

# CRS Series 1:1 Modem Redundancy Switches



## INTRODUCTION

The Comtech EF Data 1:1 Modem Redundancy Switches are companion products for the following modems:

Modem	Switch	Remarks
CDM-500	CRS-100	70/140 MHz
CDM-550		
CDM-550T		
CDM-600	CRS-150	70/140 MHz
CDM-600L		
CDM-570	CRS-180	70/140 MHz
CDM-570L	CRS-170A	L-Band
SDN-300L3 & SMS-301	CRS-170A	L-Band
SNM-1001L & SMS-301	CRS-170A	L-Band

Their purpose is to continuously monitor a pair of modems in a redundant configuration, so that the unit automatically switches data and IF signals from the failed unit to the standby unit if an equipment failure or undesired traffic condition occurs.

This fully protects traffic paths, and the operator can have increased confidence that equipment failures will not adversely affect system availability.

There are two types of switches. The first type routes data and IF signals at the switch. The CRS-100 and CRS-150 are representative of this type of switching. These switches have individual connectors mirroring the data and IF interfaces available on the modems they support. Operationally, a copy of the Tx and Rx traffic is delivered to the offline modem so that both units see identical traffic signals.

The second type performs IF switching in a switch module and carries out data switching within modems interconnected by a Y-cable. The net result is the same: both modems see the identical Tx and Rx traffic signals permitting the continual comparison of fault status. This approach is used in subsystems with the CRS-170A and CRS-180.

A significant feature of the switches is the Auxiliary Serial connections between the two modems in the pair. The online unit interrogates the standby unit at regular intervals to determine its configuration. If a difference in configuration is detected, the online unit automatically reconfigures the standby unit, so that the configurations are always synchronized. The advantage of this feature is clear: If the standby unit is replaced, it does not have to be reprogrammed to match the online unit — the process is entirely automatic.

## MANUAL AND AUTOMATIC SWITCHOVER

Manual switchover is enabled from the front panel or remote control of the online modem.

Automatic switchover conditions are user-defined by setting two switches at the front of the unit. The user can select Unit Faults only, Unit Faults or Receive Traffic Faults, Unit Faults or Transmit Traffic Faults, or all three. This user-configured feature provides a great deal of flexibility in the operation of the switches.

## OPERATION

Only one modem in the pair (the online unit) is permitted to transmit its IF carrier signal at any one instant. For total security, the offline modem mutes its TX carrier, and the switch provides further isolation by using an RF relay within the unit. Unlike some other 1:1 redundancy systems, which use a passive power combiner for this function (losing approximately 3.5 dB in output power level), the switch does not introduce any attenuation of output signal level.

The supplied G.703 interfaces support the T1, E1, T2, and E2 standards, in both balanced and unbalanced configurations. Support is also provided for 'G.703-like' signals at 512 and 1024 kbps.

Operators do not have to configure the interface type — control signals from the modems perform the selection automatically.

# CRS Series 1:1 Modem Redundancy Switches

## SPECIFICATIONS

Please consult the applicable manuals for more details.

Operating Modes	Fully automatic, Manual (via the front panel of the online modem, or via the modem's remote control interface)
Architecture	Full bridging architecture, with configuration synchronization Tx Clock and Data signals fed to both online and standby units Rx IF signal fed to both online and standby units Continuous fault comparison of online and standby units (The configuration of online and standby units is synchronized via the Auxiliary Serial link between the two Modems)
Audio	2 x 4-wire 600Ω audio interface, per Intelsat IESS-308 (9-pin D-type female)
IDR Backward Alarms	Backward Alarm Outputs BA-1 through BA-4 (Form C relays) per Intelsat IESS-308 (15 pin D-type female)

## CRS-100 SPECIFICATIONS

Fault Detection Time (maximum)	0.5 seconds
Switchover Time (after fault detection)	Within 0.1 seconds
Main Data Interfaces	EIA-422/EIA-530, V.35 DCE, Sync/Async EIA-232
IF Switching	Transmit IF: Switched by RF relay (0.3 dB max loss) Receive IF: Passive power splitting (3.5 dB max loss)
Dimensions	1.7" H x 5.7" W x 4.1" D (4.3 cm x 14.3 cm x 10.4 cm)
Weight	1.1 lbs (0.5 kg)
Power	3.2 Watts maximum, from modems
Requirements	+12 VDC @ 160 mA, -12 volts DC @ 100 mA
Approval	CE as follows: EN 55022 Class B (Emissions), EN 50082-1 (Immunity), EN 60950 (Safety) FCC Part 15 Class B

## CRS-150 SPECIFICATIONS

Fault Detection Time (maximum)	1 second
Switchover Time (after fault detection)	CRS-150: Within 0.5 seconds
Main Data Interfaces	RS-422/EIA-530 DCE (25-pin D-type female, per EIA-530) to 10 Mbps, V.35 DCE to 10 Mbps, synchronous RS-232 to 300 kbps, serial LVDS to 20 Mbps (A standard HSSI interface is provided with the addition of the Comtech EF Data CIC-20 LVDS/HSSI Interface Converter module, for operation up to 20 Mbps)
G.703 Interfaces	G.703, T1, E1, T2 and E2, bal. and unbal. (BNC connectors for 75Ω unbal., and 15 pin D-type for 120Ω balanced) <i>Note that for T1 and E1 Drop and Insert applications the unit supports Rx, Tx connections, Drop Data Out (DDO), and Insert Data In (IDI) 'G.703-like' signals at 512 kbps and 1024 kbps (through DDO and IDI ports)</i>
Overhead Interface	Intelsat IESS-308/-309/-310 Open Network overhead signals, including: IDR Overhead Data Channels (64 kHz, 8 kHz, and Octet clocks), IBS ESC and High-Rate ESC, Balanced External Reference Input, IDR Backward Alarm Inputs, (25-pin D-type male)

IF Switching	Transmit IF: Switched by RF relay (0.3 dB max loss) Receive IF: Passive power splitting (3.5 dB max loss)
IF Impedance	Optimized for 50 Ω (> 20 dB return loss on external ports) 75 Ω supported with the use of external RF transformers (supplied)
IF Connectors	BNC female
IF Freq. Range	52 - 176 MHz
Dimensions	1RU High x 4.2" D (4.45 cm x 48.25 cm x 10.7)
Weight	CRS-150: 4.6 lbs (2.1 kg)
Power	4.5 Watts maximum
Requirements	+ 12 volts DC @ 250 mA, -12 volts DC @ 120 mA Power is supplied by the online and standby Modems, and the unit current shares when both an >A= and >B= unit are present. These power supplies are electronically fused and protected. A pair of auxiliary DC inputs are provided for powering external equipment connected to main data interface, such as a CIC-20 Interface Converter
Approval	CE as follows: EN 55022 Class B (Emissions), EN 50082-1 (Immunity), EN 60950 (Safety) FCC Part 15 Class B

## CRS-170A SPECIFICATIONS

Fault Detection Time (maximum)	0.5 seconds
Switchover Time (after fault detection)	Within 0.1 seconds
Main Data Interfaces	Refer to the modems' datasheets
IF Switching	Transmit IF: Switched by RF relay (0.3 dB max loss) Receive IF: Passive power splitting (3.5 dB max loss)
Dimensions	1.7" H x 5.7" W x 4.1" D (4.3 cm x 14.3 cm x 10.4 cm)
Weight	1.1 lbs (0.5 kg)
Power	+12 VDC @ 200 mA (max)
Requirements	CE
Approval	CE

## CRS-180 SPECIFICATIONS

Fault Detection Time (maximum)	0.5 seconds
Switchover Time (after fault detection)	Within 0.1 seconds
Main Data Interfaces	Refer to the modems' datasheets
IF Switching	Transmit IF: Switched by RF relay (1.5 dB max loss) Receive IF: Passive power splitting (4.0 dB max loss)
Dimensions	1.7" H x 5.7" W x 4.1" D (4.3 cm x 14.3 cm x 10.4 cm)
Weight	1.1 lbs (0.5 kg)
Power	+12 VDC @ 80 mA (max)
Requirements	CE
Approval	CE

