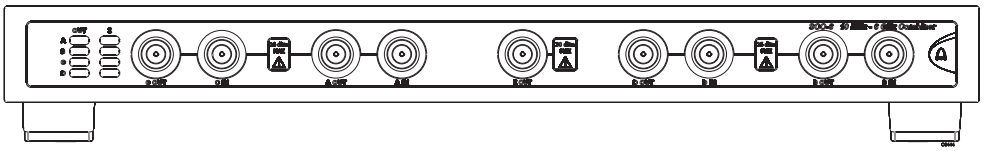


*Fig. 1 SCO Combiner front view*

*Fig. 2 SCO Combiner together with two SGAs*

The SCO provides wideband cover of 10 MHz to 6 GHz (SCO-6). It combines the outputs of two SGA signal generators via a low-loss combined path for higher output, or combines the outputs of up to four SGA signal generators to support all multisource applications.

It provides the following:

- Plug & Play operation under the control of an SGA, simplifying test configuration and calibration
- Aerolock™ interlocking mechanism for test system creation
- Direct low-loss outputs for each signal generator for LO substitution or mixer testing
- SCO path calibration data, used by the SGA to optimise the RF output level accuracy
- Ultimate RF level accuracy by path/cable calibration using USB power sensor
- Support for many applications including mixer testing, receiver selectivity, intermodulation distortion
- Level and frequency settings can be coupled via direct and indirect relationships e.g. harmonic or sub-harmonic, greatly assisting speed of test.

## Combiner control

The SCO is connected to the SGA signal generator via a plug & play USB port. The SGA recognises the SCO's presence, and the features and applications relevant to the SCO become available on the SGA. The touch-screen LCD on the SGA enables all relevant combiner set-up information to be graphically displayed on one screen, without the need to select configurations from lower-level menu structures.

# Specifications

All specifications apply after a warm-up period of 20 minutes.

## Frequency range

| | |
|---|---|
| Frequency range – all paths | 10 MHz to 6 GHz, useable to 1 MHz |

## Insertion loss

| | 10 MHz to 3 GHz | Above 3 GHz |
|---|---|---|
| A,B,C,D to Σ | <17 dB | <20 dB |
| A,B to Σ via low loss path | <12 dB | <15 dB |
| Direct paths (e.g. A in to A out) | <4 dB | <5 dB |

## VSWR (unused ports terminated in 50 ohms)

| | 10 MHz to 3 GHz | >3 GHz to 5 GHz | >5 GHz |
|---|---|---|---|
| Σ | 1.3:1 | 1.5:1 | 1.6:1 |
| A,B,C,D (inputs and outputs) | 1.6:1 | 1.8:1 | |

## Path calibration data uncertainty

| 10 MHz to 3 GHz | Above 3 GHz |
|---|---|
| ±0.2 dB | ±0.4 dB |

## Isolation (unused ports terminated in 50 ohms)

| | |
|---|---|
| Between inputs A,C or B,D, with Σ selected | >25 dB (30 dB typ) |
| All other input combinations with Σ selected | >40 dB |
| Between inputs A,B in low loss path mode, with Σ selected | >30 dB |
| Between Σ and direct outputs with Σ selected | >40 dB |
| Between Σ and direct outputs with direct paths selected | >50 dB |

## Intermoduation

The following specification applies with two S-Series signal generators providing two tones at 0 dBm on the combiner into a source VSWR of 2:1 or better:

-80 dBc

## RF connectors

| | |
|---|---|
| Impedance | 50 Ω |
| Maximum applied power A,B,C,D (inputs) | +24 dBm |
| Maximum applied power E,F,G,H (outputs) | +24 dBm |
| Maximum applied power Σ | +30 dBm |

### Environmental

| | |
|---|---|
| Rated range of use | |
| Temperature | 0 to 50°C |
| Humidity | Up to 93% at 40°C |
| Altitude | Up to 3050 m |
| Conditions of storage and transport | |
| Temperature | -40 to +71°C |
| Humidity | Up to 95% at 40°C |
| Altitude | Up to 4600 m |
| EMC | IEC/EN 61326-1:2006, Emissions Class B, Immunity Table 1 – Performance Criteria B |
| Safety | BS EN 61010-1:2010<br>BS EN 61010-2-030 :2010 |
| Mechanical | MIL-PRF-28800F Class 3 |

### Power requirements

USB 2.0

### Connectors

| | |
|---|---|
| A,B,C,D inputs, outputs and Σ | 50 Ω N-type – see options for front/rear panel configuration |
| 3 x USB 2.0 | Rear panel<br>1 x USB Type B for plug & play connection with SGA<br>2 x USB Type A for redistribution |

### Recommended calibration cycle

24 months

### Weight

4.1 kg

### Dimensions: H x W x D

1U x 444 mm x 490 mm.

Instrument includes side strap handles and front tilt feet.

Instrument includes Aerolock™ interlocking mechanism for modules mounted above and below.

## Ordering information

| | |
|---|---|
| SCO-6 | 10 MHz to 6 GHz 4-Input RF Combiner |
| Option 001 | All RF connectors on front panel |
| Option 002 | All RF connectors on rear panel |

### Extended warranty options

| | |
|---|---|
| Option 203 | 3 year warranty |
| Option 204 | 4 year warranty |
| Option 205 | 5 year warranty |

## Supplied accessories

Instruction manual

CD-ROM containing factory test results

Aerolock™ locking keys – set of two

USB Type-B to Type-A cable, 1.5 m

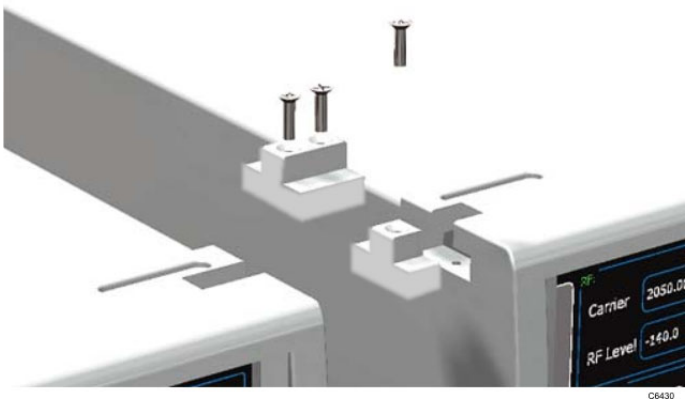
## Optional accessories

| | |
|---|---|
| 59999/163 | Precision coaxial adapter N male to SMA female |

# Chapter 2
# INSTALLATION

## Aerolock™

Aerolock™ is a simple, strong interlocking mechanism...



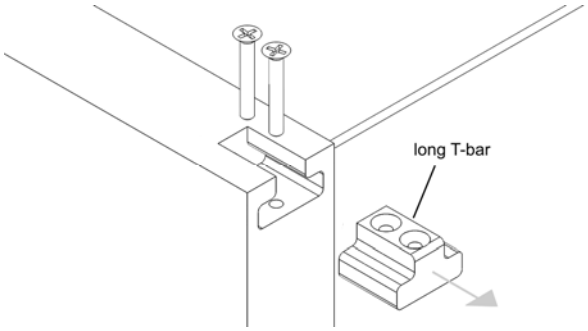

...that allows S-Series instruments to be joined together.

### How it works

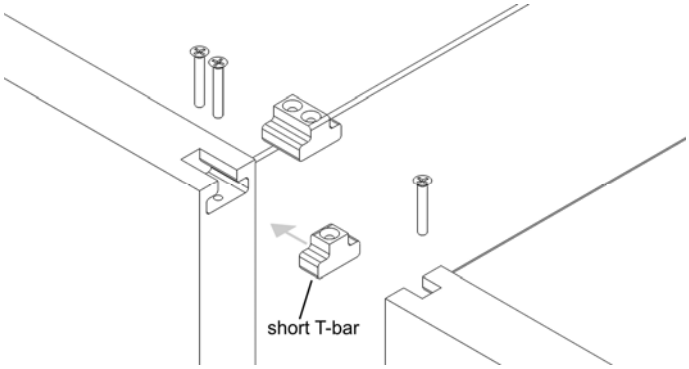
Each S-Series instrument is supplied with short and long T-bars that are located in the cut-outs at the top and bottom of the screen surround. When joining instruments together, you swap these T-bars over to allow the long T-bar to form a bridging link. You also screw the rear bumpers together.

### Procedure: front

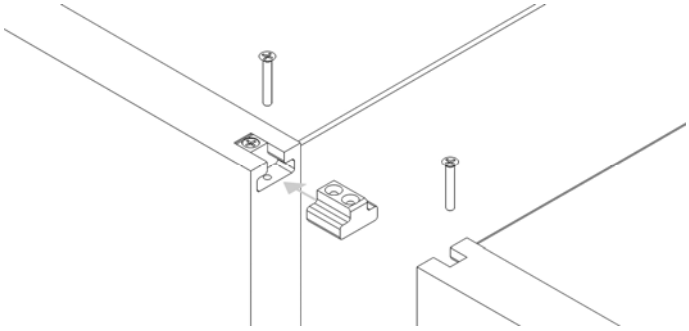
For example, to join two instruments side-by-side, remove the long T-bar from the left-hand instrument...



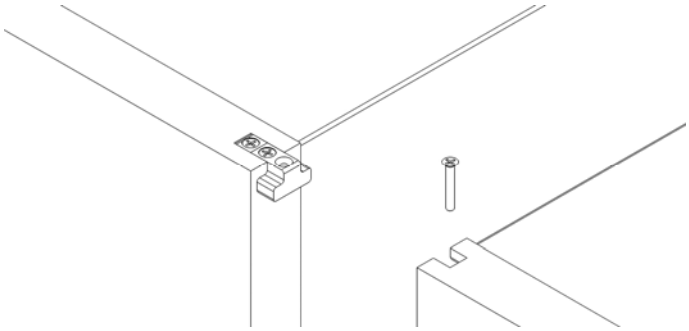
...move the short T-bar from the right-hand instrument into the vacated space on the left-hand instrument...

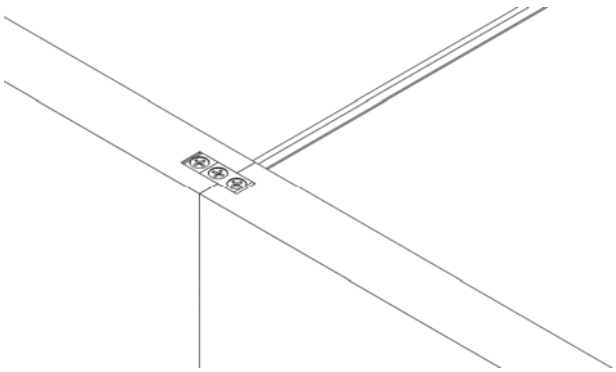



...replace the long T-bar in the left-hand instrument...



...and join the two instruments using the long T-bar as the bridging piece...

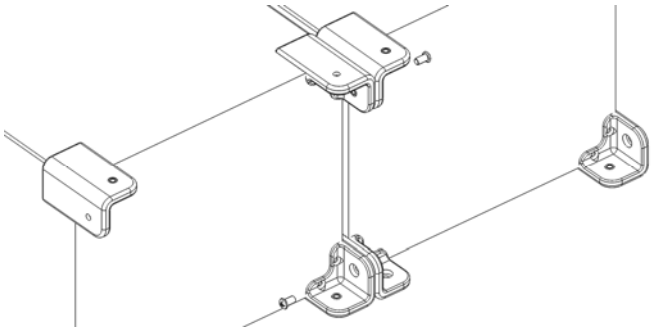




Do this at both the top and bottom of the screen surrounds.

## Procedure: rear

At the rear of the instruments, screw the rear bumpers together, using the thumbscrews and tapped inserts provided in the adjacent bumpers, top and bottom.



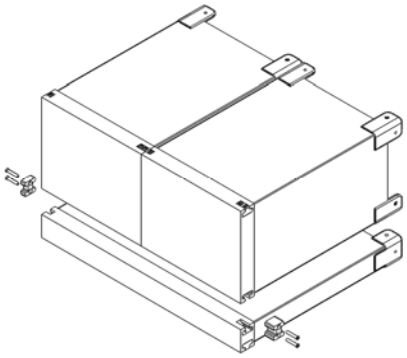
The two instruments are now joined firmly together:

## Adding a full-width module

Fit a full-width module, such as the SCO combiner, underneath two half-rack-width instruments using I-bars (supplied with the module) in exactly the same way as T-bars.

***Note**: remove the feet from the two upper instruments first.*

Again, screw the rear bumpers together to provide stability.



## Electrical connections

Signal and control connections are created by USB cables that link the master instrument (for example, the SVA) and further modules such as signal generators, analyzers, and combiner.

**WARNING**

## Heavy instrument

The SCO Combiner on its own is light enough to be handled by one person. However, if two or more S-Series instruments are attached together using the Aerolock™ mechanism, the combined weight of instruments may become more than 18 kg (40 lb), which exceeds the recommended maximum weight for manual handling by a single person.

In this case, *use two people* to lift the combined instruments. Lift under the casing, taking care to avoid trapping fingers underneath. *Do not* use the side strap handles for lifting combined instruments.

**CAUTION**

## Positioning the instrument

Excessive temperatures may affect the performance of the instrument. Completely remove any protective plastic covering, and avoid standing the instrument on or close to another instrument that is hot.

### Stability

If you stand the instrument on end on its rear-panel protectors, make sure that you provide support to prevent it from toppling over.

**CAUTION**

## Installation requirements

### Ventilation

This instrument is air-cooled. Air enters and exits through ventilation holes on either side of the instrument.

Before switching on the instrument, ensure that the ventilation holes are not restricted. Leave a clearance of at least 50 mm (2 in).

## Connecting to supply

The instrument is USB-powered and therefore contains no lethal voltages. Ensure that any line-powered instrument to which the SCO is connected is plugged into an outlet socket with a protective earth contact.

## External equipment

Connect only equipment complying with the relevant IEC safety standards to the connectors on the instrument, in order to maintain the protection provided by the instrument.

To minimize electromagnetic interference (EMI), follow the following recommendations:

- Do not use connecting cables longer than 1 m.
- Use double-screened cables where possible.

# Connections to the SCO

## Front panel

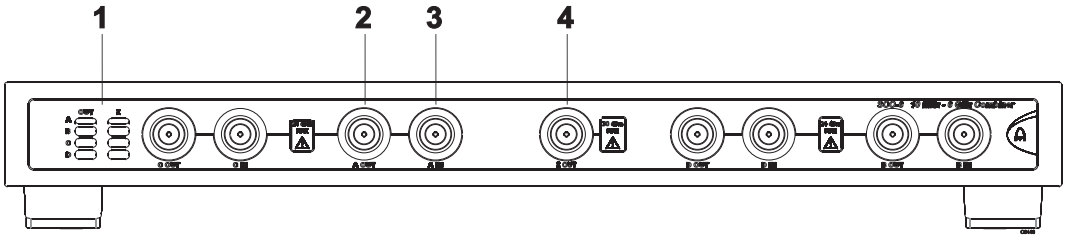



*Fig. 3 Front panel connections*

| | | |
|---|---|---|
| 1 | OUT/Z | Visual indication of signal routing. OUT column indicates direct routing of the A, B C or D signal.<br>Z column indicates routing via the combiner output. |
| 2 | A OUT | Direct routing of A IN signal (similar for B, C, D signals) |
| 3 | A IN | RF input from SGA (similar for B, C, D signals) |
| 4 | ∑ OUT | Combined output of selected input signals. |

## Rear panel

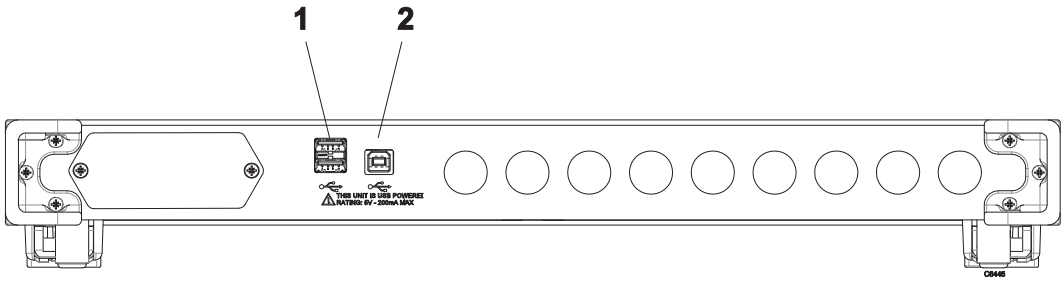



*Fig. 4 Rear panel connections*

| | | |
|---|---|---|
| 1 |  | Type A USB socket.<br>Redistribution for other USB devices with the SCO. |
| 2 |  | Type B USB socket.<br>Plug and play connection to SGA. |

## Schematic diagram

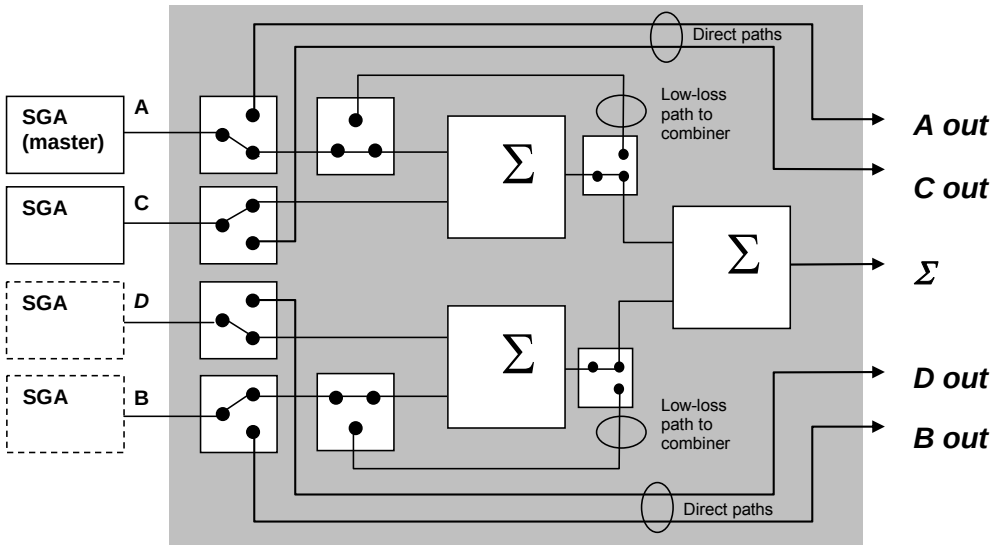



*Fig. 5 Schematic for the SCO Combiner*

# Maintenance

## Calibration

The recommended calibration interval is two years. If the instrument is due for calibration, or you suspect that it is not performing correctly, contact the Aeroflex help desk at www.aeroflex.com/ats/contact.cfm.

## Support

Contact the Aeroflex help desk at www.aeroflex.com/ats/contact.cfm if you need assistance.

## Cleaning

Before starting any cleaning, switch off the instrument and disconnect all cables.

Case exterior: use a soft cloth moistened with water to clean the case; do not use aerosol or liquid solvent cleaners.

Air inlets: remove dust and any other impediments to airflow from the air inlet holes on the sides of the instrument.

## Putting into storage

If you are putting the instrument into storage, ensure that the following conditions are maintained:

Temperature range: -40 to +71°C

Humidity: up to 95% at +40°C.

# Declaration of conformity

A copy of the EC declaration of conformity for the SCO Combiner is available on request from Aeroflex Ltd. The document number of the declaration of conformity is DC285.

# China RoHS

A declaration of specified hazardous substances that applies when this product is exported to China is available on request from Aeroflex Ltd. A copy of the declaration is provided with each shipment of the product to China.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