



CO 465 Universal SPG Changeover

The CO 465 Universal SPG Changeover

- Document Number: 82102-0080
- Document Version: 1.0
- Date: April 11, 2016
- Printed in U.S.A.

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This equipment has been tested and found to comply with the limits for a Class A, digital device, pursuant to Part 15, Subpart B of the FCC Rules and the Canadian EMC Requirement (ICES-003). These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case, the user will be required to correct the interference at their own expense. Shielded cables must be used to ensure compliance with the FCC Class A limits.

Declaration of Conformity

Utah Scientific, Inc.

4750 Wiley Post Way, Suite 150
Salt Lake City, Utah 84116-2878 U.S.A.

We declare our sole responsibility that the Utah-400 Digital Routing Switcher is in conformance with the following standards:

Emission

- EN55022:1994+A1&A2

Immunity

- EN55024:1998
- EN61000-3-2
- EN61000-3-3

Safety

- IEC 60950-1:2001 /EN 60950-1:2001

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- EMC Directive 89/336/EED
- Low Voltage Electrical Directive 72/23/EEC

Utah Scientific, Inc. hereby declares that the product specified above conforms to the above Directive(s) and Standard(s).



Important Safeguards and Notices

This section provides important safety guidelines for the Operator and Service Personnel. Specific warnings and cautions are found throughout the guide where they apply, but may not appear here. Please read and follow the important safety information, specifically those instructions related to risk of fire, electric shock, or injury to persons.

Safety Symbols



- Hazardous Voltage symbol



- Caution symbol. The product is marked with this symbol when it is necessary to refer to the manual to prevent damage to the product.

Warnings

Please observe the following important warnings:



- Any instructions in this guide that require opening the chassis, changing a power supply, or removing a board, should be performed by qualified personnel only. To reduce the risk of electric shock, do not perform any service unless you are qualified to do so.
- Heed all warnings on the unit and in the operating instructions.
- Do not use this product in or near water. Disconnect AC power before installing any options or servicing the unit unless instructed to do so by this manual.
- This product is grounded through the power cord ground conductor. To avoid electric shock, plug the power cord into a properly wired receptacle before connecting the product inputs or outputs.
- Route power cords and other cables so they won't be damaged.
- The AC receptacle (socket) should be located near the equipment and be easily accessible.
- Disconnect power before cleaning. Do not use any liquid or aerosol cleaner - use only a damp cloth.



- Dangerous voltages exist at several points in this product. To avoid personal injury, do not touch exposed conductors and components while power is on. Do not insert anything into either of the systems two-power supply cavities with power connected.
- Do not wear hand jewelry or watches when troubleshooting high current circuits, such as power supplies. During installation, do not use the door handles or front panels to lift the equipment as they may open abruptly and injure you.
- To avoid fire hazard when replacing fuses, use only the specified correct type, voltage and current rating as referenced in the appropriate parts list for this product. Always refer fuse replacement to qualified service personnel.
- Have qualified personnel perform safety checks after any service.

Cautions

Please observe the following important cautions:



- When installing this equipment do not install power cords to building surfaces. To prevent damage when replacing fuses, locate and correct the problem that caused the fuse to blow, before reconnecting power.
- Use only specified replacement parts

Notices

Please observe the following important notes:



- When the adjacent symbol is indicated on the chassis, please refer to the manual for additional information.
- For the HD-2020 Chassis and Master Control Panel, refer to “Connecting and Disconnecting Power” - Chapter 2 (Hardware Installation).

Company Information

Utah Scientific, Incorporated

**4750 Wiley Post Way, Suite 150
Salt Lake City, Utah 84116-2878 U.S.A.**

- Telephone: +1 (801) 575-8801
- FAX: +1 (801) 537-3098
- Technical Services (voice): +1 (800) 447-7204
- Technical Services (FAX): +1 (801) 537-3069
- E-Mail -General Information: info@utsci.com
- E-Mail -Technical Services: service@utsci.com
- World Wide Web: <http://www.utahscientific.com>
- **After Hours Emergency:** +1 (800) 447-7204. Follow the menu instructions for Emergency Service.

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- Repair or replacement of the software or hardware that does not meet the above warranties and is returned to Utah Scientific under the returned materials authorization (RMA) process with freight and forwarding charges paid.

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CO 465 Universal SPG Changeover

The CO 465 is a universal, modular automatic SPG changeover unit intended for use with the UTSCI range of SPGs and test pattern generators. It can be configured as 6 or 12 measured channels in a 1U rack. All channels measure both the “primary” and “backup” signals. The standard unit is supplied with two “hot Swappable” redundant power supplies for maximum security. The power supplies are directly accessible from the front panel.

To allow for mixed format requirements and offer maximum flexibility, each channel can be set to measure analog color black, standard definition SDI Video, high definition SDI Video, high definition 3G SDI Video, or AES/EBU audio (75Ω).

Each channel has a Primary input, a Backup input, a Common output and a relay that switches one of the inputs to the Common output.

Features

- Up to 12 channels in 1U
- Front panel visual fault indication
- Manual override facility
- All channels can measure analog color black, SD & HD SDI, 3G SDI, HD Tri-level sync, Timecode or AES/EBU audio
- All channels will switch if one channel fails
- Hot Swappable redundant PSUs
- Standard 1U unit 6 channels
- 6 channel option card
- Clear fault indication on front panel LCD
- All channels user configurable.

Specification

Conforms to relevant EBU, CCIR or SMPTE specifications.

Input (per channel)

- Primary (terminating BNC)
- Backup (terminating BNC)

Output ((per channel)

- BNC (single)

Controls and Indicators

- LCD Display, Rotary Knob & Switch

Changeover threshold

- analog color black: On loss of signal
- Serial Digital Video: On loss of signal
- AEE/EBU audio: On loss of signal
- HD Tri-level sync: On loss of signal
- Timecode: On loss of signal

Return Loss

- Better than 36dB @4.43 MHz

Isolation

- Better than 60 dB, both directions on all channels to 1.5 GHz

Mechanical

- Height: 1 rack unit
- Width: 19" rack mounting
- Depth: 380mm (overall)
- Weight: 6 Kg (unpacked)

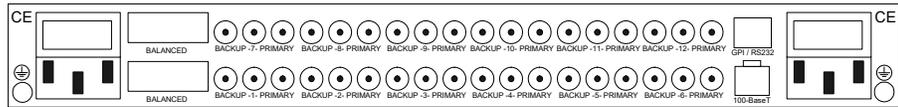


Power

- Depends on fitted options
- 40 Watts maximum

Ordering information

- CO 465/1U66 channel SPG changeover unit with redundant PSU
- CO456/1U 1212 channel SPG changeover with redundant PSU
- CO456/06Additional 6 channels – Option for CO456/1U6



Introduction

The CO 465 is a universal, modular automatic SPG changeover unit intended for use with the UTSCI range of SPGs and test pattern generators. The CO 465 can be configured as 6 or 12 measured channels in a 1U rack or 6, 12, 18 or 24 measured channels in a 2U rack. All 24 channels measure both the “primary” and “backup” signals.

An un-measured switch adds additional 8, 16, 24 or 32 channels. These are suitable for switching single-ended or differential LTC, audio or control signals.

To allow for mixed format requirements and offer maximum flexibility, each channel can be set to measure analog color black, standard definition SDI Video, high definition SDI Video, high definition 3G SDI Video, or AES/EBU audio (75Ω).

Each channel has a Primary input, a Backup input, a Common output and a relay that switches one of the inputs to the Common output.

Considerations

- Logic in the changeover can be likened to a 24-input x 28-output matrix.
- The inputs are the primary and backup measurement sensors.
- The outputs are the relays.
- Any input can be connected to any output. In this way, any sensor can be connected to any relay; e.g. the sensor on channel 4 can control the relay on channel 1.

Furthermore any number of sensors can be connected to a relay; e.g. sensors on channel 1, 4, 5 and 6 can all control the relay on channel 1.

As a result, complex relationships and separated groups can be realized. The most common relationship would be to have all sensors connected to all relays.

This manual covers the following modules/sub-assemblies:

- CO435 Main Module (6 Measured Channel) - Issue 5A
- CO436 Option Module (6 Measured Channel) - Issue 5B
- CD404 Front Panel - Issue 1A
- CD46N Frame & PSU(s) - Issue 1



Installation

Fit the 1U electronics unit into a 19 inch rack.

Connect to the rear of the electronics unit:

For each channel used, connect the Primary and Backup sources. The type of signal you connect is determined in the “Channel Setup” system, accessed by the menu or remote control.

Also required, is a cable to control the “On Air” LED on each SPG; the details of this cable are given in the appendices.

Enter the Menu system, select <-System>, scroll down and select <-Options>. Set the <Number of Channels> entry to the number of channels you have cabled up. Exit the menus and the unit is now ready for operation.

Operating Instructions

Front Panel Controls and Indicators:

Panel

There is a single “CANCEL” button, a rotary/push control and an LCD.

Backup Faults

There is an LCD indication for each channel. If a fault occurs on one of the installed channels on the Backup input, the LCD indicator will illuminate to report a fault. The fault reporting is persistent, i.e. even if the fault is only an intermittent one, the fault indicator will stay illuminated. Repairing the fault and clearing the fault in the user interface will turn the LCD indication off.

Primary Faults

There is an LCD indication for each channel. If a fault occurs on one of the installed channels on the Primary input, the LCD indicator will illuminate to report a fault. The fault reporting is persistent, i.e. even if the fault is only an intermittent one, the fault indicator will stay illuminated. Repairing the fault and clearing the fault in the user interface will turn the LCD indication off.

Maintenance

Routine attention is not normally required; there are no preset controls available on this unit.

Field Alignment

General

There are no user presets to adjust on this unit; all detector levels are factory set, and should require no further adjustment.

Single Fixed / Dual Redundant Switched-Mode Power Supply Unit

WARNING!

THIS UNIT CONTAINS EITHER ONE FIXED, OR TWO REMOVABLE SWITCHED-MODE POWER SUPPLY UNIT(S):

WHEN THE TOP COVER IS REMOVED, LIVE PARTS ARE EXPOSED.

The Switched Mode Power Supply Units (SMPSUs) used in the CO 465 unit are proprietary, bought-in units. They contain several exposed live parts, and are therefore dangerous to service. If any problems are encountered, or they fail completely, DO NOT ATTEMPT TO REPAIR. UTSCI is able to arrange for the manufacturers to repair any faulty units. Please contact Utah Scientific regarding any servicing/repair requirements.



Appendices

“On Air” Indication

In parallel with the Primary/Backup LEDs on the “Sync Source” section of the front panel, there is a single signal which is used by both of the CO490 SPGs in a Master/Slave installation. This signal is interpreted by SPG software, and determines whether the “On Air” LED on each SPG should be illuminated; when lit, the LED indicates that the SPG is currently routed through the Changeover unit.

Each SPG must be properly configured in order that this signal is interpreted correctly. Within the “Menu” system of the CO490 SPG, there is an option to designate each unit as the Primary or the Backup; set the unit intended to be the Master as “Primary”, and the Slave as “Backup”. The “On Air” LED for the Primary unit should now be illuminated, and the LED for the Backup unit should be off (assuming that “Primary” is displayed on the Changeover Panel).

The interconnection details for the cable required to accomplish the LED changeover of CO490 SPGs are as follows:

Table 0-1.

	Primary SPG D9 Skt	Changeover 10W Skt	Backup SPG D9 Skt
Pin	9	9	9

If supplementary Relay Tallies are required, use a channel on the connector marked “Balanced”. See pinout details below.

Remote Connector Pinout

Connector Type: 10 pin Socket.

Pin	Function
1.	Gnd
2.	Gnd
3.	RS232 RX from PC or similar
4.	RS232 TX to PC or similar
5.	GPI zero
6.	GPI one
7.	GPO zero
8.	GPO one
9.	On Air
10.	Gnd

View from rear of frame:

Table 0-2.

Gnd	GPO one	GPI one	RS232 TX	Gnd
ON AIR	GPO zero	GPI zero	RS232 RX	Gnd

Table 0-3.

CO490 SPG D9 Connector Pin-outs		
Pin	Description	Notes
1	GPI	General purpose input
2	RS232 RX	RS232 RX from a PC or similar
3	RS232 TX	RS232 TX to a PC or similar
4	Do not connect	GPS 10KHz / 10MHz signal



Table 0-3.

CO490 SPG D9 Connector Pin-outs		
5	Ground	
6	Ground	RS232 auxiliary RX from GPS
7	Do not connect	RS232 auxiliary TX to GPS
8	Do not connect	GPS 1Hz signal
9	On Air	Used with changeover unit
	Shell	The connector shell is grounded to chassis

Connector Type: 30 pin Socket.

Pin	Function
1.	Gnd
2.	Gnd
3.	Gnd
4.	Channel1 Backup
5.	Channel1 Common
6.	Channel1 Primary
7.	Channel2 Backup
8.	Channel2 Common
9.	Channel2 Primary
10.	Channel3 Backup
11.	Channel3 Common
12.	Channel3 Primary
13.	Channel4 Backup
14.	Channel4 Common

-
15. Channel4 Primary
 16. Channel5 Backup
 17. Channel5 Common
 18. Channel5 Primary
 19. Channel6 Backup
 20. Channel6 Common
 21. Channel6 Primary
 22. Channel7 Backup
 23. Channel7 Common
 24. Channel7 Primary
 25. Channel8 Backup
 26. Channel8 Common
 27. Channel8 Primary
 28. Gnd
 29. Gnd
 30. Gnd



```
"CY465 Changeover Unit      "  
"Operational Mode   = Manual"  
"      Output      = Primary"  
"-Signal Strength Menu Enter ->"  
"-Channel Setup   Menu Enter ->"  
"-System          Menu Enter ->"
```

```
"Channel Configuration Menu  "  
"Chan 1 Type=             xxxx"  
"Chan 2 Type=             xxxx"  
"Chan 3 Type=             xxxx"  
"Chan 4 Type=             xxxx"  
"Chan 5 Type=             xxxx"  
"Chan 6 Type=             xxxx"  
"Chan 7 Type=             xxxx"  
"Chan 8 Type=             xxxx"  
"Chan 9 Type=             xxxx"  
"Chan 10 Type=            xxxx"  
"Chan 11 Type=            xxxx"  
"Chan 12 Type=            xxxx"  
"Chan 13 Type=            xxxx"  
"Chan 14 Type=            xxxx"  
"Chan 15 Type=            xxxx"  
"Chan 16 Type=            xxxx"  
"Chan 17 Type=            xxxx"  
"Chan 18 Type=            xxxx"  
"Chan 19 Type=            xxxx"  
"Chan 20 Type=            xxxx"  
"Chan 21 Type=            xxxx"  
"Chan 22 Type=            xxxx"  
"Chan 23 Type=            xxxx"  
"Chan 24 Type=            xxxx"
```

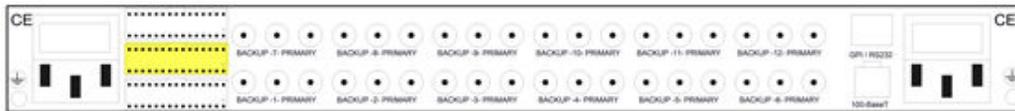
```
"System Menu                "  
"Changeover= Primary"  
"RS232Protocol = x"  
"RS232Address1 = xxxx"  
"RS232Address2 = xxxx"  
"DHCP          = On"  
"WebServer     = On"  
"IP 000.000.000.000"  
"Mask 000.000.000.000"  
"BC 000.000.000.000"  
"GWay 000.000.000.000"  
"SNMPMode =On-V3"  
"SNMPTrapMode = Off"  
"T1 000.000.000.000"  
"T2 000.000.000.000"  
"T3 000.000.000.000"  
"T4 000.000.000.000"  
"-SNMP Set String ->"  
"...Private "  
"-SNMP Get String ->"  
"...Public  "  
"Inform Retries = 000"  
"-MAC 0000.0000.0000"  
"-MUC 0000.0000.0000"  
"LCD Brightness = 15"  
"LCD Contrast = 15"  
"-Options Menu ->"  
"-Calibration Menu ->"
```

```
"Option Menu                "  
"KEY          0000.0000.0000"  
"Network Enable = x"  
"Network Enable 0000.0000.0000"  
"Number Of Channels = "
```

```
"Calibration Menu          "  
"Changeover Channel = xx"  
"Do Calibration? = x"  
" "  
"Primary High = xxxx Low = xxxx"  
"Backup High = xxxx Low = xxxx"
```

CY465A Balanced Signal Outputs - 30Way Molex

Pin Number	Signal	Default Selection
1	Ground	
2	Ground	
3	Pair 1+	LTC 2
4	Pair 1-	
5	Pair 2+	LTC 1
6	Pair 2-	
7	Pair 3+	AES 8
8	Pair 3-	
9	Pair 4+	AES 7
10	Pair 4-	
11	Pair 5+	AES 6
12	Pair 5-	
13	Pair 6+	AES 5
14	Pair 6-	
15	Pair 7+	AES 4
16	Pair 7-	
17	Pair 8+	AES 3
18	Pair 8-	
19	Pair 9+	AES 2
20	Pair 9-	
21	Pair 10+	AES 1
22	Pair 10-	
23	Pair 11+	DARS
24	Pair 11-	
25	AUD1+ Left	
26	AUD1- Left	
27	AUD2+ Right	
28	AUD2- Right	
29	Ground	
30	Ground	

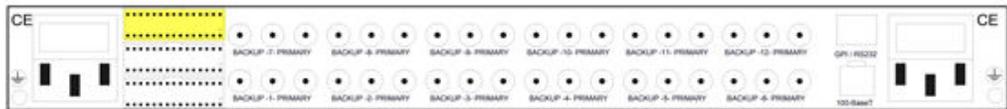




CY465A Balanced Signal from Primary CY460 Inputs - 30Way Molex

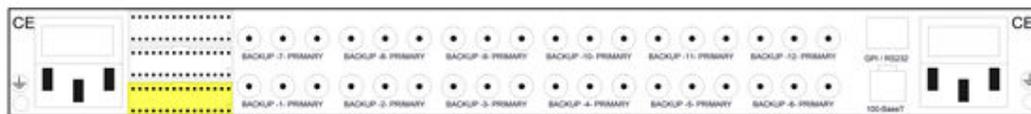
Section 1

Pin Number	Signal	Default SPG Selection
1	Ground	
2	Ground	
3	Pair 1+	LTC 2
4	Pair 1-	
5	Pair 2+	LTC 1
6	Pair 2-	
7	Pair 3+	AES 8
8	Pair 3-	
9	Pair 4+	AES 7
10	Pair 4-	
11	Pair 5+	AES 6
12	Pair 5-	
13	Pair 6+	AES 5
14	Pair 6-	
15	Pair 7+	AES 4
16	Pair 7-	
17	Pair 8+	AES 3
18	Pair 8-	
19	Pair 9+	AES 2
20	Pair 9-	
21	Pair 10+	AES 1
22	Pair 10-	
23	Pair 11+	DARS
24	Pair 11-	
25	AUD1+ Left	
26	AUD1- Left	
27	AUD2+ Right	
28	AUD2- Right	
29	Ground	
30	Ground	



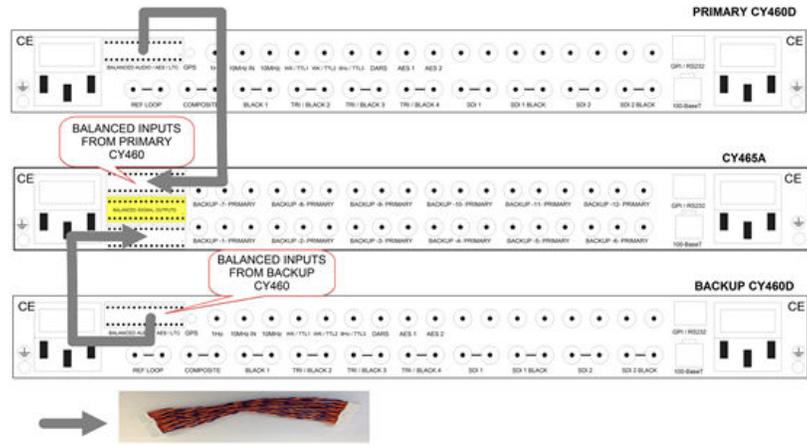
CY465A Balanced Signal from Backup CY460D Inputs - 30Way Molex

Pin Number	Signal	Default SPG Selection
1	Ground	
2	Ground	
3	Pair 1+	LTC 2
4	Pair 1-	
5	Pair 2+	LTC 1
6	Pair 2-	
7	Pair 3+	AES 8
8	Pair 3-	
9	Pair 4+	AES 7
10	Pair 4-	
11	Pair 5+	AES 6
12	Pair 5-	
13	Pair 6+	AES 5
14	Pair 6-	
15	Pair 7+	AES 4
16	Pair 7-	
17	Pair 8+	AES 3
18	Pair 8-	
19	Pair 9+	AES 2
20	Pair 9-	
21	Pair 10+	AES 1
22	Pair 10-	
23	Pair 11+	DARS
24	Pair 11-	
25	AUD1+ Left	
26	AUD1- Left	
27	AUD2+ Right	
28	AUD2- Right	
29	Ground	
30	Ground	





Section 1



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