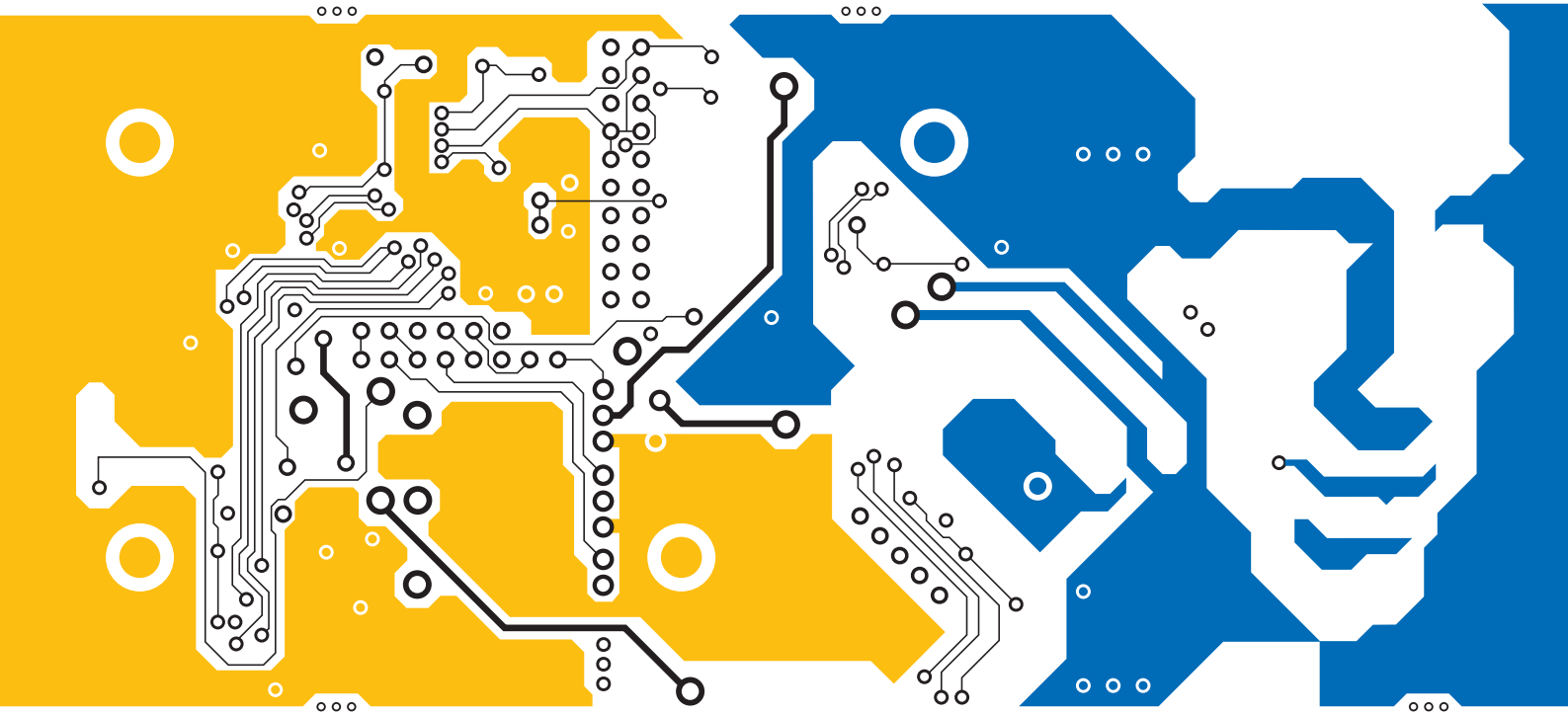
CODAN

C-Band Transceiver Redundancy Switching Equipment

5700 series

SATELLITE COMMUNICATIONS



REFERENCE MANUAL

Codan part number 15-44003-EN Issue 2, March 2002

Table of contents

5 How the redundancy system works

6 Installation and setup

7 Operating the redundancy system

8 Maintenance and fault finding

List of figures

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List of tables

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1 About this manual

This manual is for installation technicians and operators of the Codan C-Band Transceiver 5700 series with Redundancy Switching Equipment C series. The C series redundancy switching equipment provides improved access to the serial interface of the associated C-Band transceivers. This equipment can be identified by the serial numbers of the Redundancy Controller 5586 and Redundant System Monitor 5587. Serial numbers that begin with a C indicate a C series product.

This manual has nine chapters:

Chapter 1 About this manual—lists all the terms, abbreviations and units used in this manual

Chapter 2 Redundancy controller compliance—describes how to ensure that compliance of the redundancy controller is maintained

Chapter 3 Overview—provides a general description of the redundancy switching equipment

Chapter 4 Specifications—contains the specifications of the redundancy switching equipment

Chapter 5 How the redundancy system works—provides a brief technical description of the redundancy switching equipment and its building blocks

Chapter 6 Installation and setup—describes how to unpack, install and set up the redundancy switching equipment

Chapter 7 Operating the redundancy system—describes the operation of the redundancy switching equipment

Chapter 8 Maintenance and fault finding—describes maintenance and fault finding procedures for the transceiver and redundancy switching equipment

Chapter 9 Drawings—contains drawings of panel layouts, cable assembly diagrams and instructions for mounting hardware

An index can be found at the end of the manual.

Standards and icons

The following standards and icons are used in this manual:

This typeface	Means...
BOLD/Bold	a button, switch, connector or LED
Bold	a command that you enter or keyboard key that you press
Italics	a cross-reference or text requiring emphasis
UPPER CASE	a switch position

This icon	Means...
	a warning—your actions may cause harm to yourself or the equipment
	a caution—proceed with caution as your actions may lead to loss of data, privacy or signal quality
	a note—the text provided next to this icon may be of interest to you
❑	a step to follow

Definitions

Acronyms and abbreviations

Acronym	Means...
DAMA	demand assigned multiple access
DC	direct current
DIP	dual inline package
I/P	input
IF	intermediate frequency
LED	light emitting diode
LNA	low noise amplifier
MS	military style
O/P	output
OMT	ortho-mode transducer
PCB	printed circuit board
PLD	programmable logic device
PSU	power supply unit
RF	radio frequency
RU	rack unit
Rx	receive
SELV	safety extra low voltage
SSPA	solid state power amplifier
Tcvr	transceiver
TDMA	time division multiple access
TNV	telecom network voltage
TRF	transmit reject filter
Tx	transmit

Glossary

This term	Means...
Carrier	RF signal used to carry information.
C-Band	Frequency band nominally covering the range 3.4 GHz to 7.025 GHz.
High power transceiver	Transceiver system that uses an SSPA rated at 60 W and above.
Hunting	Rapid switching from one stream to the other.
Low power transceiver	Transceiver system that uses an SSPA rated at 40 W and below.
Modem	Device used to convert digital information to a modulated RF carrier and to extract digital information from a modulated RF carrier.
Packet protocol	Serial communication method using a structured addressable packet of ASCII characters.
Redundancy controller	Equipment that provides the facility to switch between two streams of transceiver equipment to provide redundancy protection.
Redundant system monitor	Equipment that provides remote monitor and control facilities for a redundancy system.
Stream	The on-line or off-line sets of equipment.
Transceiver	Equipment comprising the converter, solid state power amplifier, low noise amplifier, power supply and appropriate connecting cables.

Units

Measurement	Unit	Abbreviation
Attenuation	decibel	dB
Current	ampere	A
Data rate	bits per second	bps
Frequency	hertz	Hz
Impedance	ohm	Ω
Length	metre	m
Noise temperature	kelvin	K
Pressure	pascal	Pa
Power	decibels relative to a carrier	dBc
Power	decibels relative to 1 mW	dBm
Power	watt	W
Temperature	degrees Celsius	°C
Time	second	s
Voltage	volt	V
Weight	gram	g

Unit multipliers

Unit	Name	Multiplier
m	milli	10^{-3}
d	deci	10^{-1}
k	kilo	10^{3}
M	mega	10^{6}
G	giga	10^{9}

About this issue

This is the second issue of the C-Band Transceiver 5700 series Redundancy Switching Equipment Reference Manual covering the CE compliance regulations introduced in April 2001. This manual describes the C series redundancy switching equipment and how to install, set up and operate both low and high power transceiver redundancy systems.

Associated documents

This manual is one of a series of publications related to Codan C-Band Transceiver 5700 series equipment. Other documents include:

- C-Band Transceiver 5700 series Reference Manual (Codan part number 15-44001-EN, previously Codan part number 15-40141)
- C-Band and Ku-Band Hub-mount SSPAs 5760/5712H and 5940 Reference Manual (Codan part number 15-44011-EN)
- Hand-Held Controller 5560 User Guide (Codan part number 15-44009-EN, previously Codan part number 15-40157)
- Remote Controller 5570 User Guide (Codan part number 15-44010-EN, previously Codan part number 15-40158)

2 Redundancy controller compliance

This chapter describes how to ensure the Redundancy Controller 5586 and Redundant System Monitor 5587 comply with the European Electromagnetic Compatibility Directive and the European Low Voltage Directive.

Electromagnetic compatibility and safety notices

The Redundancy Controller 5586 and Redundant System Monitor 5587 have been tested and comply with the following standards:

- ETSI EN 301 489-1 V1.2.1 (2000–08) ‘Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements’
- ETSI EN 301 489-12 V1.1.1 (2000–12) ‘Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 12: Specific conditions for Very Small Aperture Terminal, Satellite Interactive Earth Stations operated in the frequency ranges between 4 GHz and 30 GHz in the Fixed Satellite Service (FSS)’
- EN 60950 ‘Safety of Information Technology Equipment, including electrical business machines’, 2000

Compliance with these standards is sufficient to fulfil the requirements of the following directives:

- European EMC Directive, 89/336/EEC
- European Low Voltage Directive, 73/23/EEC with no lower voltage limit

Equipment supplied by Codan that satisfies these requirements is identified by the CE 0682 markings on the model label of the product.

Complying with the European EMC and Low Voltage Directives

Electromagnetic compatibility

To ensure compliance with the EMC Directive is maintained, you must:

- ❑ Use the standard shielded cables supplied by Codan for all connections.
- ❑ Ensure the covers for the equipment are correctly fitted.

If it is necessary to remove the covers at any stage, they must be re-fitted correctly before using the equipment.

Electrical safety

All circuits within the Redundancy Controller 5586 are TNV circuits provided that the protective earth terminal on the controller is connected to earth. All circuits within the Redundant System Monitor 5587 are SELV circuits provided that the protective earth terminal on the monitor is connected to earth.

Earth symbol

A protective earth connection point has been provided on the redundancy controller and redundant system monitor. To comply with the European Low Voltage Directive, the symbol shown in Table 2-1 is used to identify the connection.

Table 2-1: Earth symbol

Symbol	Meaning
	Protective earth

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3 Overview

This chapter provides a general description of:

- the redundancy switching equipment (3-2)
- the redundancy controller (3-7)
- the RF switches (3-11)
- the redundant system monitor (3-12)

Redundancy switching equipment

Redundancy switching equipment consists of:

- an outdoor-mounted Redundancy Controller 5586
- a combined RF waveguide/coaxial switch, or two separate RF waveguide switches
- an indoor-mounted Redundant System Monitor 5587 (optional)

This equipment provides the facility to switch between two streams of C-Band transceiver equipment to provide redundancy protection.

A stream of C-Band transceiver equipment consists of:

- a C-Band Converter module 5700
- an SSPA
- an LNA
- a Power Supply Unit 5582B (low power transceiver system only)

For details about the transceiver, see the *C-Band Transceiver 5700 series Reference Manual*.

Figure 3-1 shows the block diagram of a redundancy system.

When a detectable fault occurs in the on-line transceiver, and the off-line transceiver is serviceable, the redundancy controller switches over the two transceivers. The interruption to traffic is usually less than one second.

Figure 3-1: Block diagram of the single switch redundancy system for the low power C-Band transceiver with a combined RF waveguide/coaxial switch

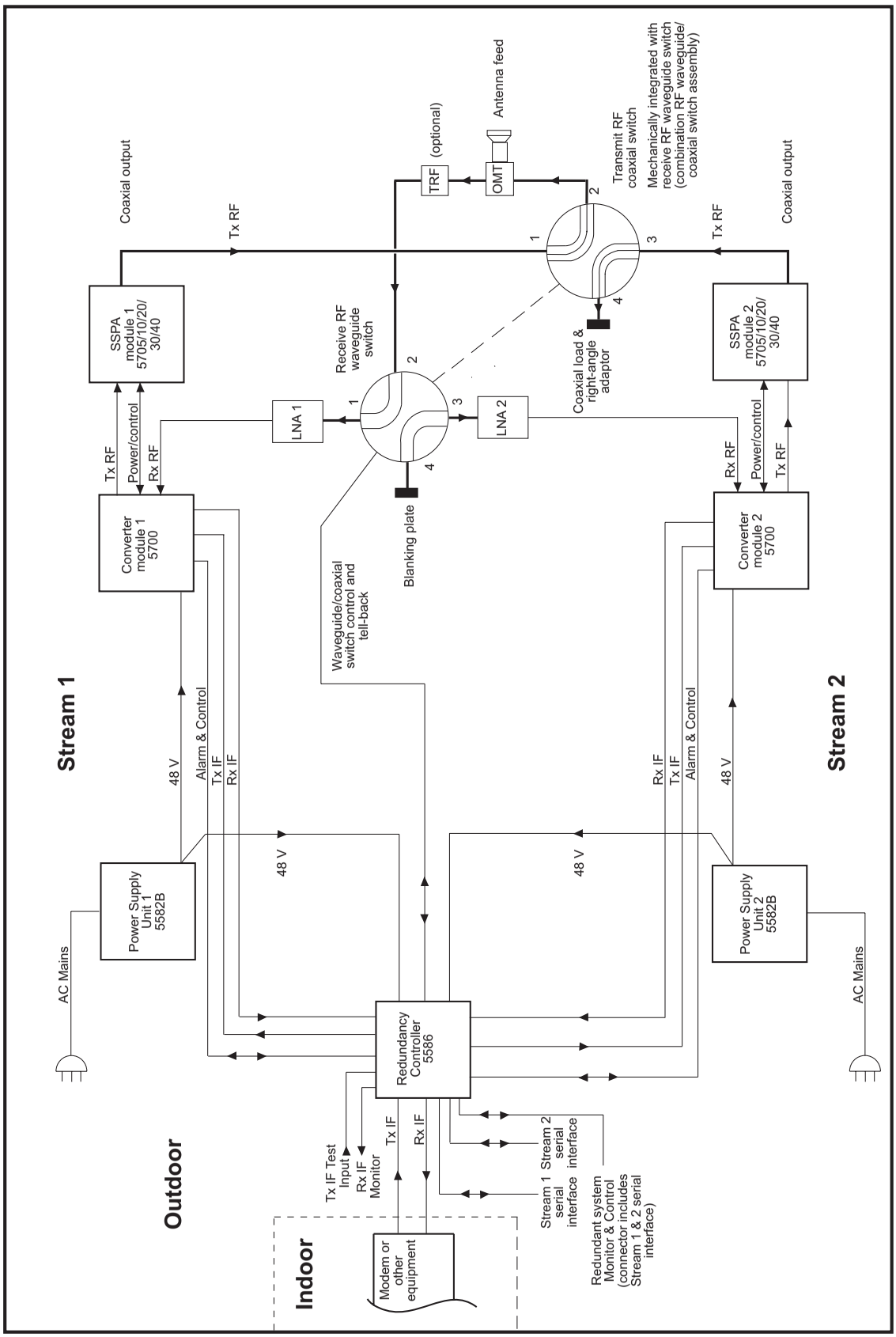


Figure 3-2: Block diagram of the dual switch redundancy system for the low power C-Band transceiver with separate RF waveguide switches

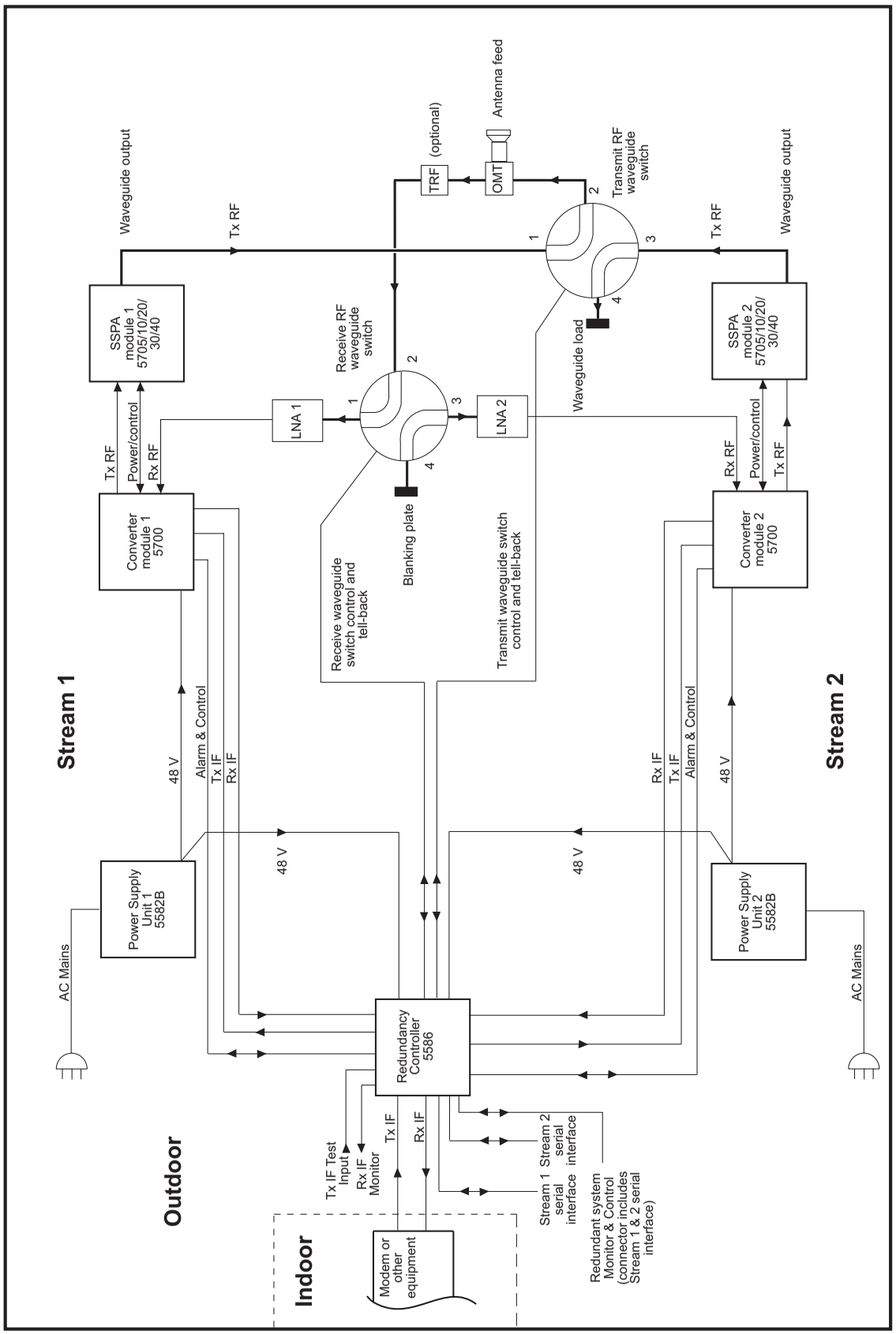
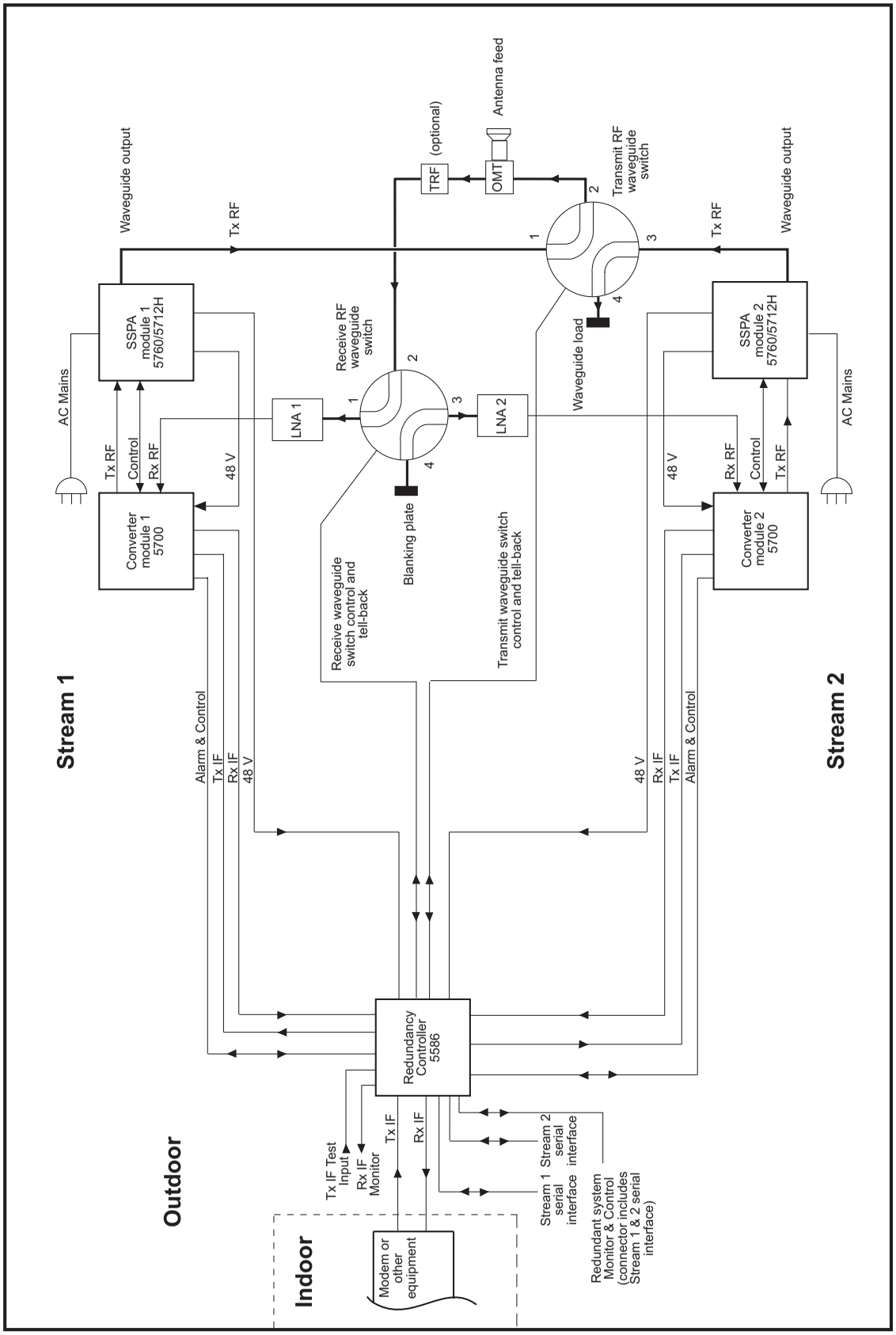


Figure 3-3: Block diagram of the dual switch redundancy system for the high power C-Band transceiver with separate waveguide switches



Redundancy system control

You can control and monitor the redundancy switching equipment in several ways:

- using the controls on the PCB of the redundancy controller
- remotely using the control interface via the **Redundancy Controller M&C** connector on the redundancy controller
- remotely using the optional Redundant System Monitor 5587 connected to the **Redundancy Controller M&C** connector on the redundancy controller (see page 6-6, *Installing the redundant system monitor*)
- remotely using the monitor and control interface via the **Monitor & Control** connector on the optional Redundant System Monitor 5587

SSPA control

You can control the activation of the SSPA in several ways:

- using the controls on the PCB of the redundancy controller
- remotely using the monitor and control interface via the **Redundancy Controller M&C** connector on the redundancy controller
- using the controls on the control panel of the converter modules (or via their serial ports)
- remotely using the optional Redundant System Monitor 5587 connected to the **Redundancy Controller M&C** connector on the redundancy controller
- using Hand-Held Controllers 5560 plugged temporarily into each of the **Serial Interface** connectors on the redundancy controller
- using Remote Controllers 5570 plugged into each of the **Serial Interface—Stream 1** and **Serial Interface—Stream 2** connectors on the rear panel of the optional Redundant System Monitor 5587

The redundancy controller

The redundancy controller is the main component of the redundancy switching system. It controls the switching between on-line and off-line transceiver streams. The redundancy controller is normally installed near the converter modules of the two transceivers.

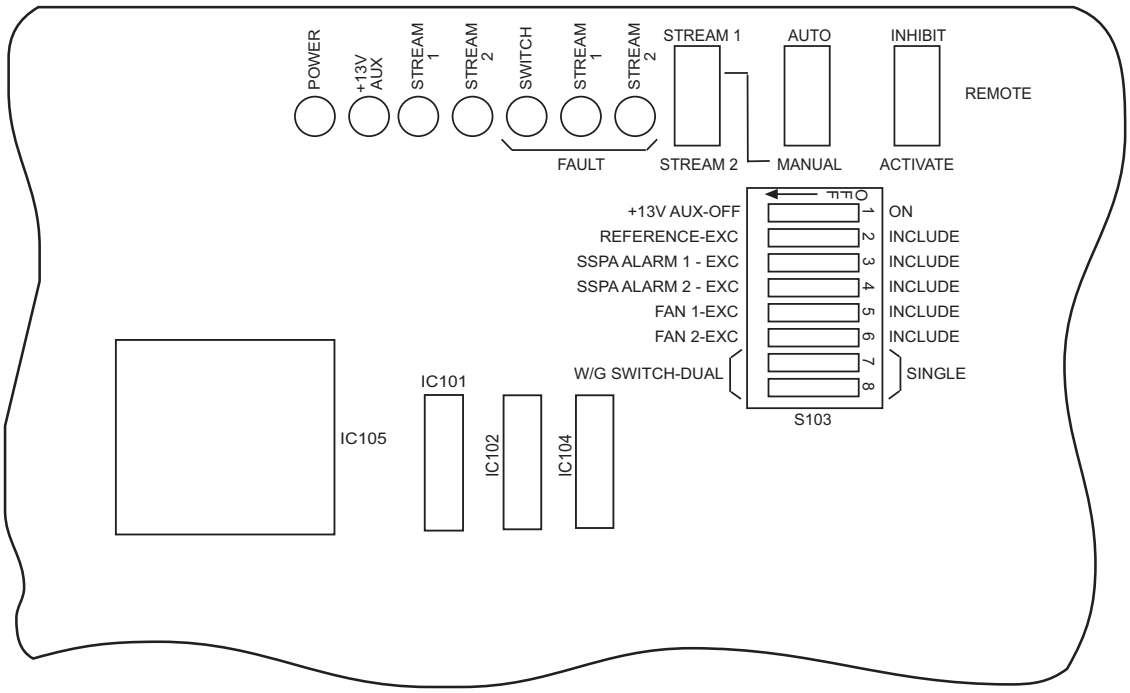
The redundancy controller controls the RF switches. It also switches the following signals:

- Tx IF to the transmit paths of the converter modules
- Rx IF from the receive paths of the converter modules
- monitor and control signals between the redundancy controller and each converter module

The redundancy controller communicates with the transceivers via opto-isolators and relay contacts. The serial interfaces of the transceivers are kept available for separate use. DC supply connections are provided for situations where only isolated contact closures are available.

The control portion of the PCB of the redundancy controller is shown in Figure 3-4.

Figure 3-4: Portion of the PCB of the redundancy controller with switches and LEDs



LED indicators

The PCB of the redundancy controller has seven LEDs:

- two green LEDs indicating the input **POWER** status and the **+13 V AUX** supply status
- two yellow status LEDs indicating the **STREAM 1** and **STREAM 2** on-line status
- three red fault LEDs indicating **SWITCH FAULT**, **STREAM 1 FAULT** and **STREAM 2 FAULT** status

Table 3-1: LED indicators on the PCB of the redundancy controller

LED	Colour	Indicates...
POWER	green	The power is on.
+13 V AUX	green	The +13 V auxiliary supply is on.
STREAM 1	yellow	Stream 1 is on line.
STREAM 2	yellow	Stream 2 is on line.
SWITCH FAULT	red	A fault in an RF waveguide switch.
STREAM 1 FAULT	red	A fault in the transceiver of Stream 1.
STREAM 2 FAULT	red	A fault in the transceiver of Stream 2.

If a switch fault exists, the **SWITCH FAULT** LED does not illuminate in the first five seconds following power up or a switchover.

Switches

The PCB of the redundancy controller has three switches:

- **STREAM 1/STREAM 2**
- **AUTO/MANUAL**
- **INHIBIT/REMOTE/ACTIVATE**

Table 3-2: Switches on the PCB of the redundancy controller

Switch	Function
STREAM 1/STREAM 2	Selects Stream 1 or Stream 2 in Manual mode.
AUTO/MANUAL	Controls the Auto or Manual mode setting.
INHIBIT/REMOTE/ACTIVATE	Controls activation of the SSPAs of the two transceivers.
INHIBIT	Inhibits both SSPA modules and overrides any activate command from other sources.
REMOTE	Enables the remote activation of the on-line SSPA module.
ACTIVATE	Activates the on-line SSPA module.

If a redundant system monitor is connected, mode selection depends on the settings of the **AUTO/MANUAL** switch on the redundancy controller and the **Auto/Manual** switch on the redundant system monitor (see page 7-4, *Switches*).

Internal DIP switches

DIP switches are used to configure the redundancy controller. Most of the switches are used to set whether or not certain alarm conditions will initiate a switchover. The DIP switches for the waveguide switch are used to set the number of RF waveguide switches that the redundancy controller controls (see Figure 3-4).

Table 3-3: Internal DIP switches on the PCB of the redundancy controller

Switch	Function
+13 V AUX	Switches the power supply to the redundant system monitor.
REFERENCE	Controls whether or not the redundancy controller recognises warm-up alarm signals from the transceivers.
SSPA ALARM 1 and **SSPA ALARM 2**	The function of these DIP switches is *not* required in the C-Band redundancy switching system. Both switches *must* be set to EXCLUDE.
FAN 1 and **FAN 2**	Controls whether or not the redundancy controller recognises SSPA fan faults from transceiver 1 and transceiver 2.
W/G SWITCH (×2)	Controls whether or not the redundancy system is set up with one or two RF waveguide switches.

RF switches

RF switches control both the receive and transmit RF paths. The switches direct signals for both on-line and off-line modules. There are two types of RF switch:

- an RF waveguide switch
- an RF coaxial switch

In the receive path, an RF waveguide switch directs the received RF from the antenna Rx port to one of the LNAs.

In the transmit path, either an RF waveguide switch or an RF coaxial switch directs the transmitted RF from the on-line SSPA module to the antenna Tx feed port depending on whether waveguide output or coaxial output SSPA modules are being used (see Figures 3-1 and 3-2).

If the transmit path requires an RF coaxial switch, the switch is mechanically integrated with the receive RF waveguide switch in a combined RF waveguide/coaxial switch. The combined RF waveguide/coaxial switch is controlled by a single cable.

The off-line modules can be operated and tested via the off-line ports of the redundancy controller and waveguide switches. Any RF from the off-line SSPA module is directed to a high power termination.

The redundant system monitor

The redundant system monitor extends the control and monitoring facilities of the outdoor-mounted redundancy controller to a convenient indoor location. It has the same major controls and indicators of the redundancy controller (see drawing 03-01038 in Chapter 9, *Drawings*, and page 3-7, *The redundancy controller*).

The control panel indicators on the redundant system monitor show:

- power status
- current stream selection
- switch faults
- stream faults

This enables you to check the status of the redundancy system without having to go out to the antenna.

The rear panel connectors enable:

- connection of a remote controller for each stream
- control of redundancy functions via opto-isolated inputs
- monitoring of the redundancy system via relay contacts

4 Specifications

This chapter lists the specifications of the redundancy switching equipment:

- transmit path (4-2)
- receive path (4-3)
- switching (4-4)
- general (4-4)
- environmental (4-5)
- physical (4-6)

This chapter also includes separate specifications for the optional redundant system monitor:

- general (4-7)
- environmental (4-8)
- physical (4-8)
- power supply (4-8)

Redundancy switching equipment

Transmit path

IF input

Frequency range	50 to 180 MHz
Impedance	50 Ω standard 75 Ω optional
Connector	N-type female
Return loss (on-line ports)	20 dB minimum

IF switch

Loss (to on-line output)	0.5 dB maximum
Ripple	±0.05 dB typical 70 MHz ±20 MHz 140 MHz ±40 MHz
Loss (to off-line output)	50 dB minimum
Tx/Rx isolation	90 dB minimum

Tx splitter option

Loss (to both outputs)	3.75 dB maximum
Ripple	±0.07 dB typical 70 MHz ±20 MHz 140 MHz ±40 MHz
Tx/Rx isolation	90 dB minimum

RF switches

Frequency range	5.850 to 7.025 GHz
Impedance	50 Ω (RF coaxial switch)
Connectors/interface	N-type female (RF coaxial switch) CPR137-G flange, M5 threads (RF waveguide switch)
Switch loss	0.5 dB maximum (RF coaxial switch) 0.1 dB maximum (RF waveguide switch)

Receive path

IF output

Frequency range	50 to 180 MHz
Impedance	50 Ω standard 75 Ω optional
Connectors	N-type female
Return loss (on-line ports)	20 dB minimum

IF switch

Loss (to on-line output)	0.5 dB maximum
Ripple	±0.05 dB typical 70 MHz ±20 MHz 140 MHz ±40 MHz
Loss (to off-line output)	50 dB minimum
Tx/Rx isolation	90 dB minimum

RF waveguide switch

Frequency range	3.400 to 4.800 GHz
Interface	CPR229-G flange, M6 threads
Switch loss	0.1 dB maximum

Switching

Modes

Auto	On receipt of fault indication
Manual	Stream select switch or remote selection, i.e. via the redundant system monitor

Switching time

1 s maximum
200 ms typical

Hardware

IF switching	High frequency latching relays
RF switching	Two types: • integrated Rx waveguide and Tx coaxial latching transfer switch with tell-back contacts • separate Tx and Rx waveguide latching transfer switches with tell-back contacts

General

Power and cables

Input voltage	42 to 72 V DC
Power consumption	9 W nominal
IF and control cables	5 m standard (other lengths optional)
RF switch cables	5 m standard (other lengths optional)

Fuses

2 × 250 mA delay, 20 × 5 mm (on the PCB of the redundancy controller)

Monitor and control facilities

Controls	Mode, **AUTO**/**MANUAL** Manual stream selector, **STREAM 1**/**STREAM 2** SSPA control, **INHIBIT**/**REMOTE**/**ACTIVATE**
Indicators	Power (input) +13 V auxiliary supply status Stream 1 selected Stream 2 selected Switch Fault Stream 1 Fault Stream 2 Fault
Remote monitor and control	Stream Faults Stream selection output Auto/Manual mode control Remote stream selection SSPA control

Environmental

RF switches

Temperature range	–40°C to +55°C
Maximum relative humidity	100%
Weatherproofing	IP65
Dehydration	Optional pressurisation inlet for dry air feed, or passive desiccant system on waveguide section

Redundancy controller

Temperature range	–40°C to +55°C
Maximum relative humidity	95% @ 40°C, non-condensing
Cooling	Convection
Weatherproofing	IP65

Physical

Size

Redundancy controller	300 mm W × 160 mm D × 370 mm H
Combined RF waveguide/ coaxial switch	90 mm W × 90 mm D × 260 mm H
Receive RF waveguide switch	90 mm W × 90 mm D × 215 mm H
Transmit RF waveguide switch	70 mm W × 60 mm D × 155 mm H

Weight

Redundancy controller	7.3 kg
Combined RF waveguide/ coaxial switch	2.6 kg
Receive RF waveguide switch	2.4 kg
Transmit RF waveguide switch	0.8 kg

Redundant system monitor

General

Power

Voltage	11 to 16 V DC @ 160 mA maximum, reverse polarity protected

Rear panel facilities

Connectors	To redundancy controller, D25P (uses 19-way control cable, Codan part number 08-05133-xxx, supplied) **Serial Interface—Stream 1** **Serial Interface—Stream 2** **Monitor & Control** 11 to 16 V DC input, (may be powered from a low-voltage, plug-in mains adaptor) with 2.5 mm DC plug
Fuse	500 mA delay, 20 × 5 mm

Monitor and control facilities

Control panel switches	Mode, **Auto**/**Manual** Manual stream selector, **Stream 1**/**Stream 2** SSPA control, **Inhibit**/**Remote**/**Activate**
Control panel indicators	On Stream 1 selected Stream 2 selected Switch Fault Stream 1 Fault Stream 2 Fault

Environmental

Temperature range	–10°C to +50°C
Maximum relative humidity	95% @ 40°C, non-condensing

Physical

Size	483 mm W × 70 mm D × 44 mm H (1 RU)
Weight	0.5 kg

Power supply

For cable runs between the redundancy controller and redundant system monitor of up to 100 m, the redundant system monitor can be powered from the redundancy controller by switching on the +13 V AUX supply.

For cable runs over 100 m, the redundant system monitor requires a separate 11–16 V DC supply at 160 mA.

When two remote controllers are connected to the redundant system monitor, current drain will increase to 400 mA. In this case, the maximum cable length that can be used with the redundant system monitor powered from the redundancy controller is 50 m before external power is required.

The power supply can be provided by a low-voltage, plug-in mains adaptor (plug-pack) with a 2.5 mm DC plug that suits your local mains power supply.

The required connections to the 2.5 mm DC plug are:

Outer	+11 to +16 V DC
Inner	0 V (ground/chassis)

5 How the redundancy system works

This chapter describes how the redundancy switching equipment works. It covers operation of the:

- redundancy controller, including fault monitoring, operating modes, power supplies, the monitor and control interface and transceiver serial interface (5-2)
- RF switches (5-7)
- SSPAs (5-9)
- redundant system monitor (5-10)

The redundancy controller

The redundancy controller:

- monitors the Stream 1 and Stream 2 transceivers for faults
- controls the RF switch positions
- directs the IF paths via high frequency relays
- monitors the RF switches for switch faults

When you power up the system, the redundancy controller remembers which stream was last on line and selects this as the on-line stream.

When the redundancy controller is operating in Manual mode, the switch positions can be changed via the **STREAM 1**/**STREAM 2** switch.

When the redundancy controller is operating in Auto mode, it monitors the two transceiver streams for faults. When a detectable fault occurs in the on-line transceiver and the off-line transceiver is serviceable, the redundancy controller switches over the two transceivers. The interruption to traffic is less than one second.

The redundancy controller switches the transmit and receive IF signals between the modem equipment and the transceivers, and the transmit and receive RF signals between the transceivers and the antenna ports. Transmit RF, receive RF and IF switching is done simultaneously. The IF relays in the redundancy controller and the RF switches are latching types with electromechanical memory. Loss of power to the redundancy controller will not cause the IF and RF paths to change.

If you have the Tx IF splitter option fitted to the 5586, the Tx IF interface to the indoor equipment is configured for splitter operation instead of switched operation (see page 5-6, *Tx IF splitter option*).

For test purposes, you can access the IF ports of the off-line stream at the **Tx IF Test In** and **Rx IF Test Out** connectors.

Transceiver faults

The redundancy controller uses a PLD to monitor the alarm signals from both transceivers. The two transceivers send alarm signals via cables connected to the 19-way **Transceiver (1)** and **Transceiver (2)** connectors on the redundancy controller.

The redundancy controller processes the incoming alarm signals and recognises two possible alarm conditions for each transceiver:

- a warm-up alarm
- a hardware fault

Warm-up alarm

The redundancy controller recognises a warm-up alarm when it receives signals from the transceiver indicating that the reference frequency oscillator has not fully warmed up and stabilised.

You can configure the redundancy controller to ignore the warm-up alarm signals from the transceivers by setting the appropriate DIP switch in the redundancy controller (see page 6-21, *Enabling transmission during the warm-up period*).

Hardware fault

The redundancy controller recognises a hardware fault when it receives any one of the six alarm or fault signals from the transceiver, as listed in Table 5-1.

Table 5-1: Alarm and fault signals

Type of alarm or fault signal	Name of red FAULT LED on the control panel of the converter module	Latched fault
Converter module fault	**CONV**	No
LNA fault	**LNA**	No
SSPA module fault	**SSPA**	Yes
SSPA temperature alarm	**TEMP**	No
SSPA fan fault	**FAN**[a]	Yes
SSPA output alarm	N/A[b]	No

a. This alarm is not used in high power transceiver systems using the 5760/5712H SSPAs.
b. This alarm is not used in the C-Band redundancy system. The associated DIP switch should be set to EXCLUDE (see page 6-21, *Excluding SSPA output alarms*).

A latched fault needs to be reset by temporarily setting the **SSPA** switch to INHIBIT. An unlatched fault will clear itself if the condition that caused the fault disappears.

You can configure the redundancy controller to ignore the SSPA fan fault signals from the transceivers by setting the appropriate switches in the redundancy controller (see page 6-21, *Excluding SSPA fan faults*).

The redundancy controller recognises a hardware fault as more serious than a warm-up alarm. For example, if Stream 1 has generated a warm-up alarm and Stream 2 has generated a hardware fault, the redundancy controller makes Stream 1 the on-line stream.

Operating modes of the redundancy controller

The redundancy controller can operate in:

- Auto mode
- Manual mode

Auto mode

In Auto mode, the redundancy controller automatically selects the on-line stream (either Stream 1 or Stream 2), depending on the fault and alarm signals from the two streams.

The redundancy controller switches between the on-line and off-line streams if:

- the on-line stream generates a warm-up alarm and the off-line stream is fault free
- the on-line stream generates a hardware fault and the off-line stream is either fault free or is generating a warm-up alarm

Manual mode

In Manual mode, the **STREAM 1**/**STREAM 2** switch on the PCB of the redundancy controller is used to enable the stream that you want on line.

If a redundant system monitor is connected, mode selection depends on the settings of the **AUTO**/**MANUAL** switch on the redundancy controller and the **Auto**/**Manual** switch on the redundant system monitor (see page 7-4, *Switches*).

Power supply

The 48 V DC power source for the redundancy controller is normally supplied from both power supply units of the low power transceiver system or both SSPAs of the high power transceiver system. This parallel arrangement ensures continuity of supply if one power source fails.

You can also power the redundancy controller from a separate 48 V DC source.

Monitor and control interface of the redundancy controller

The monitor and control interface of the redundancy controller enables you to perform the following functions remotely:

- monitor operation of the redundancy switching system using the dry relay contacts
- switch streams using external force signals
- activate the SSPA module of the on-line stream
- inhibit the SSPA modules of both transceivers

Most of the remote control functions are achieved by grounding (0 V) the appropriate control signal. The internal opto-isolators are used for external control. They are supplied with 12 V DC nominally from either an external source or by loopback at the monitor and control interface of the redundancy controller. To provide loopback, pin A (+13 V AUX) must be connected to pin L (Control Common + I/P).

The redundancy controller *does not* have a serial control facility.

For details about the monitor and control interface of the redundancy controller, see page 6-12, *Accessing the monitor and control interface*.

Serial interfaces of the transceivers

The **MONITOR**/**CONTROL** connector on each transceiver includes the serial interface of the transceiver. Although the redundancy controller plugs into this connector, the redundancy controller uses opto-isolators and relay contacts to communicate with the transceiver. You can access the serial interfaces of the two transceivers at the 19-way MS **Serial Interface (1)** and **Serial Interface (2)** connectors on the redundancy controller.

These connectors are suitable for temporary PC, hand-held controller or remote controller connections.

The serial interfaces for both transceivers are also included on the pins of the 19-way **Redundancy Controller M&C** connector interface of the redundancy controller for remote monitor and control applications.

Options

75 Ω option

The IF interface to the indoor equipment can be optionally configured for 75 Ω operation.

Option code 15-40144 provides two 75 Ω transformers, which are fitted inside the redundancy controller at the **Tx IF I/P** and **Rx IF O/P** connectors (see drawing 15-40144-001 in Chapter 9, *Drawings*).

You still use 50 Ω coaxial cables to connect the redundancy controller to the two transceivers.

To avoid possible damage caused by incorrectly connecting 50 Ω plugs to 75 Ω sockets, Codan does not use 75 Ω N-type connectors on the converter.

Tx IF splitter option

The Tx IF interface to the indoor equipment can be optionally configured for splitter operation instead of switched operation. This allows both transmit paths of the two streams to generate the required output power simultaneously. This mode of operation provides the shortest possible switchover time.

Option code 15-40185 provides a Tx IF splitter, which is fitted inside the redundancy controller at the **Tx IF I/P** and **Tx IF O/P** connectors (see drawing 15-40185-001 in Chapter 9, *Drawings*).

When the Tx IF splitter option is fitted, the **Tx IF Test In** connector is disconnected and testing of the transmit path in the off-line stream is no longer possible.

RF switches

Combined RF waveguide/coaxial switch

The combined RF waveguide/coaxial switch combines waveguide and coaxial switching in a single assembly (see Figure 3-1). The switch is an electrically operated, 4-port WR229 waveguide transfer switch, which is mechanically integrated with a 4-port coaxial transfer switch for transmit RF.

The LNAs are directly coupled to ports 1 and 3 of the combined RF waveguide/coaxial switch. The switch is coupled via port 2 to the WR229 receive port of the antenna. A blanking plate normally protects port 4 from the weather. When the blanking plate is removed from port 4, 4 GHz test signals can be fed to the off-line LNA.

Coaxial cable connects the SSPA modules to ports 1 and 3 of the N-type switch. The transmit antenna feed connects to port 2 of the switch. A power attenuator connects to port 4, which enables monitoring of the output of the off-line SSPA module.

Two coils of the switch control switch movement. Applying 48 V DC to coil 1 selects Stream 1. Applying 48 V DC to coil 2 selects Stream 2. Switching time is nominally 150 ms. The coils are self-disconnecting after switching, i.e. when switching is completed, the internal microswitches remove the 48 V DC applied to the coils.

The redundancy controller verifies RF switching by monitoring the tell-back contacts to the combined RF waveguide/coaxial switch. If the tell-back contacts indicate an abnormal condition, the red **SWITCH FAULT** LED on the PCB of the redundancy controller illuminates.

The **SWITCH FAULT** LED will not illuminate in the five seconds following power up or switchover.

Separate RF waveguide switches

If the SSPA modules have WR137 waveguide outputs, separate RF waveguide switches are used for transmit RF and receive RF. Separate control cables connect the redundancy controller to each RF switch (see Figure 3-2).

For receive RF, the LNA waveguide inputs are coupled to ports 1 and 3 of the receive RF switch. The switch is coupled via port 2 to the WR229 receive port of the antenna. A blanking plate normally protects port 4 from the weather.

For transmit RF, the waveguide outputs of the SSPA modules are connected to the WR137 transmit RF switch via short waveguide sections to ports 1 and 3. Port 2 of the switch connects to the antenna via a section of waveguide. A suitably rated load or power attenuator terminates port 4 on the switch.

Each RF switch has two coils to control switch movement. Applying 48 V DC to coil 1 selects Stream 1. Applying 48 V DC to coil 2 selects Stream 2. Switching time is nominally 150 ms. The coils are self-disconnecting after switching, i.e. when switching is completed, the internal microswitches remove the 48 V DC applied to the coils.

The redundancy controller verifies RF switching by monitoring the tell-back contacts of both switches. If the tell-back contacts indicate an abnormal condition, the red **SWITCH FAULT** LED on the PCB of the redundancy controller illuminates.

The **SWITCH FAULT** LED will not illuminate in the five seconds following power up or switchover.

SSPA control

Normally, you set the **SSPA** switch on each converter to control the activation of an SSPA module. You can, however, activate the selected SSPA module from the redundancy controller or a remote location.

When the redundancy controller controls the activation of an SSPA module, only the SSPA module of the on-line transceiver is activated.

For special applications, you may want to control SSPA activation remotely. An IF signal sent to the redundancy controller is preceded by a remote command to activate the SSPA module. This arrangement is very energy efficient since an SSPA module is only activated when the on-line transceiver is required to transmit.

For safety reasons, an inhibit signal from any part of the redundancy control system overrides all activation signals. For example, you might want to inhibit the ability to activate an SSPA module to be quite sure that nothing can start transmission during transceiver maintenance.

For CE compliance, the converter must be set to operate in CE compliant mode and the SSPA must be activated via the remote serial interface. For information on how to set up the converter and activate the SSPA remotely, see *Chapter 7, Setting up the transceiver* and *Chapter 8, Operating the transceiver* in the *C-Band Transceiver 5700 series Reference Manual*.

In addition, all switches that are used to set the activation state of the SSPA (**SSPA** switch on the converter, **INHIBIT**/**REMOTE**/**ACTIVATE** switch on the PCB of the redundancy controller and the **SSPA** switch on the control panel of the redundant system monitor) must be set to REMOTE/Remote.

Redundant system monitor

The controls and indicators of the redundancy controller are duplicated on the control panel of the redundant system monitor, which is used for remote applications. The redundant system monitor provides this capability via the monitor and control interface of the redundancy controller.

6 Installation and setup

This chapter explains how to unpack, install and set up the redundancy switching equipment. It covers:

- unpacking the equipment (6-2)
- installing the equipment (6-3)
- connecting the cables (6-7)
- accessing the monitor and control interface of the redundancy controller (6-12)
- accessing the serial interface of the transceivers (6-14)
- connecting the redundant system monitor (6-15)
- setting up the DIP switches in the redundancy controller (6-19)
- switching on the redundancy switching equipment (6-24)

Unpacking the equipment

Ensure that the packing boxes are upright as indicated by the printing on the boxes. Open each box and check for signs of damage to the equipment. If you notice any damage, contact Codan immediately. Failure to contact Codan before returning the unit may result in any warranty being void.

Installing the equipment

All equipment that is mounted outdoors *must* be adequately weatherproofed.

- Ensure all waveguide joints are properly sealed with the appropriate gasket.
- Use self-amalgamating tape to seal connectors and cable entry points from the connector to the cable sheath.

Mounting the converter, SSPA and power supply units

For low power transceiver systems, a redundancy system mounting kit (Codan part number 15-40143) enables the converters and SSPAs to be mounted in pairs (see drawing 15-40143-001 sheet 1 and drawing 15-40143-001 sheet 2 in Chapter 9, *Drawings*). This kit contains four mounting rails and is intended to be used with the standard mounting kits supplied with the converters and SSPAs. Not all parts supplied in these standard kits are used in a redundancy installation.

For high power transceiver systems, the redundancy system is supplied complete with all the brackets necessary to mount the equipment as shown on drawing 15-40197-001 in Chapter 9, *Drawings*. This arrangement uses some of the standard mounting hardware supplied with the transceivers.

If you prefer to mount the converter and SSPA modules independently, follow the installation instructions in *Chapter 6, Installation* in the *C-Band Transceiver 5700 series Reference Manual*.

It is recommended that the SSPA modules are mounted as close as possible to the antenna feed to minimise waveguide/coaxial cable losses. The converter modules can be mounted further down the boom to minimise the mechanical leverage load on the antenna. Ensure that you arrange the layout of the modules to minimise the length of cable required to connect each module. In particular, the length of waveguide/coaxial cable should be minimised to reduce transmission losses. This applies to the waveguide/coaxial cable between the SSPA module outputs and the transmit RF switch, and between the transmit RF switch and the antenna feed.

If the waveguide outputs of the SSPA are attached directly to the waveguide switch with rigid connections, ensure that there are no undue stresses on the waveguide sections when the flange hardware is tightened. Tighten the SSPA mounting screws between the SSPA and mounting rail last. The long mounting rails have oversized holes to enable the SSPA modules to be secured in the exact positions required, which avoids stressing the rigid waveguide components.

Mounting the redundancy controller

The redundancy controller has two mounting flanges. Each flange has ten mounting holes. If you are going to use the supplied mounting kit, fitting instructions are provided on drawing 15-40128-001 in Chapter 9, *Drawings*. For high power transceiver systems, see drawing 15-40197-001. Otherwise, for hole locations, see drawing 03-00919.

Mount the redundancy controller upright on or near the antenna structure. A protected position is preferable however, the redundancy controller can withstand exposure to outdoor conditions.

Installing the combined RF waveguide/coaxial switch

Handle the switch with care. It is easily damaged.

To install the switch:

- ❑ Hold waveguide port 2 of the combined RF waveguide/coaxial switch against the antenna receive feed (or the TRF, if fitted). Decide which way the switch is to face.
- ❑ Attach the LNAs to ports 1 and 3 of the switch using the flange kits (Codan part number 15-40107).
- ❑ Clamp the gaskets tightly to ensure perfect seals.
- ❑ If the blanking plate (Codan part number 05-06765) was not factory fitted, attach it to waveguide switch port 4 using the flange kit (Codan part number 15-40108).
- ❑ If you want to allow for dry air pressurisation, fit the supplied air nozzle (Codan part number 30-27011-001) to the blanking plate. If this is not required, fit the M5 screw with seal into the blanking plate.
- ❑ Attach the right-angled N-adaptor (Codan part number 60-15863-945) to port 4 of the coaxial section of the switch.
- ❑ Attach the dummy load or power attenuator to the free end of the N-adaptor.
- ❑ Attach the switch to the antenna feed (or the TRF, if fitted) using the flange kit (Codan part number 15-40106).

  The supplied flange kit fits most brands of TRFs. If a TRF is not fitted, use the appropriate M6 hardware.
- ❑ Connect the outputs of the LNAs to the **Rx RF I/P** connectors on the appropriate converters using coaxial cables (Codan part number 08-05366-030).

  The LNA on the waveguide switch port 1 connects to the Stream 1 converter and the LNA on port 3 connects to the Stream 2 converter.
- ❑ Connect the outputs of the SSPAs to the appropriate N-connectors of the coaxial switch using coaxial cables (Codan part number 08-05366-010).

The SSPA on the waveguide switch port 1 connects to the Stream 1 converter and the SSPA on port 3 connects to the Stream 2 converter.

- ❑ Connect port 2 of the coaxial switch to the antenna feed using coaxial cable (Codan part number 08-05366-010).
- ❑ Seal all N-connections with self-amalgamating tape.

Ensure all joints are completely weatherproof.

Spare flange kits are supplied with the redundancy package to provide for variations in installations.

Installing the separate receive and transmit waveguide switches

Handle the switches with care. They are easily damaged.

To install the receive waveguide switch:

- ❑ Hold waveguide port 2 of the receive waveguide switch against the antenna receive feed (or the TRF, if fitted). Decide which way the switch is to face.
- ❑ Attach the LNAs to ports 1 and 3 of the switch using the flange kits (Codan part number 15-40107).
- ❑ Clamp the gaskets tightly to ensure perfect seals.
- ❑ If the blanking plate (Codan part number 05-06765) was not factory fitted, attach it to waveguide switch port 4 using the flange kit (Codan part number 15-40108).
- ❑ If you want to allow for dry air pressurisation, fit the supplied air nozzle (Codan part number 30-27011-001) to the blanking plate. If this is not required, fit the M5 screw with seal into the blanking plate.
- ❑ Attach the switch to the antenna feed (or the TRF, if fitted) using the flange kit (Codan part number 15-40106).

  The supplied flange kit fits most brands of TRFs. If a TRF is not fitted, use the appropriate M6 hardware.

  Spare flange kits are supplied with the redundancy package to provide for variations in installations.

- ❑ Connect the outputs of the LNAs to the **Rx RF I/P** connectors on the appropriate converters using coaxial cables (Codan part number 08-05366-030).

  The LNA on the waveguide switch port 1 connects to the Stream 1 converter and the LNA on port 3 connects to the Stream 2 converter.

To install the transmit waveguide switch:

- ❑ Connect ports 1 and 3 of the transmit switch to the SSPA modules using the waveguide sections and flange kits (Codan part number 15-40123).
- ❑ Connect port 2 of the transmit switch to the antenna feed transmit flange using a half or full gasket kit and rigid or flexible waveguide as appropriate.
- ❑ Attach a waveguide load (high power transceivers) or N-type transition with coaxial load/power attenuator (low power transceivers) to port 4 of the switch using the flange kit (Codan part number 15-40123).
- ❑ Connect the inputs of the SSPAs to the converters using coaxial cables (Codan part number 08-05366-020 or 08-05366-030).

  The SSPA on the waveguide switch port 1 connects to the Stream 1 converter and the SSPA on port 3 connects to the Stream 2 converter.
- ❑ Seal all N-connections with self-amalgamating tape.

Ensure all joints are completely weatherproof.

Spare flange kits are supplied with the redundancy package to provide for variations in installations.

Installing the redundant system monitor

The redundant system monitor is optional. If required, it should be mounted indoors in a rack frame (only 1 RU of space is required). The monitor is held in position with four rack screws and nuts.

Connecting the cables

In addition to the transceiver cables that interconnect the modules of each transceiver, there are 11 or 12 cables that attach to the redundancy controller.

These cables are:

- two power cables to the power supply units (low power transceiver systems only)
- two power cables to the SSPAs (high power transceiver systems only)
- two control cables to the converter modules
- four IF coaxial cables to the converter modules
- two IF coaxial cables to the modem or other equipment (supplied by the user)
- one or two RF switch cables to the RF switch(es)

Figures 3-1, 3-2 and 3-3 are block diagrams showing the cable connections to the redundancy controller.

Electronic equipment mounted outdoors *must* be weatherproofed. Ensure all connectors and cable entry points are adequately sealed with self-amalgamating tape (see page 6-3, *Installing the equipment*).

The last three digits of the Codan part number for a cable (shown as ‘xxx’) indicate the length of the cable.

Connecting the transceiver cables

To connect the transceiver cables:

❑ Refer to *Chapter 6, Installation* in the *C-Band Transceiver 5700 series Reference Manual* for details on how to connect the cables to the transceiver.

Connecting the power cables

To connect the power cables in low power transceiver systems:

❑ Connect each power supply unit to the redundancy controller using the 2-core power cables.

To connect the power cables in high power transceiver systems:

❑ Connect each SSPA to the redundancy controller using the power cables (Codan part number 08-05641).

Do not connect either of the 48 V rails to ground inside the redundancy controller.

Tables 6-1 and 6-2 list the appropriate terminals for the connections.

Table 6-1: Power cable connections (low power transceiver systems)

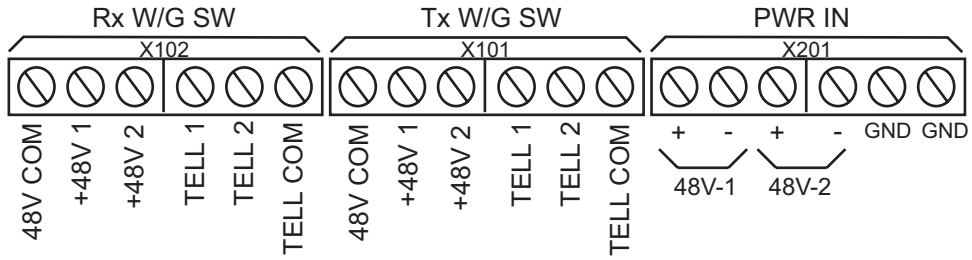
Stream	Power supply terminal	Redundancy controller terminal
1	+ and – terminals of **Aux 48V**	+ and – terminals of **48V-1** on PWR IN terminal strip (through **48 V (1)** gland)
2	+ and – terminals of **Aux 48V**	+ and – terminals of **48V-2** on PWR IN terminal strip (through **48 V (2)** gland)

Table 6-2: Power cable connections (high power transceiver systems)

Stream	SSPA connector	Redundancy controller terminal
1	**–48 V DC OUTPUTS**	+ and – terminals of **48V-1** on PWR IN terminal strip (through **48 V (1)** gland)
2	**–48 V DC OUTPUTS**	+ and – terminals of **48V-2** on PWR IN terminal strip (through **48 V (2)** gland)

At the redundancy controller end, pass the cables through the appropriate glands before attaching the cable wires to the PWR IN terminal strip on the PCB (see Figure 6-1).

Figure 6-1: PWR IN terminal strip on the PCB of the redundancy controller



Connecting the control cables

To connect the control cables:

- ❑ Connect each converter module to the redundancy controller using the control cables (08-05160-xxx).

  Table 6-2 lists the appropriate connectors for the control connections.

Table 6-3: Control cable connections

Stream	Redundancy controller connector	Converter connector
1	**Transceiver (1)**	**MONITOR/CONTROL**
2	**Transceiver (2)**	**MONITOR/CONTROL**

Connecting the IF from the redundancy controller to the converter modules

To connect the IF cables:

- ❑ Connect the transmit and receive IF connectors on the redundancy controller to each converter using the four 50 Ω coaxial (N–N) cables (Codan part number 08-05366-xxx).

  Table 6-4 lists the appropriate connectors for the IF connections.

Table 6-4: IF coaxial cable connections (redundancy controller/converters)

Stream	Redundancy controller connector	Converter connector
1	**Tx (1) O/P**	**Tx IF I/P**
	Rx (1) I/P	**Rx IF O/P**
2	**Tx (2) O/P**	**Tx IF I/P**
	Rx (2) I/P	**Rx IF O/P**

Cables 08-05366-xxx are low-loss double-screened coaxial cables.

Connecting the IF from the redundancy controller to a modem or other equipment

To connect the IF cables:

- ❑ Connect the transmit and receive IF connectors on the redundancy controller to a modem or other equipment using two IF coaxial cables.

  Table 6-5 lists the appropriate connectors for the modem (or other equipment) connection.

Table 6-5: IF coaxial cable connections (redundancy controller/modem/other equipment)

Stream	Redundancy controller connector	Modem or other equipment
1	**Tx IF I/P**	Transmit IF output connector
2	**Rx IF O/P**	Receive IF input connector

Connecting the RF switches

If you are using a separate receive waveguide switch or a combined RF waveguide/coaxial switch:

- ❑ Connect the receive waveguide switch or the combined RF waveguide/coaxial switch to the redundancy controller (through **Rx W/G SW** gland) using the switch cable (Codan part number 08-05158-xxx).

If you are using a separate transmit waveguide switch:

- ❑ Connect the transmit waveguide switch to the redundancy controller (through **Tx W/G SW** gland) using the switch cable (Codan part number 08-05159-xxx).

  Table 6-6 lists the appropriate connectors/glands for the connections.

Table 6-6: Cable connections (redundancy controller/RF switches)

Redundancy controller gland	Waveguide switch
Rx W/G SW terminal strip (through **Rx W/G SW** gland)	6-way MS connector on the receive waveguide or combined waveguide/coaxial switch
Tx W/G SW terminal strip (through **Tx W/G SW** gland)	6-way MS connector on the transmit waveguide switch

- ❑ At the redundancy controller end, pass the cables through the glands before attaching the cable wires to the terminal strips. For connection details, see Figure 6-2, Table 6-7 and drawings 08-05158 and 08-05159 in Chapter 9, *Drawings*.

Figure 6-2: W/G switch terminal strips on the PCB of the redundancy controller

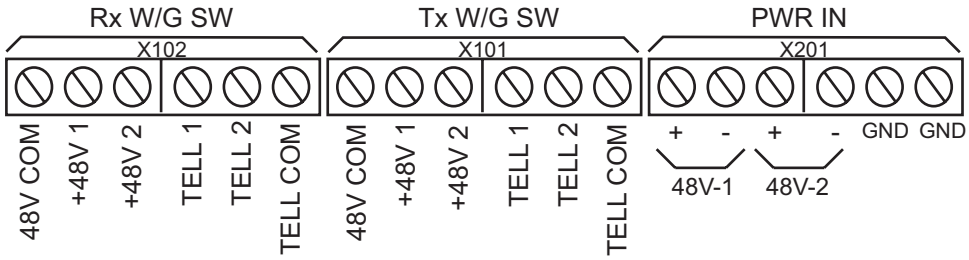


Table 6-7 lists the colour coding of cable wires for all RF switch types.

Table 6-7: Colour coding of cable wires

Wire colour	**Name on terminal strip**	**Function**
Black	**48 V COM**	48 V Common
Red	**+48 V 1**	Coil 1
Yellow	**+48 V 2**	Coil 2
Green	**TELL 1**	Tell-back Position 1
Blue	**TELL 2**	Tell-back Position 2
White	**TELL COM**	Tell-back Common

Accessing the monitor and control interface

Remote control and monitoring of the redundancy switching system is possible via the 19-way **Redundancy Controller M&C** connector on the redundancy controller. This may be achieved directly via connections to this interface or via the optional redundant system monitor.

To use this 19-way connector, you need a 19-way MS plug, part number MS3116J14-19P (Codan part number 60-00191-580).

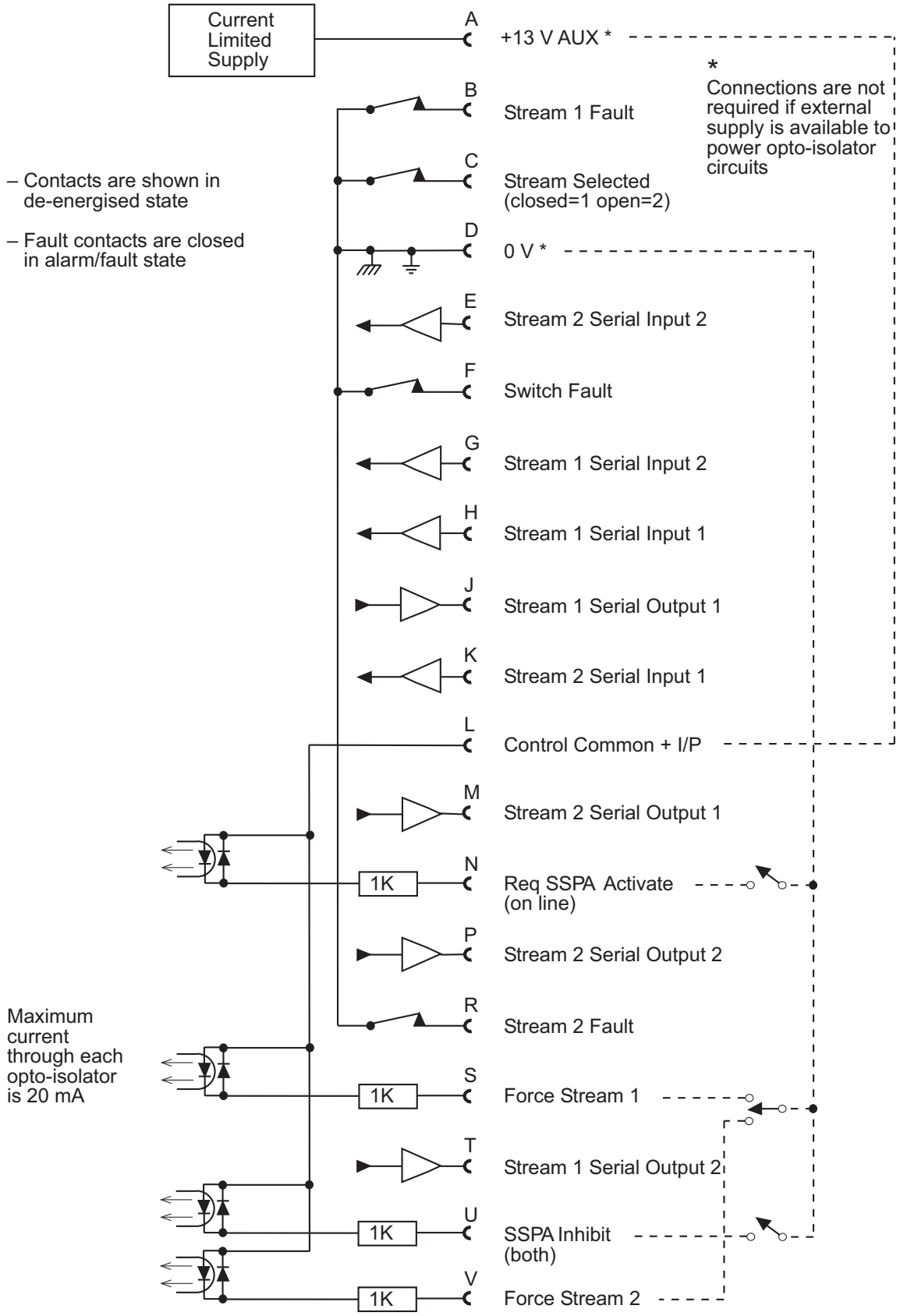
Figure 6-3 shows the monitor and control interface at the **Redundancy Controller M&C** connector of the redundancy controller. Contacts are shown in their de-energised state.

The maximum current through each opto-isolator is 20 mA. Fault contacts are closed in fault state. Contact outputs connect to ground.

Relay contacts indicate the following faults and operational status of the redundancy system (the four relay contacts share a common contact connection):

- Stream 1 Fault
- Stream 2 Fault
- Stream Selected
- Switch Fault

Figure 6-3: Monitor and control interface of the redundancy controller



Accessing the serial interfaces of the transceivers

The C-Band Transceiver 5700 series has a serial monitor and control facility that is normally accessed through the 19-way **MONITOR/CONTROL** connector on the converter module. In a redundancy switching system, these connectors are used to connect the redundancy controller. The serial interface connections for the Stream 1 transceiver are looped across inside the redundancy controller to the 19-way **Serial Interface (1)** connector. Similarly, the serial interface connections for the Stream 2 transceiver are looped across inside the redundancy controller to the 19-way **Serial Interface (2)** connector. The serial interface connections for both Stream 1 and Stream 2 transceivers are also looped across to the **Redundancy Controller M&C** connector.

Hand-held controllers, PCs and remote controllers can be temporarily plugged into the **Serial Interface** connectors of the redundancy controller to communicate directly with the appropriate transceiver (see the appropriate user guide or transceiver reference manual).

Alternatively, if you wish to use a single connector to access the serial interfaces of both transceivers, use the 19-way **Redundancy Controller M&C** connector on the redundancy controller. See Figure 6-3 for connections.

The **Serial Interface** connectors and the **Redundancy Controller M&C** connector on the redundancy controller are wired in parallel. If you are using the serial connections on the **Redundancy Controller M&C** connector, you *cannot* also use the serial connections on the **Serial Interface (1)** or **Serial Interface (2)** connectors.

For RS485 multidrop applications, an internal loom in the redundancy controller can be connected to a header, which links the serial lines for both transceivers together (see page 6-22, *Configuring the serial interface*). This eliminates the need for external linking of serial interface lines.

Once the serial interfaces are linked, RS485 serial data connections to the two transceivers *must* be made via the serial interface connections for Stream 1 on the **Redundancy Controller M&C** connector.

Operation with hand-held controllers *is not* possible when the serial interfaces are linked. Both the redundancy controller and the converter will require reconfiguration for operation with hand-held controllers. Reconfiguration involves:

- configuring the redundancy controller for unlinked serial interface operation
- setting the serial interface option switches on the converter to ASCII and RS232 (hand-held controllers only)

For details on the serial interface and protocols for the transceiver, see *Chapter 6, Installation* in the *C-Band Transceiver 5700 series Reference Manual*.

Connecting the redundant system monitor

The optional redundant system monitor is connected to the redundancy controller using the 19-way cable (Codan part number 08-05133-xxx).

To connect the redundant system monitor:

- ❑ Plug the 25-way D-type socket of the 19-way cable into the **Monitor & Control** connector on the rear of the redundant system monitor.
- ❑ Plug the 19-way MS plug of the 19-way cable into the **Redundancy Controller M&C** connector on the redundancy controller.

Accessing the monitor and control interface via the redundant system monitor

Remote monitoring and control of the redundancy switching system is possible via the 15-way **Monitor & Control** connector on the redundant system monitor. This may be achieved directly via connections to this interface.

To use this 15-way connector, you need a 15-way D-type socket (DB15S).

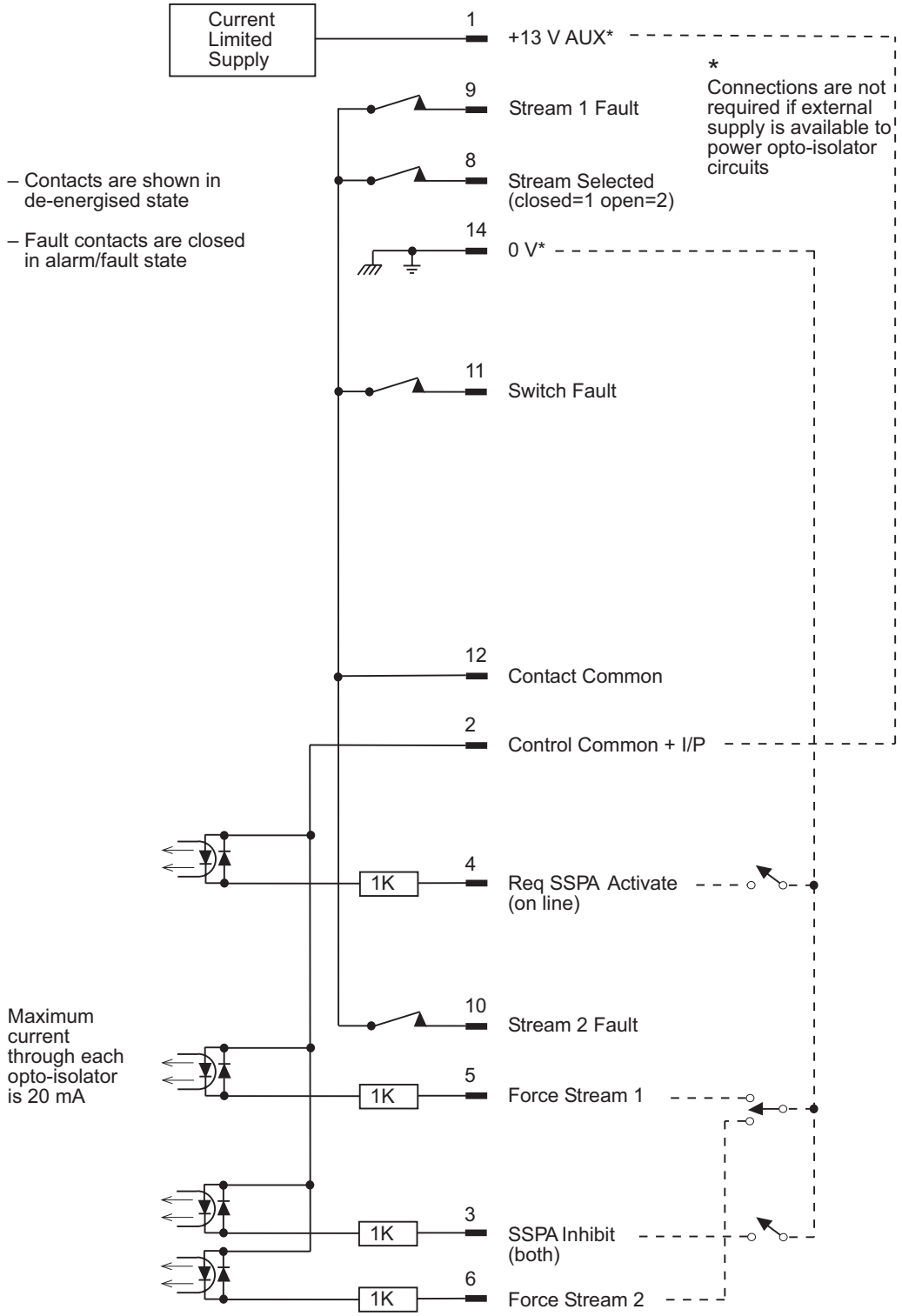
Figure 6-4 shows the monitor and control interface at the **Monitor & Control** connector of the redundant system monitor. Contacts are shown in their de-energised state.

The maximum current through each opto-isolator is 20 mA. Fault contacts are closed in fault state.

Relay contacts indicate the following faults and operational status of the redundancy system (the four relay contacts share a common contact connection):

- Stream 1 Fault
- Stream 2 Fault
- Stream Selected
- Switch Fault

Figure 6-4: Monitor and control interface of the redundant system monitor



Accessing the serial interfaces of the transceivers via the redundant system monitor

If a redundant system monitor is connected, access to the serial interfaces of the transceivers is also provided by the **Serial Interface—Stream 1** and **Serial Interface—Stream 2** connectors at the rear of the redundant system monitor. These connectors are 15-way D-type sockets that enable direct interfacing, or interfacing with a Remote Controller 5570. To use these 15-way sockets with direct interfacing, a 15-way D-type plug (DB15P) is required.

Table 6-8: Pin allocations for Serial Interface—Stream 1 and Serial Interface—Stream 2 connectors

Pin	Function
2	Serial output 1
3	Serial input 1
5	GND
8	+ 13 V AUX
10	Serial input 2
11	Serial output 2
15	Chassis

For details on installing a Remote Controller 5570, see the *Remote Controller 5570 User Guide*.

To connect remote controllers, use 15-way cables (Codan part number 08-05686-xxx).

When connecting remote controllers to the redundant system monitor, the serial interface *must* be unlinked for correct operation (see page 6-14, *Accessing the serial interfaces of the transceivers*).

Once the serial interfaces are linked, the serial interface connections to the redundant system monitor *must* be made to the **Serial Interface—Stream 1** connector.

Setting up the internal DIP switches in the redundancy controller

DIP switches in the redundancy controller set up how the controller works.

The redundancy controller has eight switches on the PCB (see drawing 03-01037 in Chapter 9, *Drawings*):

- **+13 V AUX**
- **REFERENCE**
- **SSPA ALARM 1**
- **SSPA ALARM 2**
- **FAN 1**
- **FAN 2**
- **W/G SWITCH**
- **W/G SWITCH**

DIP switch settings

The settings of the DIP switches control the operation of the redundancy controller.

Table 6-9 lists the DIP switches and their settings.

Table 6-9: DIP switches on the PCB of the redundancy controller

DIP switches	Setting
+13 V AUX	This switch controls the +13 V AUX power supply, which is used by the redundant system monitor. This supply is overload protected so that if it is accidentally shorted to earth, it will switch off. To restore power, switch the **+13 V AUX** switch off and then on again.
REFERENCE	When this switch is set to EXCLUDE, the redundancy controller ignores warm-up alarm signals in determining whether or not an automatic switchover is required (see page 6-21, *Enabling transmission during the warm-up period*).
SSPA ALARM 1 and **SSPA ALARM 2**	SSPA output alarms are *not* used in the C-Band redundancy switching system. Both of these DIP switches *must* be set to EXCLUDE (see page 6-21, *Excluding SSPA output alarms*).
FAN 1 and **FAN 2**	When a switch is set to EXCLUDE, the redundancy controller ignores SSPA fan faults for that transceiver (see page 6-21, *Excluding SSPA fan faults*).
W/G SWITCH (×2)	If a combined RF waveguide/coaxial switch is used, both **W/G SWITCH** switches *must* be set to SINGLE. The redundancy controller monitors the tell-back contacts from the combined RF waveguide/coaxial switch only. If separate RF switches are used, both **W/G SWITCH** switches *must* be set to DUAL. The redundancy controller monitors the tell-back contacts from both the transmit and receive RF waveguide switches.

Changing the internal DIP switches to provide different functions

Enabling transmission during the warm-up period

If you wish to transmit during the warm-up period of the transceivers:

- ❑ Select the reference oscillator override option on both converter modules (see *Chapter 6, Installation* in the *C-Band Transceiver 5700 series Reference Manual*).
- ❑ Set the **REFERENCE** switch on the redundancy controller to EXCLUDE so that warm-up alarms are ignored.

Excluding SSPA fan faults

In very cold climates, where fan failure is not considered a serious fault, you can stop SSPA fan faults from causing stream switching by changing the **FAN 1** and **FAN 2** switches on the PCB of the redundancy controller to EXCLUDE.

In high power transceiver systems, the SSPA fans are not monitored by the converter and the **FAN 1** and **FAN 2** switches should be set to EXCLUDE.

If SSPA fan faults are not critical or a high power transceiver system is being used:

- ❑ Set the **FAN 1** and **FAN 2** switches to EXCLUDE.

If an SSPA does not use a fan, no fan fault will be generated.

Excluding SSPA output alarms

For all C-Band applications, the SSPA output alarms should be excluded.

To exclude SSPA output alarms:

- ❑ Set **SSPA ALARM 1** and **SSPA ALARM 2** switches on the PCB of the redundancy controller to EXCLUDE.

Configuring the serial interface

For RS485 multidrop applications, an internal loom in the redundancy controller can be connected to another header, which links the serial lines for both transceivers together (see Figure 6-5).

If independent serial interface operation is required:

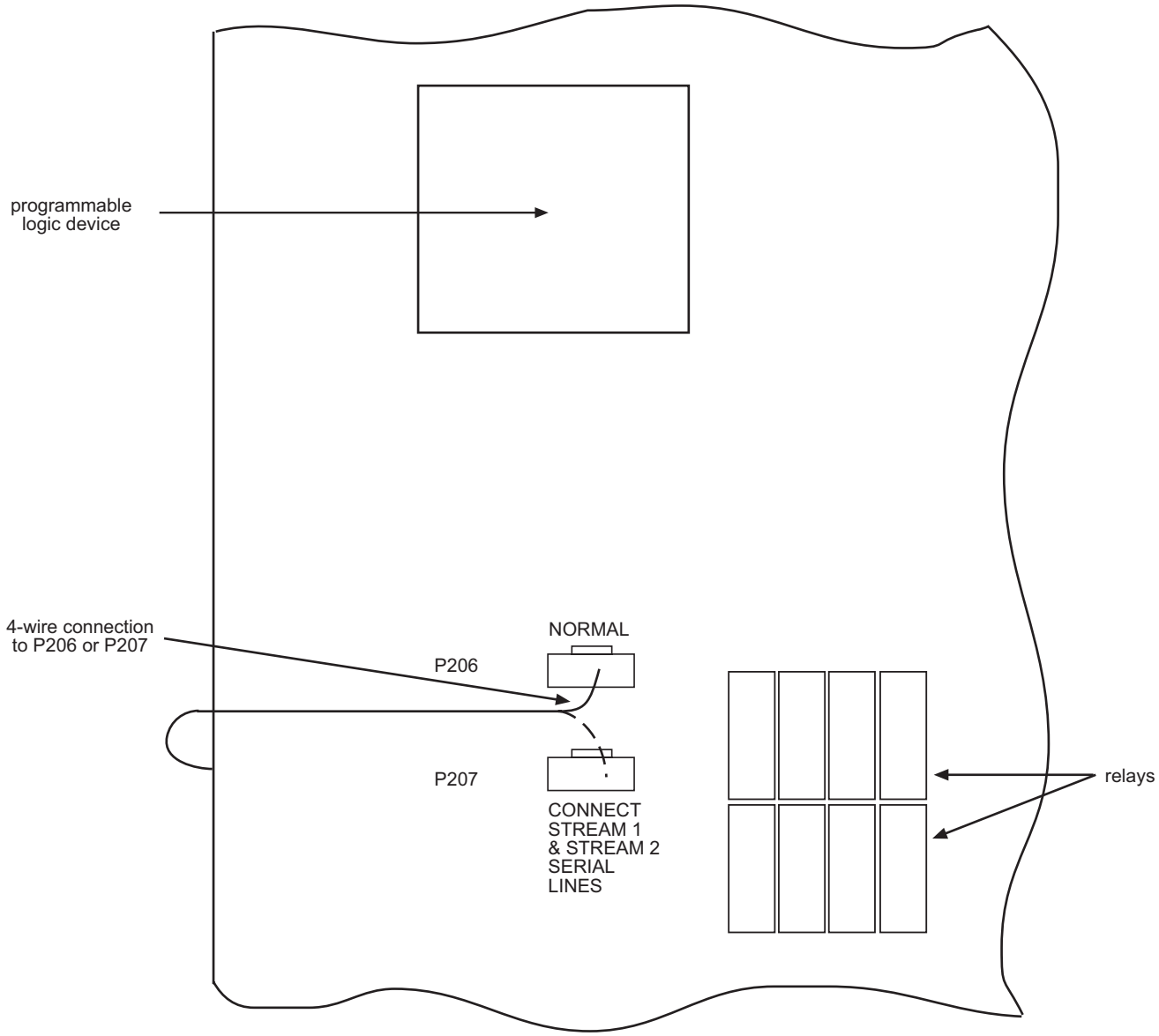
- ❑ On the PCB of the redundancy controller, connect the 4-wire connector to **NORMAL** (P206).

If linked Stream 1 and Stream 2 serial interface operation is required:

- ❑ On the PCB of the redundancy controller, connect the 4-wire connector to **CONNECT STREAM 1 & STREAM 2 SERIAL LINES** (P207).

Once the serial interfaces are linked, the serial interface connections to the redundancy controller *must* be made to the serial interface connections for Stream 1 of the **Redundancy Controller M&C** connector on the redundancy controller. If a redundant system monitor is installed, the serial interface connections to the redundant system monitor *must* be made to the **Serial Interface—Stream 1** connector.

Figure 6-5: Portion of the PCB of the redundancy controller showing the 4-wire connection used to configure the serial interface



Switching on the redundancy switching equipment

If a redundant system monitor is installed, set the **Auto**/**Manual** switch on the redundant system monitor to Auto, and the **SSPA** switch to Remote. This ensures that during the initial commissioning phase, the redundant system monitor has no effect on operation. The switch settings can be changed after the commissioning phase.

The following sections explain operation of the redundancy switching equipment via the redundancy controller only.

Setting up how the system will run

Before powering up the redundancy controller, you need to set up how the redundancy switching system will run.

To set up the redundancy switching system:

- ❑ See *Chapter 7, Setting up the transceiver* in the *C-Band Transceiver 5700 series Reference Manual* to set up the options and operating parameters for the first transceiver.
- ❑ Set the same options and operating parameters for the other transceiver.
- ❑ Switch off the AC power supply to each Power Supply Unit 5582B (low power transceiver systems) or each SSPA (high power transceiver systems).

  This switches off the power to both transceivers (including power to the redundancy controller).
- ❑ Use a 2.5 mm Allen key to remove the transparent cover on the control panel of each converter.
- ❑ On both converter modules, set the **POWER** switch to ON.
- ❑ On both converter modules, set the **SSPA** switch to ACTIVATE.

  For CE compliant operation, you must set the **SSPA** switch on the converter to REMOTE and activate the SSPA via the converters' serial interfaces. You can do this with a PC (using the **SPA1** command), a Hand-Held Controller 5560 or Remote Controller 5570.

  Under normal operation this keeps both the on-line and off-line SSPA modules activated. This is the recommended operating mode.
- ❑ Replace the transparent cover on the control panel of each converter.

  When you are replacing the transparent cover, ensure the gasket is in place and that the screws are *not* overtightened.

- ❑ On the PCB of the redundancy controller, set the **AUTO**/**MANUAL** switch to MANUAL.

  This prepares the redundancy controller to run in Manual mode.

- ❑ On the PCB of the redundancy controller, set the **INHIBIT**/**REMOTE**/**ACTIVATE** switch to INHIBIT.

  This inhibits both SSPA modules regardless of other switch settings.

  You are now ready to power up the redundancy switching system.

Powering up the system

To power up the system:

- ❑ Switch on the AC power supply to each Power Supply Unit 5582B (low power transceiver systems) or each SSPA (high power transceiver systems) to power up both transceivers and the redundancy controller.

  On each converter module, the green **ON** LED and the yellow **WARM-UP** LED should be on. On the PCB of the redundancy controller, the green **POWER** LED and one of the yellow **STREAM 1** or **STREAM 2** LEDs should be on.

  If the **REFERENCE** switch on the PCB of the redundancy controller has not been set to EXCLUDE, the redundancy controller recognises both streams as faulty during the warm-up period of the transceiver. The red **STREAM 1 FAULT** and **STREAM 2 FAULT** LEDs should be on. If you want the redundancy controller to ignore warm-up alarms, see page 6-21, *Enabling transmission during the warm-up period*.

  If the **REFERENCE** switch on the PCB of the redundancy controller has been set to EXCLUDE, the red **STREAM 1 FAULT** and **STREAM 2 FAULT** LEDs should not be on.

  The redundancy switching system is now running in Manual mode.

- ❑ If you want to switch streams manually, momentarily push the **STREAM 1**/**STREAM 2** switch on the PCB of the redundancy controller towards the stream that you want.

  The yellow **STREAM 1** and **STREAM 2** LEDs change their on/off state depending on which stream is selected. The LED that is on indicates the on-line stream.

  You do not need to wait for any stream faults to clear.

  After switchover, the redundancy controller will not let you switch streams again for five seconds.

Adjusting the transceivers

For information on how to set up the transceiver, see *Chapter 7, Setting up the transceiver* in the *C-Band Transceiver 5700 series Reference Manual*.

To adjust the transceivers:

- ❑ Align the antenna.
- ❑ For the first transceiver adjust the:
  - cable compensation[1]
  - transmit attenuation
  - receive attenuation
- ❑ When you need to transmit, change the **INHIBIT**/**REMOTE**/**ACTIVATE** switch on the PCB of the redundancy controller from INHIBIT to ACTIVATE.

  Use the **STREAM 1**/**STREAM 2** switch on the PCB of the redundancy controller to switch streams.
- ❑ Adjust the second transceiver in the same way as the first transceiver.

It is important that both transceivers are identically adjusted. For example, it is particularly important that transmit signal levels do not change significantly (<1 dB) on switchover.

The redundancy switching system is now ready to run automatically.

Starting automatic operation

To start full automatic operation of the earth station:

- ❑ Set the **AUTO**/**MANUAL** switch on the control panel of the redundancy controller to AUTO.

  This starts the redundancy switching system running in Auto mode.
- ❑ Check that:
  - the **SSPA** switch on the control panel of each converter module is set to ACTIVATE
  - the **INHIBIT**/**REMOTE**/**ACTIVATE** switch on the PCB of the redundancy controller is set to either ACTIVATE or REMOTE

1. Cable compensation facility is not provided in converters with D prefix serial numbers.

If you need to operate in CE compliant mode, check that:

- the **SSPA** switch on the control panel of each converter module is set to REMOTE
- the **INHIBIT**/**REMOTE**/**ACTIVATE** switch on the PCB of the redundancy controller is set to REMOTE
- the **SSPA** switch on the control panel of the redundant system monitor is set to Remote
- the SSPA has been activated via the converters' serial interfaces

You are now ready for live traffic.

Before leaving the earth station, ensure all cable joints are adequately weatherproofed and all equipment covers are secure.

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7 Operating the redundancy system

This chapter explains how to operate the redundancy system. It covers:

- switching the redundancy system on and off (7-2)
- checking the operation of the LED indicators and controls of the redundancy controller and the redundant system monitor (7-3)
- switching between streams automatically and manually (7-6)
- switching streams remotely (7-9)
- controlling the transceivers, including controlling the SSPA modules (7-10)

Switching the redundancy system on and off

When you power up the redundancy controller, the redundancy switching system resumes operation from the state that it was in prior to being switched off. For example, if Stream 1 was on line then the redundancy controller resumes operation with Stream 1 on line.

You can switch off the redundancy switching system at any time by simply switching off the PSUs at the mains supply.

Checking the operation of the LED indicators and controls

Redundancy controller

The redundancy controller has seven LED indicators and three switches on the internal PCB (see drawing 03-01037 in Chapter 9, *Drawings*).

LED indicators

Table 7-1: LED indicators on the PCB of the redundancy controller

LED	Colour	Operation
POWER	green	48 V DC is being supplied from either of the power supply units.
+13 V AUX	green	+13 V AUX is being supplied to the optional redundant system monitor.
STREAM 1	yellow	Stream 1 is on line.
STREAM 2	yellow	Stream 2 is on line.
SWITCH FAULT	red	The redundancy controller has detected an inconsistent RF switch position. For example, the LED may indicate a jammed waveguide switch or a broken switch cable.
STREAM 1 FAULT	red	The redundancy controller has received alarm signals from the Stream 1 transceiver.
STREAM 2 FAULT	red	The redundancy controller has received alarm signals from the Stream 2 transceiver.

Switches

Table 7-2: Switch positions on the PCB of the redundancy controller

Switch	Function
AUTO[a]	The redundancy controller automatically switches between streams depending on the operating status of each stream.
MANUAL[a]	The redundancy controller switches to the stream selected by the operator using the **STREAM 1**/**STREAM 2** switch.
STREAM 1	Selects Stream 1 when the redundancy controller is in Manual mode.
STREAM 2	Selects Stream 2 when the redundancy controller is in Manual mode.
INHIBIT	Both SSPA modules are inhibited and any activate command from another source is overridden.
REMOTE	Remote activation of the on-line SSPA module is enabled by signals received at the monitor and control interface of the redundancy controller.
ACTIVATE	Redundancy controller controls activation and deactivation of each SSPA as the module comes on line or goes off line respectively. This setting is useful if you only want to activate the SSPA module that is currently on line.

a. If the redundant system monitor is connected, auto stream switching will only occur if both the **AUTO**/**MANUAL** switch on the PCB of the redundancy controller and the **Auto**/**Manual** switch on the control panel of the redundant system monitor are set to AUTO/Auto. Manual control from the control panel of the redundant system monitor is always available. Manual control from the PCB of the redundancy controller is only available if the **Auto**/**Manual** switch on the control panel of the redundant system monitor is set to Auto and the **AUTO**/**MANUAL** switch on the redundancy controller is set to MANUAL.

Redundant system monitor

The redundant system monitor has six LED indicators and three switches on the control panel (see drawing 03-01038 in Chapter 9, *Drawings*).

The LED indicators and switches of the redundant system monitor have the same functions as the corresponding indicators and switches on the redundancy controller (see page 7-3, *Redundancy controller*).

Selecting manual operation using the **Auto**/**Manual** switch on the redundant system monitor overrides the setting of the **AUTO**/**MANUAL** switch on the PCB of the redundancy controller.

Switching between streams

The redundancy controller enables automatic and manual switching of streams.

You can set the redundancy controller to:

- automatically switch streams when it receives an alarm from the on-line stream
- manually force the system to switch between Stream 1 and Stream 2

The redundancy controller always switches transmit and receive paths together. It is protected against rapid switching from one stream to the other (hunting) by timer control of the switching rate.

Operating the redundancy system in Auto mode

Selecting Auto mode in a system without a redundant system monitor

To select Auto mode:

- ❑ Set the **AUTO**/**MANUAL** switch on the PCB of the redundancy controller to AUTO.

Selecting Auto mode in a system with a redundant system monitor

To select Auto mode:

- ❑ Set the **AUTO**/**MANUAL** switch on the PCB of the redundancy controller and the **Auto**/**Manual** switch on the control panel of the redundant system monitor to AUTO/Auto.

The **AUTO**/**MANUAL** switch on the redundancy controller and the **Auto**/**Manual** switch on the redundant system monitor *must* both be set to AUTO/Auto for the redundancy system to run in Auto mode.

Either the **STREAM 1** or **STREAM 2** LED will be on, corresponding to the stream that is selected.

Operating the redundancy system in Manual mode

Selecting Manual mode in a system without a redundant system monitor

To select Manual mode:

- ❑ Set the **AUTO**/**MANUAL** switch on the PCB of the redundancy controller to MANUAL.

  This puts the redundancy controller in Manual mode.

- ❑ Momentarily push the **STREAM 1**/**STREAM 2** switch on the PCB of the redundancy controller towards the stream that you want.

  The yellow **STREAM 1** or **STREAM 2** LED will be on, indicating the selected stream.

  

  After switchover, the redundancy controller will not let you switch streams again for five seconds.

Selecting Manual mode in a system with a redundant system monitor

If Manual mode is selected on both the redundant system monitor and the PCB of the redundancy controller, the **Stream 1**/**Stream 2** switch of the redundant system monitor overrides the stream selection of the redundancy controller. Switching streams using the **STREAM 1**/**STREAM 2** switch on the PCB of the redundancy controller *is not* possible.

If Manual mode has been selected on the redundant system monitor (and Auto mode on the PCB of the redundancy controller):

- ❑ Set the **Stream 1**/**Stream 2** switch on the control panel of the redundant system monitor to either Stream 1 or Stream 2 to select the stream that you want.

  The yellow **Stream 1** or **Stream 2** LED will be on, corresponding to the stream that is selected.

  

  After switchover, the redundancy controller will not let you switch streams again for five seconds.

If Manual mode has been selected on the PCB of the redundancy controller (and Auto mode on the redundant system monitor):

- ❑ Momentarily push the **STREAM 1**/**STREAM 2** switch on the PCB of the redundancy controller towards the stream that you want.

  The yellow **STREAM 1** or **STREAM 2** LED will be on, corresponding to the stream that was selected.

  

  After switchover, the redundancy controller will not let you switch streams again for five seconds.

Switching streams remotely

External force signals on either of the stream control lines of the **Redundancy Controller M&C** connector override both Auto and Manual mode stream switching, regardless of fault indications.

If the on-line transceiver becomes faulty and automatic switchover does not occur because the off-line transceiver is also faulty, you may be able to restore communications by externally forcing the off-line stream back to the on-line stream.

For example, if one stream was switched off line because of an SSPA fan fault, and the on-line transceiver generates a converter module fault, the redundancy controller will not switch streams again. Both streams will be recognised as having hardware faults. The off-line stream with the SSPA fan fault may still be able to transmit and receive. You can attempt to restore communications by remotely forcing the selection of the off-line stream. If this is successful, you can maintain station operation using this stream while the converter module of the other stream is repaired. You can do this by providing your own control system that uses the monitor and control interface, or you can use the rack-mounted Redundant System Monitor 5587 (see page 3-12, *The redundant system monitor*).

Controlling the transceiver

For correct operation of the redundancy system, both transceivers must be on.

To switch the transceivers on:

- ❑ Set the **POWER** switch on both converter modules to ON (see page 6-24, *Setting up how the system will run*).

  Both converters are now fully operational in the redundancy system. The state of the SSPA modules depends on how the SSPA controls are set (see below, *Controlling the SSPA*).

Controlling the SSPA

The standby state of the off-line SSPA module is dependent on how the SSPA modules are controlled. The off-line SSPA module can be set to two states:

- activated in a hot standby system
- not activated in a warm standby system

Hot standby

In hot standby, both SSPA modules are activated ready for immediate use. As the off-line SSPA module is always activated, its status is always current, i.e. current faults in the SSPA are indicated. A hot standby system has greater power consumption than any other redundancy system configuration.

To set the SSPA modules to operate in hot standby:

- ❑ Use a 2.5 mm Allen key to remove the transparent cover on the control panel of each converter.
- ❑ Set the **SSPA** switch on each converter module to ACTIVATE.

  If you need to operate in CE compliant mode, you must:

  - set the **SSPA** switch on the control panel of each converter module to REMOTE
  - set the **INHIBIT**/**REMOTE**/**ACTIVATE** switch on the PCB of the redundancy controller to REMOTE
  - set the **SSPA** switch on the control panel of the redundant system monitor to Remote
  - activate the SSPA via the converters' serial interfaces

- ❑ Replace the transparent cover on the control panel of each converter.

When you are replacing the transparent cover, ensure the gasket is in place and that the screws are *not* overtightened.

When operating in non-CE compliant mode, we recommend that you set the SSPA modules of both transceivers permanently to ACTIVATE at the converter modules. This keeps the off-line stream in hot standby ready for immediate operation.

An optional Tx IF splitter is available that can be factory or customer installed. This enables the Tx signal to be fed to both streams in a hot standby installation.

Warm standby

In warm standby, only the on-line SSPA is activated. This provides a lower power consumption than the hot standby system, but the latched status of the off-line SSPA module may not be current. In warm standby, the on-line SSPA can be controlled locally or remotely.

Warm standby cannot be used if the system is required to operate in CE compliant mode. In warm standby, the on-line SSPA is automatically activated when power is applied. This is contrary to CE requirements.

To set the SSPA modules to operate in warm standby:

- ❑ Use a 2.5 mm Allen key to remove the transparent cover on the control panel of each converter.
- ❑ Set the **SSPA** switch on each converter module to REMOTE.
- ❑ Replace the transparent cover on the control panel of each converter.

When you are replacing the transparent cover, ensure the gasket is in place and that the screws are *not* overtightened.

To activate the SSPA locally:

- ❑ Set the **INHIBIT**/**REMOTE**/**ACTIVATE** switch on the PCB of the redundancy controller to ACTIVATE.

To activate the SSPA remotely:

- ❑ Set the **INHIBIT**/**REMOTE**/**ACTIVATE** switch on the PCB of the redundancy controller to REMOTE.

❑ Either:

- set the **Inhibit**/**Remote**/**Activate** switch on the redundant system monitor to Activate, or
- use the remote activation facility on the **Monitor & Control** connector on the redundant system monitor (see page 6-16, *Accessing the monitor and control interface via the redundant system monitor*)

These SSPA control settings are summarised in Table 7-3.

Table 7-3: Settings to activate the SSPAs in standby states

Standby state	**SSPA switches on converter modules**	**INHIBIT/ REMOTE/ ACTIVATE switch on redundancy controller**	**Inhibit/ Remote/ Activate switch on redundant system monitor**	**Req SSPA Activate using the M & C interface of the redundant system monitor[a]**
Hot standby (CE compliant mode)	**REMOTE**[b]	**REMOTE**	**Remote**	Not connected
Hot standby	**ACTIVATE**	**ACTIVATE** or **REMOTE**	**Activate** or **Remote**	Ignored
Warm standby (control via the redundancy controller)	**REMOTE**	**ACTIVATE**	**Activate** or **Remote**	Ignored
Warm standby (control via the redundant system monitor)	**REMOTE**	**REMOTE**	**Activate**	Ignored
Warm standby (control via the M & C interface of the redundant system monitor)	**REMOTE**	**REMOTE**	**Remote**	Opto-energised

a. On the rear panel of the redundant system monitor.
b. The converters' serial interfaces must be used to activate the SSPAs.

If a redundant system monitor is not installed, remote SSPA activation can be achieved via the **Redundancy Controller M&C** connector on the redundancy controller (see page 6-12, *Accessing the monitor and control interface*). In this case, the **SSPA** switches on the converters must be set to REMOTE, and the **INHIBIT**/**REMOTE**/**ACTIVATE** switch on the redundancy controller must be set to REMOTE.

Inhibiting the SSPA modules

To ensure that transmissions are not made, the SSPA modules can be inhibited from being activated, irrespective of the activate controls and inputs. Each SSPA module can be inhibited independently by switching the **SSPA** switch on the converter module to INHIBIT. Alternatively, both SSPA modules can be inhibited simultaneously either locally or remotely.

To inhibit the SSPA modules locally:

- ❑ Set the **INHIBIT**/**REMOTE**/**ACTIVATE** switch on the PCB of the redundancy controller to INHIBIT.

To inhibit both SSPA modules remotely:

- ❑ Either:
  - set the **Inhibit**/**Remote**/**Activate** switch on the redundant system monitor to Inhibit, or
  - use the SSPA Inhibit input on the **Monitor & Control** connector on the rear panel of the redundant system monitor (see page 6-16, *Accessing the monitor and control interface via the redundant system monitor*)

If the redundant system monitor *is not* installed, use the SSPA Inhibit input on the **Redundancy Controller M&C** connector to remotely inhibit both SSPA modules (see page 6-16, *Accessing the monitor and control interface via the redundant system monitor*).

Resetting latched fault conditions in Auto mode

If a latched hardware fault (SSPA module or SSPA fan fault) caused the redundancy controller to switch streams, the off-line stream *cannot* be automatically reselected until you have manually reset the fault condition.

Try resetting the fault condition by inhibiting, then reactivating the SSPA module. If this fails, see *Chapter 9, Maintenance and fault finding* in the *C-Band Transceiver 5700 series Reference Manual*.

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8 Maintenance and fault finding

This chapter describes how to maintain and troubleshoot the redundancy switching system. It covers:

- safety precautions (8-2)
- troubleshooting the transceiver (8-4)
- troubleshooting the redundancy switching equipment (8-8)
- troubleshooting the redundant system monitor (8-14)
- replacing a fuse (8-16)
- reverting to a single-transceiver earth station (8-17)

Before you follow any troubleshooting procedure, determine whether or not the redundancy switching system:

- is fully installed
- is set up correctly
- was operating satisfactorily before the fault occurred

To fault find the system:

- ❑ If you think one of the transceivers is faulty, see page 8-4, *Troubleshooting the transceiver*.
- ❑ If you think the redundancy switching equipment is faulty, see page 8-8, *Troubleshooting the redundancy switching equipment*.

Precautions

DC supply

When servicing, and particularly when connecting test equipment, take care to avoid shorting different 0 V rails together.

The PSUs (low power transceiver systems) or SSPAs (high power transceiver systems) supply the external 48 V DC to the redundancy controller. The positive rail of each 48 V DC supply is normally grounded inside the PSU. Both the positive and negative rails are diode ORed in the redundancy controller.

The nominal 48 V DC supply voltage from the 5582B PSU may be between 42 and 72 V DC depending upon the AC mains voltage.

The internal 48 V DC line of the redundancy controller supplies power to the RF switches. The potential of the internal 48 V DC line differs slightly from the external 48 V DC supplied from each transceiver due to the diode ORing.

The 48 V DC line in the redundancy controller is fed to an isolating DC–DC converter. This converter supplies 13 V and 5 V power for the control electronics. The low voltage rails have a negative ground/chassis.

RF switches

Handle all RF switches with care. They are easily damaged.

It is critical to weatherproof waveguide and control joints for long-term switch reliability.

The RF switch is a precision microwave electromechanical assembly. *Do not* attempt to repair it yourself. Return all faulty RF switches to Codan for repair.

Shields and lids

Secure all RF shields and lids to ensure correct system operation.

Fuses and overcurrent protection

The redundancy controller is protected by two fuses on the PCB. Both fuses are slow blow 20 × 5 mm type, rated at 250 mA. One fuse protects the 48 V positive rail, the other protects the 48 V negative rail.

The redundant system monitor is protected by one fuse on the rear panel. The fuse is a slow blow 20 × 5 mm type, rated at 500 mA. The fuse protects the plug-pack used to supply the 11 to 16 V DC (nominal) required to power the redundant system monitor.

If technical assistance is required...

If the fault finding procedures do not locate the faulty module or cable, or if further technical assistance is required for any other reason, please contact the Customer Service Engineering staff. For the most rapid response, please call the Codan office that is currently in office hours (see Table 8-1).

Outside of normal office hours, Codan has Customer Service Engineers on call to provide emergency technical assistance. They will either answer your call immediately or return your call as soon as possible. The contact phone numbers for after hours emergency technical assistance are listed in Table 8-1.

Table 8-1: Customer service contact numbers

Region	Office hours contact number	After hours contact number	Email address
Asia/Pacific	+61 8 8305 0311	+61 8 8305 0427	asiatech.support@codan.com.au
UK, Europe and Middle East	+44 1252 717 272	+44 1252 741 300	uktech.support@codan.com.au
The Americas	+1 703 361 2721	+1 703 366 3690	ustech.support@codan.com.au

If you are connected to a voice mail system when you call, please follow the instructions carefully, i.e. leave a brief, clear description of your problem and your name and contact phone number including the country code.

Troubleshooting the transceiver

Transceiver fault indications

A transceiver is faulty if:

- the **STREAM 1 FAULT** or **STREAM 2 FAULT** LED on the PCB of the redundancy controller is on
- the redundancy controller has switched streams automatically

When the redundancy controller switches streams, you may hear the RF switches operate. Switchover is indicated when the yellow **STREAM 1** and **STREAM 2** LEDs on the PCB of the redundancy controller have changed their on/off state.

If the transceiver has automatically recovered from the fault, the **STREAM 1 FAULT** or **STREAM 2 FAULT** LED will no longer be on.

Finding faults in a transceiver

Faults in a transceiver are indicated by a switchover occurring and LEDs illuminating on either the converter module or the PCB of the redundancy controller.

If a switchover has occurred but no red **FAULT** LED is illuminated on either the converter module or PCB of the redundancy controller, the fault may have cleared itself. For example, the transceiver may recover from an SSPA temperature alarm once it has cooled down at night.

To find faults in the transceiver:

- ❑ If the fault indicated on the converter is a warm-up alarm (see page 5-3, *Transceiver faults*), wait for the transceiver to warm up and the condition to clear automatically.
- ❑ If the fault indicated on the redundancy controller is a hardware fault, note the transceiver fault conditions indicated by the five red **FAULT** LEDs on the control panel of the converter (see page 5-3, *Transceiver faults*), then troubleshoot the transceiver (see *Chapter 9, Maintenance and fault finding* in the *C-Band Transceiver 5700 series Reference Manual*).

RF testing the off-line stream

You can perform RF tests on the transmit and receive paths of the off-line stream.

System with separate RF waveguide switches

To test the transmit path of the off-line stream:

- ❑ Use a 2.5 mm Allen key to remove the transparent cover on the control panel of the off-line converter.
- ❑ Note the position of the **SSPA** switch on the control panel of the off-line converter module because you will have to reset it to this position after the test.
- ❑ Inhibit the SSPA by moving the **SSPA** switch on the converter to INHIBIT.
- ❑ Remove the waveguide load from port 4 of the transmit RF switch.
- ❑ Connect a suitably rated attenuator and test equipment to port 4 of the transmit RF switch.
- ❑ Inject a transmit IF test carrier into the **Tx IF Test In** connector on the redundancy controller.
- ❑ Set the **SSPA** switch on the control panel of the off-line converter module to ACTIVATE.
- ❑ Perform tests as required.
- ❑ After testing, set the **SSPA** switch to INHIBIT, reconnect the waveguide load, and then reset the **SSPA** switch to its original position.
- ❑ Replace the transparent cover on the control panel of the converter.

When you are replacing the transparent cover, ensure the gasket is in place and that the screws are *not* overtightened.

To test the receive path of the off-line stream:

- ❑ Remove the blanking plate from port 4 of the receive RF switch.
- ❑ Inject a low level 4 GHz test signal into this port.
- ❑ Monitor the receive IF signal of the off-line stream at the **Rx IF Test Out** connector on the redundancy controller.
- ❑ When testing is completed, re-attach the blanking plate to port 4 of the receive RF switch.

System with a combined RF waveguide/coaxial switch

To test the transmit path of the off-line stream:

- ❑ Use a 2.5 mm Allen key to remove the transparent cover on the control panel of the off-line converter.
- ❑ Note the position of the **SSPA** switch on the control panel of the off-line converter module because you will have to reset it to this position after the test.
- ❑ Inhibit the SSPA by moving the **SSPA** switch on the converter to INHIBIT.
- ❑ Remove the protective cap at the output of the coaxial load/attenuator on the RF switch.
- ❑ Connect suitably rated test equipment to the output of the coaxial load/attenuator.
- ❑ Inject a transmit IF test carrier into the **Tx IF Test In** connector on the redundancy controller.
- ❑ Set the **SSPA** switch on the control panel of the off-line converter module to ACTIVATE.
- ❑ Perform tests as required.
- ❑ After testing, set the **SSPA** switch to INHIBIT, replace the protective cap at the output of the coaxial load/attenuator, and then reset the **SSPA** switch to its original position.
- ❑ Replace the transparent cover on the control panel of the converter.

When you are replacing the transparent cover, ensure the gasket is in place and that the screws are *not* overtightened.

To test the receive path of the off-line stream:

- ❑ Remove the blanking plate from port 4 of the receive RF switch.
- ❑ Inject a low level 4 GHz test signal into this port.
- ❑ Monitor the receive IF signal of the off-line stream at the **Rx IF Test Out** connector on the redundancy controller.
- ❑ When testing is completed, re-attach the blanking plate to port 4 of the receive RF switch.

Disconnecting a faulty transceiver

If you cannot rectify the fault, you may need to remove the faulty transceiver from the system so that it can be repaired.

To remove the faulty transceiver while maintaining a communication path:

- ❑ Ensure the **POWER** switch on the control panel of the on-line transceiver is set to ON.
- ❑ Ensure the **SSPA** switch on the control panel of the on-line transceiver is set to ACTIVATE.
- ❑ Power down the off-line transceiver.
- ❑ Disconnect the power from the off-line transceiver, then disconnect the control and IF connections from the redundancy controller.

  This will not interrupt traffic. The redundancy controller will continue to run the on-line transceiver and receive power from the remaining PSU.

Troubleshooting the redundancy switching equipment

There are two probable types of faults for the redundancy switching equipment:

- faults in the RF switches
- faults in the redundancy controller

Faults in the RF switches

Faults in the RF waveguide switches are caused inside the switches or in the switch cables. Such faults are likely if:

- the **SWITCH FAULT** LED on the PCB of the redundancy controller is illuminated, which indicates inconsistencies from the RF switch tell-back contacts
- there is a loss of the transmit or receive signal

If these faults are indicated, continue from page 8-9, *Finding faults in an RF switch*.

Faults in the redundancy controller

Faults in the redundancy controller are caused by faults in the controller unit itself or the cables connected to the controller. These types of faults are indicated by the failure of the redundancy switching equipment when an RF waveguide switch fault is unlikely. To determine where the fault may be, continue from page 8-11, *Finding faults in the redundancy controller and cables*.

Finding faults in an RF switch

The redundancy controller monitors the RF switch tell-back contacts.

If Stream 1 is on line:

- position 1 tell-back contact should be closed to the tell-back common contact
- position 2 tell-back contact should be open

The opposite should be true when Stream 2 is on line.

If the redundancy controller detects that either tell-back contact is set incorrectly, the **SWITCH FAULT** LED illuminates.

RF switch faults might be caused by:

- an open or short in the control cable for the switch
- a jammed switch or switch that does not rotate through its full 90° arc
- a burnt-out coil in the switch

To find faults in an RF switch:

❑ Have someone listen at the RF switch for a ‘clunk’ while you manually operate the transmit and receive RF switches using the **STREAM 1**/**STREAM 2** switch on the PCB of the redundancy controller.

❑ If the RF switch sounds like it is operating, the problem may be:

- a faulty RF switch cable
- faulty tell-back contacts
- failure of the switch to rotate through its full 90° arc

To check the switch cable:

❑ Use a multimeter to check the continuity of the RF switch cable (see drawing 08-05158 or 08-05159 in Chapter 9, *Drawings*).

To check control signals from the redundancy controller:

❑ Check for the presence of 48 V DC at the Rx W/G SW terminal strip on the PCB of the redundancy controller.

If Stream 1 is selected, 48 V DC (±10 V) should momentarily appear between terminal 1 (**48V COM**) and terminal 2 (**+48V 1** for coil 1).

If Stream 2 is selected, 48 V DC should momentarily appear between terminal 1 (**48V COM**) and terminal 3 (**+48V 2** for coil 2).

❑ If separate RF switches are used, repeat the previous step for the Tx W/G SW terminal strip on the PCB of the redundancy controller.

To check an RF switch:

- ❑ Disconnect the control cable from the RF switch.
- ❑ Use a multimeter to check the resistance of the coils and tell-back contacts at the connector on the switch.

  Table 8-2 shows the expected results at RF switch position 1 and position 2.

Table 8-2: Resistance of WR137 and WR229 switch coils when the RF switch is in positions 1 and 2

RF switch	Resistance of pin A (coil 1) to pin B (common)	Resistance of pin C (coil 2) to pin B (common)	Tell-back contact
Position 1 (coil 1 open circuit)	Very high	100 Ω (WR137) 24 Ω (WR229)	D-E closed F-E open
Position 2 (coil 2 open circuit)	100 Ω (WR137) 24 Ω (WR229)	Very high	D-E open F-E closed

If both coils of an RF switch have high resistance, it is possible that the switch has burnt out. If the resistance of the coils is within the range, the switch may be jammed.

If an RF switch appears to be jammed:

- ❑ Remove the RF switch from the waveguide components and check for foreign material.
- ❑ Reconnect the control cable to the RF switch.
- ❑ Try manually operating the RF switch using the **STREAM 1**/**STREAM 2** switch on the PCB of the redundancy controller while someone observes the internal waveguide mechanism (ensure that the redundant system monitor is in Auto mode).
- ❑ If the RF switch does not move, remove the control cable and the actuator cover from the RF switch.

  Try physically rotating the RF switch by hand.
- ❑ If the RF switch functions correctly, reinstall the RF switch to the waveguide components.
- ❑ If the RF switch fails to operate correctly, bypass the switch by connecting the LNA or SSPA directly to the antenna's receive port or transmit port respectively.
- ❑ Return the RF switch to Codan for repair.

Finding faults in the redundancy controller and cables

To find faults in the redundancy controller and cables:

- ❑ If some of the LEDs on the redundancy controller are on indicating that the redundancy controller is powered, continue from page 8-11, *Checking for operational faults in the redundancy controller*.

  Otherwise, start from *Checking for supply faults in the redundancy controller.*

Checking for supply faults in the redundancy controller

To check for supply faults in the redundancy controller:

- ❑ Check that the transceivers are powered up and that the power supply units are supplying the redundancy controller with power.
- ❑ Check for 48 V DC across the PWR IN terminal strip on the PCB of the redundancy controller.
- ❑ If 48 V DC is not present, check for loose connectors and any obvious signs of damage such as burnt-out components.
- ❑ If 48 V DC is present, then check the fuses.
- ❑ If the fuses have not blown, then the power supply inside the redundancy controller is faulty. Contact your Codan representative for assistance.

Checking for operational faults in the redundancy controller

To check for operational faults in the redundancy controller:

- ❑ Remove any cable connected to the **Redundancy Controller M&C** connector on the redundancy controller.

  Disconnecting this cable removes the possibility that stream selection is under external force control.

  

  Externally applied contact closures at pin S (Force Stream 1) and pin V (Force Stream 2) of the monitor and control interface override both automatic and manual stream selection.

- ❑ Select Manual mode and change the stream selection (see page 7-7, *Operating the redundancy system in Manual mode*).
- ❑ If the redundancy controller does not change streams in Manual mode, then the redundancy controller is faulty. Contact your Codan representative for assistance.

  If the redundancy controller does change streams in Manual mode, then select Auto mode (see page 7-6, *Operating the redundancy system in Auto mode*).

- ❑ If the redundancy controller and the converters do not indicate any faults, check that the redundancy controller automatically changes streams by disconnecting the LNA coaxial cable to the on-line converter.
- ❑ If the redundancy controller indicates a stream fault on the on-line stream but does not change streams in Auto mode, then the redundancy controller is faulty. Contact your Codan representative for assistance.
- ❑ If the converter indicates a fault but the redundancy controller does not indicate the associated stream fault, check for an incorrect fault relay status from the converter at the redundancy controller end of the control cable.

  To identify the state of the relays, use a multimeter on the pins that connect to the fault relay outputs from the converter and note if the LEDs on the converter correspond (see *Chapter 6, Installation* in the *C-Band Transceiver 5700 series Reference Manual*).
- ❑ If the fault relay outputs at the cable end are correct (closed fault relay contacts for each fault indication), then the redundancy controller is faulty. Contact your Codan representative for assistance.

  If the fault relay outputs at the cable end are incorrect (no closed fault relay contacts), check for an incorrect fault relay status from the converter at the **MONITOR/CONTROL** connector.
- ❑ If the fault relay outputs at the converter interface are correct (closed fault relay contacts for each fault indication), check for an open circuit in the control cable (see drawing 08-05160 in Chapter 9, *Drawings*).
- ❑ If there is an open circuit in the control cable, replace the control cable.
- ❑ If the redundancy controller indicates a stream fault when a fault does not exist on the associated stream converter, check that the **SSPA ALARM 1** and **SSPA ALARM 2** switches are set to EXCLUDE.
- ❑ If the switches were set correctly, disconnect the associated stream control cable from the redundancy controller.
- ❑ If the redundancy controller still indicates a stream fault, then the redundancy controller is faulty. Contact your Codan representative for assistance.
- ❑ If the redundancy controller does not indicate a stream fault, then reconnect the control cable to the redundancy controller and disconnect it at the associated stream converter.
- ❑ If the redundancy controller indicates a stream fault, check for a short circuit in the control cable (see drawing 08-05160 in Chapter 9, *Drawings*).
- ❑ If there is a short circuit in the control cable, replace the control cable.
- ❑ If the redundancy controller does not indicate a stream fault, check for an incorrect fault relay status from the converter.

To identify the state of the relays, use a multimeter on the pins that connect to the fault relay outputs from the converter and note if the LEDs on the converter correspond (see *Chapter 6, Installation* in the *C-Band Transceiver 5700 series Reference Manual*).

Troubleshooting the redundant system monitor

The redundant system monitor or its associated cable are faulty if:

- the LED indicators on the redundant system monitor do not accurately reflect the status of the redundant system as shown by the LED indicators of the redundancy controller
- the control switches do not operate correctly as detailed on page 7-5, *Redundant system monitor*

Ensure no external signals are applied via the **Monitor & Control** connector on the rear panel of the redundant system monitor, and that the redundancy controller is operating correctly.

Checking for supply faults

To check for supply faults to the redundant system monitor:

- ❑ If the **On** LED on the redundant system monitor is not on, switch the +13 V Aux supply in the redundancy controller off then on again.
- ❑ If the **On** LED is still not on, disconnect the redundant system monitor.
- ❑ Switch the +13 V Aux supply off then on again.
- ❑ Check for +13 V (nominal) between pin 2 (+ve) and pin 8 (–ve) on the redundant system monitor end of the cable.

  If voltage is present, the redundant system monitor is faulty. Contact your Codan representative for assistance.
- ❑ If the voltage is not present, disconnect the redundant system monitor cable from the **Redundancy Controller M&C** connector on the redundancy controller.
- ❑ Switch the +13 V Aux supply off then on again.
- ❑ Check for +13 V (nominal) between pin A (+ve) and pin D (–ve) on the **Redundancy Controller M&C** connector.

  If voltage is present, the control cable is faulty.

  If voltage is not present, the redundancy controller is faulty (see page 8-11, *Finding faults in the redundancy controller and cables*).

Checking the LED indicators on the redundant system monitor

If the LED indicators on the redundant system monitor are not showing the correct status (see page 7-5, *Redundant system monitor*), then:

- ❑ Check the relay contact status for the LED indicator in question at the **Redundancy Controller M&C** connector on the redundancy controller (see page 6-16, *Accessing the monitor and control interface via the redundant system monitor*).

  If the relay contact status is incorrect, the redundancy controller is faulty (see page 8-11, *Finding faults in the redundancy controller and cables*).

  If relay contact status is correct, the cable may be faulty.

- ❑ Check the relay contact status at the corresponding cable connection to the redundant system monitor. For cable details, see drawing 08-05133 sheet 1 and drawing 08-05133 sheet 2 in Chapter 9, *Drawings*.

  If the relay contact status is correct, the redundant system monitor is faulty. Contact your Codan representative for assistance.

  If the relay contact status is incorrect, the cable is faulty.

- ❑ Check for an open or short circuit in the cable (see drawing 08-05133 sheet 1 and drawing 08-05133 sheet 2 in Chapter 9, *Drawings*).

Checking the control functions of the redundant system monitor

If a control function is incorrect:

- ❑ Simulate the control function in question at the **Redundancy Controller M&C** connector on the redundancy controller (see page 6-12, *Accessing the monitor and control interface*).

  If the correct function is not obtained, the redundancy controller is faulty (see page 8-11, *Finding faults in the redundancy controller and cables*).

- ❑ If the correct function is obtained, simulate the control function using the corresponding cable connection to the redundant system monitor. For cable details, see drawing 08-05133 sheet 1 and drawing 08-05133 sheet 2 in Chapter 9, *Drawings*.

  If the correct function is obtained, the redundant system monitor is faulty. Contact your Codan representative for assistance.

  If the correct function is not obtained, the cable is faulty.

- ❑ Check for an open or short circuit in the cable (see drawing 08-05133 sheet 1 and drawing 08-05133 sheet 2 in Chapter 9, *Drawings*).

Replacing fuses

Make sure that the power is switched off before replacing fuses or disconnecting power cables.

To replace a blown fuse:

- ❑ Switch off both PSUs to isolate the redundancy controller from primary power.
- ❑ Replace the blown fuse on the PCB of the redundancy controller.
- ❑ If the fuse blows again, the redundancy controller is faulty. Contact your Codan representative for assistance.

If the fuse does not blow:

- ❑ Reconnect all cables one by one.

  If the fuse blows, the last unit connected, or its cable, is faulty.

  If the fuse *does not* blow after reconnecting all cables, the original fuse may have blown because of a temporary power supply surge.
- ❑ If a problem persists, contact your Codan representative for assistance.

Reverting to a single-transceiver earth station

If it is necessary to remove the redundancy controller from the system because it is faulty, you can restore communications by reverting to a basic, single-transceiver earth station. You can either leave the RF switches in place or remove them.

To revert to a single-transceiver earth station:

- ❑ Switch off both transceivers.
- ❑ Unplug each power supply cable to the redundancy controller at the PSU.
- ❑ Remove the six control and IF coaxial cables between the redundancy controller and the transceivers.
- ❑ At the redundancy controller, unplug the two IF coaxial cables that connect to the modem or other equipment. Reconnect these cables directly to the on-line transceiver.

  If you are unsure of the position of the RF switches, use a multimeter to check the tell-back contacts at the control connector for the RF switch (see Table 8-3).

Table 8-3: Tell-back contacts for switch positions 1 and 2

Switch position 1	**Switch position 2**
D-E closed	D-E open
F-E open	F-E closed

- ❑ Make sure the **POWER** switch on the on-line converter module is set to ON.
- ❑ Make sure the **SSPA** switch on the on-line converter module is set to ACTIVATE (unless you are using remote control for SSPA activation, then the **SSPA** switch is set to REMOTE).
- ❑ Remove any remote interface cable from the **Redundancy Controller M&C** connector on the redundancy controller.
- ❑ Connect this cable directly to the **MONITOR/CONTROL** connector on the converter module.

  Transferring the Monitor and Control cable from the redundancy controller to a single transceiver enables you to maintain major control functions at your remote control location. Remote SSPA activate, SSPA inhibit and serial interface signals will still function correctly. Pin allocations do not change.
- ❑ If you need to remove a faulty RF switch, connect the SSPA module or LNA directly to the antenna feed.

If the Tx splitter option is not fitted, no gain adjustments should be necessary as the loss through the entire switch system is typically less than 1 dB.

If the Tx splitter option is fitted, the Tx attenuation should be increased by 3 dB to compensate for the removal of the Tx splitter. To set the Tx attenuation, see *Chapter 8, Operating the transceiver* in the *C-Band Transceiver 5700 series Reference Manual*.

9 Drawings

Drawings	Description
03-00919	Redundancy Controller Mounting Details
03-01036	Redundancy Controller Connector Layout
03-01037	Redundancy Controller Control Panel/PCB
03-01038	Redundant System Monitor Front and Rear Panels
08-05133 sheet 1 08-05133 sheet 2	Cable, 19-way Mil(P)–D(S)
08-05158	Cable, Waveguide switch
08-05159	Cable, Waveguide switch
08-05160	Cable, 19-way MS Control
08-05641	Cable, Power
08-05686	Cable, 15-way Control
15-40128-001	Redundancy Controller Fitting Instructions
15-40143-001 sheet 1 15-40143-001 sheet 2	Boom mounting kit, Redundant Transceiver System
15-40144-001	Fitting Details, 75 Ω Option
15-40185-001	Fitting Details, Splitter
15-40197-001	Fitting Instruction, High Power C-Band Transceiver (CE), Redundant

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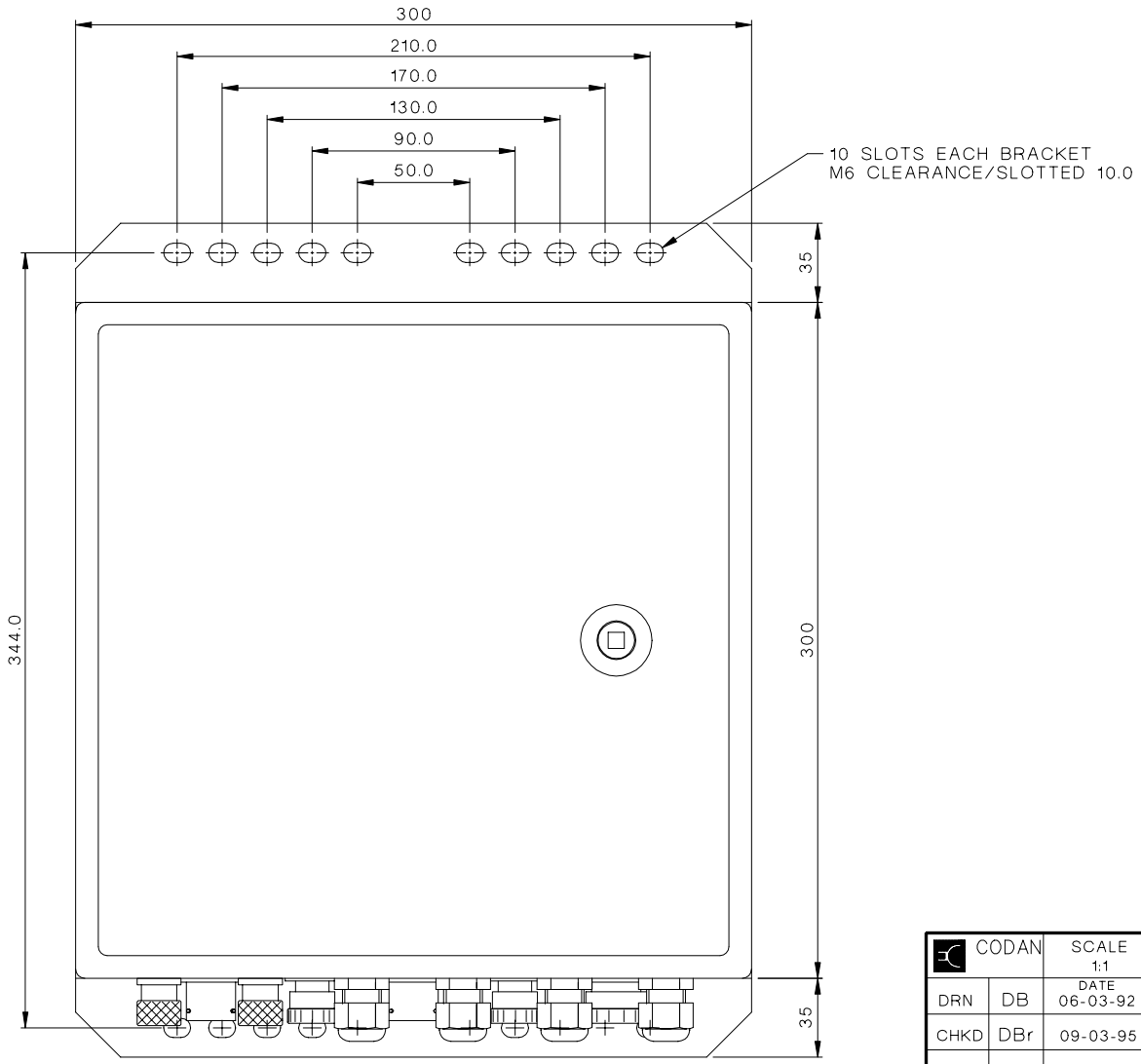
DO NOT SCALE



DIMENSIONS IN mm

ISSUE 2:
EXTERNAL DIMS
ADDED
C/R 24686
DSB 12-08-96

FILE No.
08\05156XAP.DWG

CODAN		SCALE 1:1
DRN	DB	DATE 06-03-92
CHKD	DBr	09-03-95
APPD	IRP	08-05-96

TOLERANCES
UNLESS OTHERWISE STATED

2 PLACES DEC.	±0.25
1 PLACE DEC.	±0.5
0 PLACE DEC.	±1
ANGULAR	±2°

TITLE
REDUNDANCY CONTROLLER
TYPE 5586
MOUNTING DETAILS

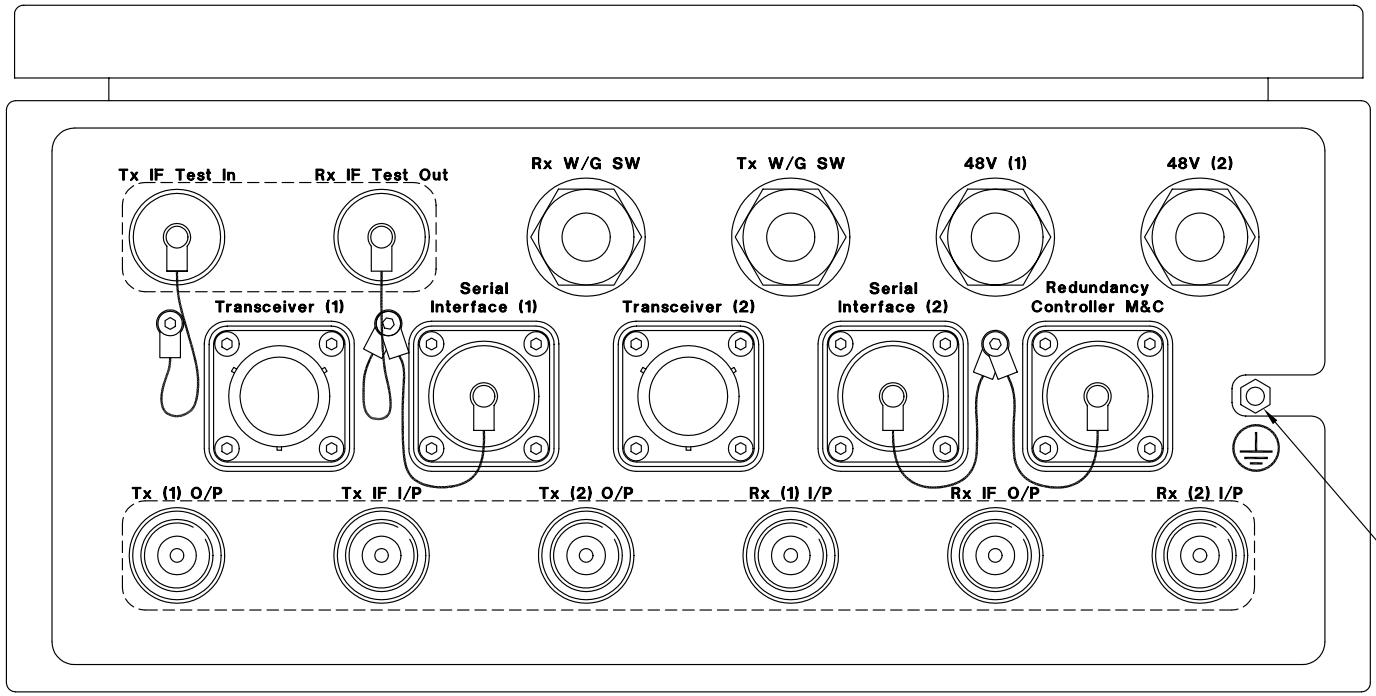
A3

DRAWING/DOC NO.
03-00919

ISS										
AA	A	1	2							SHT. 1 OF 1

DO NOT SCALE

ISSUE 2
EARTH SYMBOL, STUD & NOTE 1 ADDED.
C/R 27075
PMK 13-09-01



NOTES:
1. PROTECTIVE EARTH MUST BE CONNECTED TO GROUND

REMOVE BURRS & SHARP EDGES

DIMENSIONS IN mm

FILE No.
03\01036__2.DWG

CODAN

MATERIAL

FINISH

SCALE		1:1
DRN	SMC	DATE 19-11-99
CHKD	DB	10-12-99
APPD	GHZ	20-03-00

TOLERANCES
UNLESS OTHERWISE STATED
2 PLACES DEC. ±0.25
1 PLACE DEC. ±0.5
0 PLACE DEC. ±1

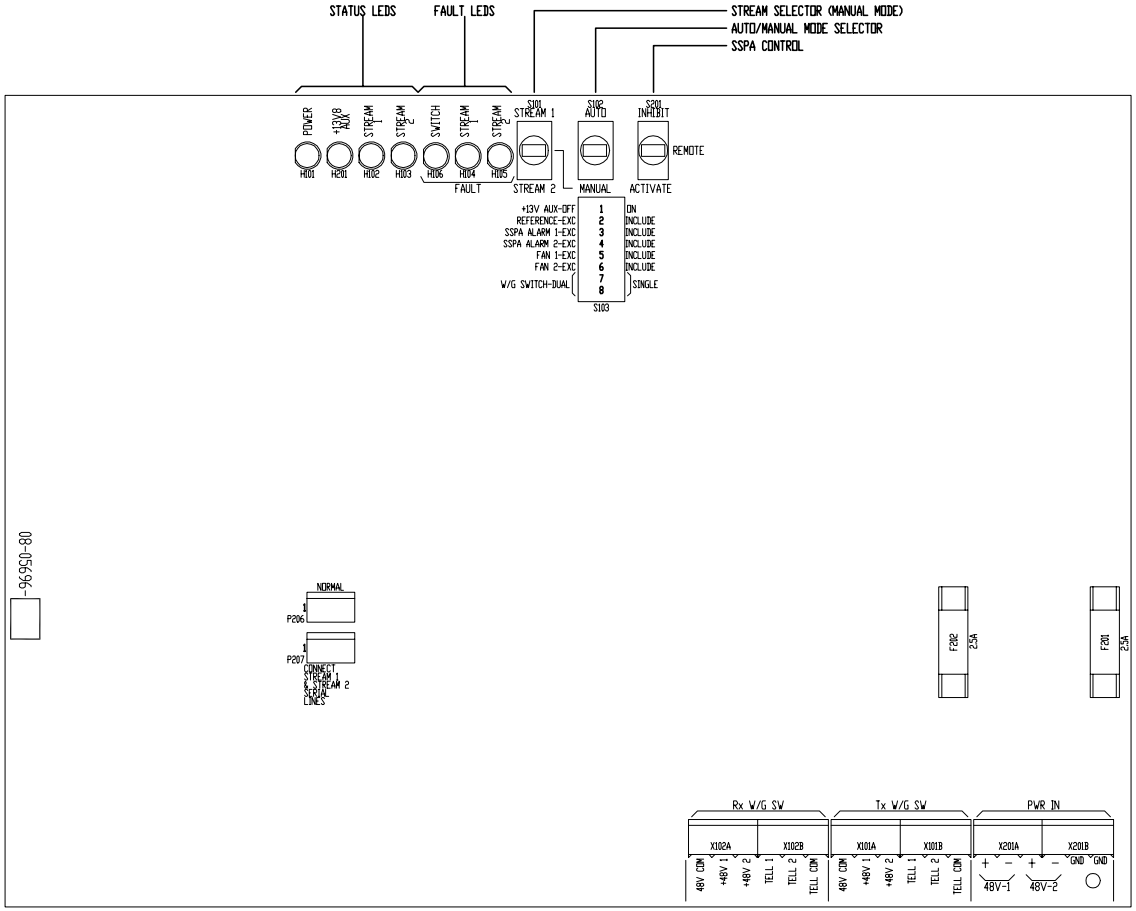
TITLE
CONNECTOR LAYOUT
TYPE 5586 "C" SERIES

A3

DRAWING/DOC NO.
03-01036

ISS A 1 2

SHT. 1 OF 1



ISSUE CHANGE

ISSUE 1:
+13V8 WAS +13V
C/N 26511
GSP 20-3-00

PCB 07-01881-02
ASSY 08-05696-001

FILE NAME 03\01037_1

CODAN

MATERIAL

FINISH

SCALE 2:1

		DATE
DRN.	C G	10-12-99
CHKD.	D.B	10-12-99
APPD.	GSP	20-3-00

TOLERANCES UNLESS OTHERWISE STATED
2 PLACES DEC ±
1 PLACE DEC ±
ANGULAR ±

REDUNDANCY CONTROLLER
'C' SERIES
CONTROL PANEL

A1

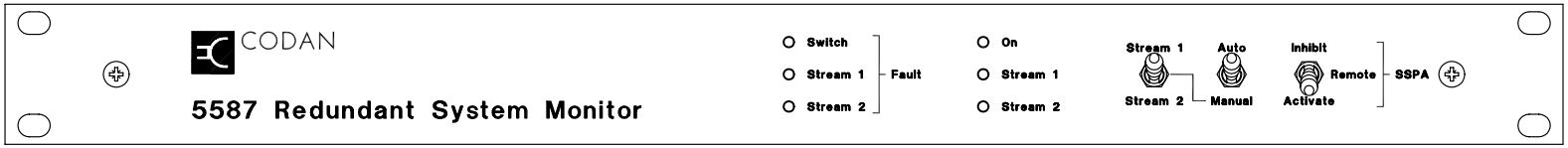
DRAWING/DOC. NO.
03-01037

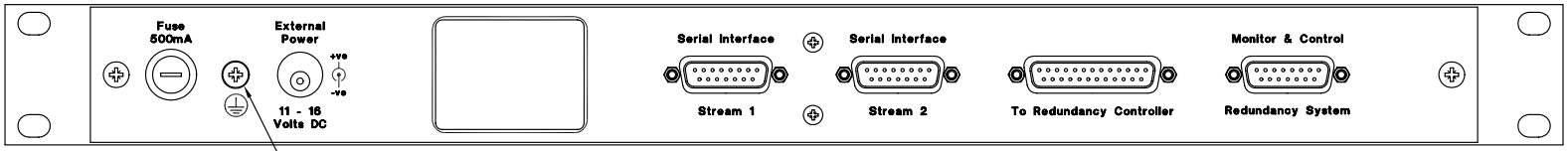
ISS A 1

SHT 1 OF 1

DO NOT SCALE

ISSUE 2
EARTH SYMBOL CHANGED. NOTE ADDED.
C/R 27075
PMK 13-09-01





NOTE: PROTECTIVE EARTH MUST BE CONNECTED TO GROUND

DIMENSIONS IN mm

FILE No.
03\01038__2.DWG

CODAN

MATERIAL

FINISH

SCALE 1:1

DRN	SMC	DATE 22-11-99
CHKD	DB	10-12-99
APPD	GHZ	20-03-00

TOLERANCES
UNLESS OTHERWISE STATED
2 PLACES DEC. ±0.25
1 PLACE DEC. ±0.5
0 PLACE DEC. ±1

TITLE
REDUNDANT SYSTEM MONITOR, "C" SERIES

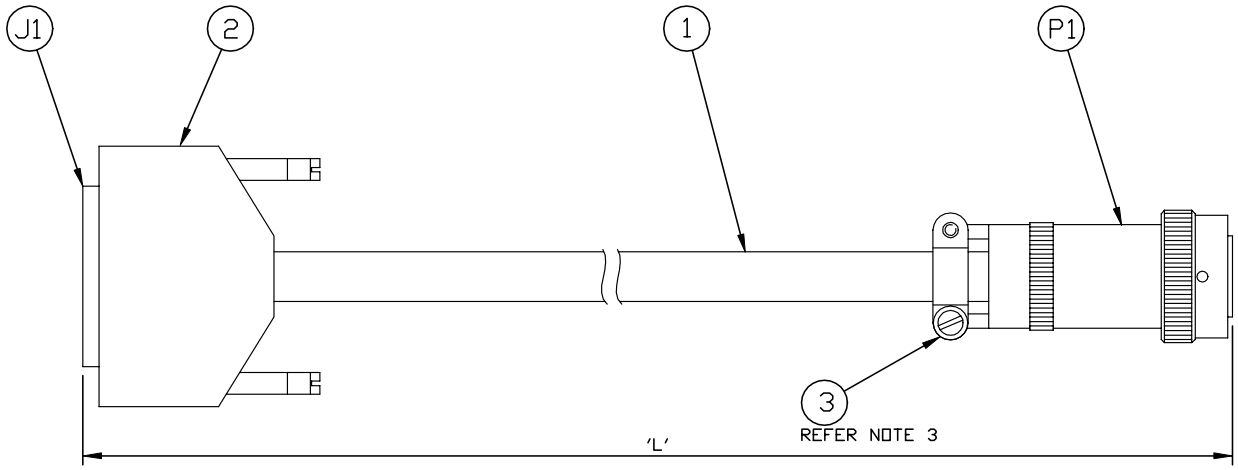
A2

DRAWING/DOC NO.
03-01038

ISS A X 2

SHT. 1 OF 1

DO NOT SCALE



COLOUR	FROM	TO
-	J1/1	-
VIOLET/WHITE	2	P1/A
YELLOW/BLUE	3	B
YELLOW/RED	4	P
WHITE/RED	5	C
BLACK	6	V
PINK	7	R
BROWN/WHITE	8	D
BLUE	9	S
VIOLET	10	E
ORANGE	11	F
-	12	-
-	13	-
-	14	-
RED/BLACK	15	M
RED/BLUE	16	L
GREY/RED	17	N
SLATE	18	K
WHITE	19	U
YELLOW	20	J
GREEN	21	T
BROWN	22	H
RED	23	G
-	24	-
SCREEN	25	SHELL

08-05133-XYZ

VARIANT XYZ LENGTH = XYZ x 1.0 METRES
TOLERANCE = ±50.0mm

ITEM	DESCRIPTION	MANUFACTURER	MANUFACTURERS PART No	CODAN PART No	QTY
1	CABLE, 19 CORE 16/0.20 SCREENED	A. F. BAMBACK	01-00471	67-01916-000	A/R
2	COVER, 25WAY SCREW-LOCK	STC-CANNON	DBBS-B	60-00259-094	1
3	LUG, SOLDER 3.5mm	W. CLIFORD	G410 CODE 330	61-30200-025	1
P1	PLUG, 19WAY MIL	ITT-CANNON	MS3116J-14-19P	60-00191-580	1
J1	SOCKET, 25WAY 'D'	ITT-CANNON	DB25S	60-00253-270	1

NOTES

1. P1 MUST BE FITTED TO THE CORRECT END OF THE CABLE TO ALLOW ALL CONNECTIONS TO BE MADE WITHOUT CROSSING WIRES.
2. WHERE TWO COLOURS ARE SPECIFIED AS THE WIRE COLOUR, THE FIRST COLOUR IS THE BODY & THE SECOND IS THE STRIPE COLOUR.
3. THE SCREEN WIRES SHOULD BE SOLDERED TO A SOLDER LUG. THE LUG IS PLACED BETWEEN THE RUBBER GROMMET & THE CABLE CLAMP AND ATTACHED TO THE CONNECTOR SHELL WITH THE CLAMP SCREW.

ISSUE B
: WHITE/BROWN WAS RED/BROWN
: WHITE/VIOLET WAS RED/VIOLET
C/R 24178
DJM 1-3-95

ISSUE 2
: VIOLET/WHITE WAS WHITE/VIOLET
: BROWN/WHITE WAS WHITE/BROWN
: GREY/RED WAS RED/GREEN
C/R 24831
I.R. PARKER 16-12-96

ISSUE 3:
ITEM 3 & NOTE 3 ADDED.
TABLE MODIFIED TO ADD SHELL TO SCREEN.
C/R 25940 ADB 27-4-99

ISSUE 4
PARTS LIST ADDED.
C/R 26361
21-12-99 GZ

FILE No.
08\05133__4.DWG

CODAN

MATERIAL

FINISH

SCALE 1:1

DRN	DB	DATE 31-8-94
CHKD	DJM	31-8-94
APPD	CM	1-6-95

TOLERANCES UNLESS OTHERWISE STATED
2 PLACES DEC. ±0.25
1 PLACE DEC. ±0.5
0 PLACE DEC. ±1
ANGULAR ±2

TITLE
CABLE, 19 WAY MIL(P) - D(S)

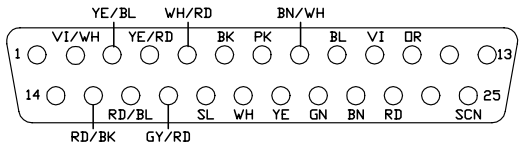
A3

DRAWING/DOC NO.
08-05133

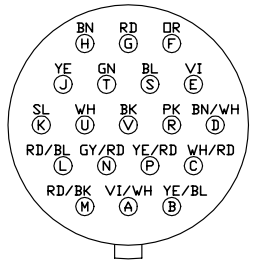
ISS 4

SHT. 1 OF 2

DO NOT SCALE



REAR VIEW OF J1



REAR VIEW OF P1

ISSUE B
: PIN COLOURS 2-11 WERE ASSIGNED TO PINS 1-10
: WH/VI WAS RD/VI
: WH/BN WAS RD/BN
C/R 24178
DJM 1-3-95

ISSUE 2
: REFER TO SHEET 1
I.R. PARKER 16-12-96

ISSUE 3:
REFER SHT 1
C/R 25940 ADB 27-4-99

ISSUE 4
REF SHT 1

FILE No.
08\05133__4.DWG

CODAN

MATERIAL

FINISH

		SCALE NTS
DRN	DB	DATE 31-8-94
CHKD	DJM	31-8-94
APPD	CM	1-6-95

TOLERANCES UNLESS OTHERWISE STATED

2 PLACES DEC.	±0.25
1 PLACE DEC.	±0.5
0 PLACE DEC.	±1
ANGULAR	±2

TITLE
CABLE, 19 WAY
MIL(P) - D(S)

A3

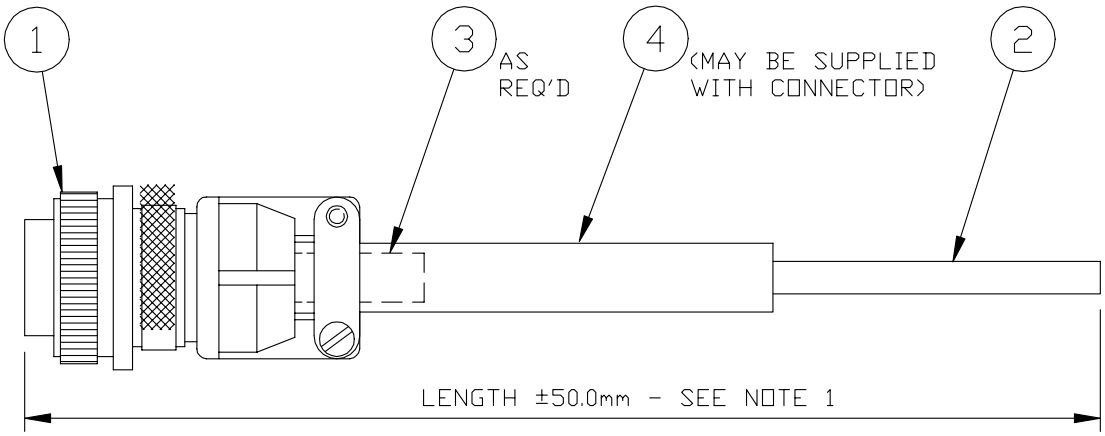
DRAWING/DOC NO.
08-05133

ISS 4

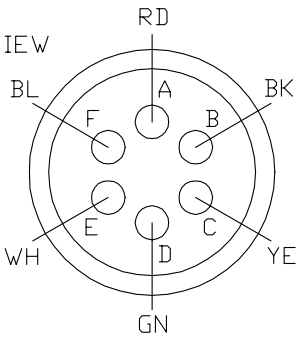
SHT. 2 OF 2

DO NOT SCALE

ITEM	DESCRIPTION	MANUFACTURER	MANUFACTURERS PART No	CODAN PART No	QTY
1	SOCKET, 6WAY MIL SCREW	ITT-CANNON	MS3106F-14S-6S	60-00064-001	1
2	CABLE, 6 CORE 16/0.20	A. F. BAMBACK	90153R	67-60604-801	A/R
3	SLEEVE, HELSYN 5x1WALLx19	HELLERMANN	H50x19mm	71-95010-190	2
4	BUSHING, TELESCOPING	ITT-CANNON	MS3420-6	60-90509-003	1



ITEM 1
REAR VIEW



PIN	WIRE
A	RED
B	BLACK
C	YELLOW
D	GREEN
E	WHITE
F	BLUE

NOTES

1. LENGTH IS DEFINED BY SUFFIX OF PART No IN METRES eg 08-05158-005 IS 5.0m LONG
2. FIT ITEM 3 AS REQUIRED TO HELP CABLE FILL BUSHING (ITEM 4).
3. INJECT SMALL AMOUNT OF SILICON SEALANT AROUND EACH JOINT BEFORE CLOSING CONNECTOR.

CCT DIAG REF 04-03063

ISSUE 1
ITEM 1 PIN DETAIL ADDED.
C/R 24606
DSB 09-08-96

ISSUE 2
NOTES 2&3 AND ITEMS 3&4 ADDED.
C/R 24757
11-12-96 IRP

ISSUE 3
PARTS LIST ADDED.
C/R 26361
21-12-99 GZ

FILE No.
08\05158__3.DWG

CODAN

MATERIAL

FINISH

SCALE 1:1

DRN	DB	DATE 3-3-95
CHKD	DB	9-3-95
APPD	DSB	21-08-96

TOLERANCES UNLESS OTHERWISE STATED

2 PLACES DEC.	±0.25
1 PLACE DEC.	±0.5
0 PLACE DEC.	±1
ANGULAR	±2

TITLE CABLE, RECEIVE/COMBINATION WAVEGUIDE SWITCH

A4

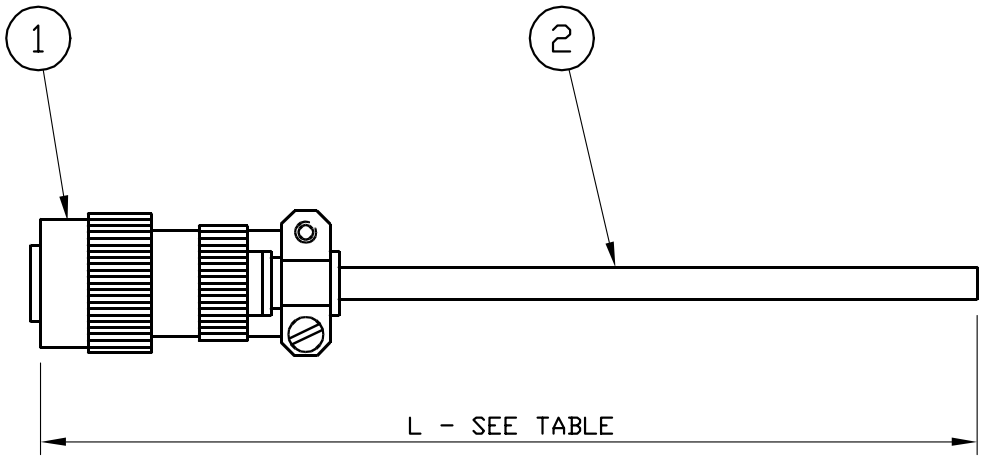
DRAWING/DOC NO.
08-05158

ISS 3

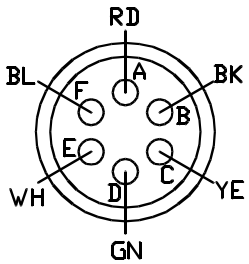
SHT. 1 OF 1

DO NOT SCALE

ITEM	DESCRIPTION	MANUFACTURER	MANUFACTURERS PART No	CODAN PART No	QTY
1	SOCKET, 6WAY MIL	ITT-CANNON	MS3116F-10-6S	60-00064-091	1
2	CABLE, 6 CORE 16/0.20	HARTLAND	HCG006	67-60604-801	A/R



PIN	WIRE
A	RED
B	BLACK
C	YELLOW
D	GREEN
E	WHITE
F	BLUE



ITEM 1
REAR VIEW

ISSUE 1
ITEM 1 PIN DETAIL ADDED.
C/R 24606
DSB 09-08-96

ISSUE 2
PARTS LIST ADDED
C/R 26361
HJK 21/12/99

ISSUE 3:
ITEM 2 MANUFACTURER WAS BAMBACK, P/N WAS 90153R.
NOTE 1 DELETED.
VARIANT TABLE ADDED
DIM NOTE CHANGED.
C/R 26603
HKJ 22-6-00

ASSEMBLY	L	TOL
08-05159-005	5m	±50mm

CCT DIA REF 04-03064

FILE No.
08\05159__3.DWG

CODAN

MATERIAL

FINISH

SCALE 1:1

DRN	DB	DATE 3-3-95
CHKD	DB	9-3-95
APPD	DSB	21-08-96

TOLERANCES UNLESS OTHERWISE STATED
2 PLACES DEC. ±0.25
1 PLACE DEC. ±0.5
0 PLACE DEC. ±1
ANGULAR ±2

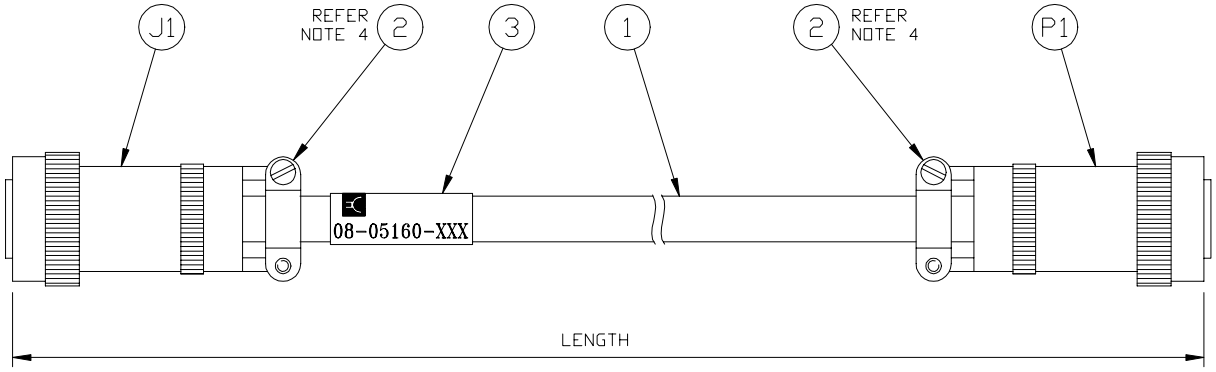
TITLE
CABLE,
WAVEGUIDE SWITCH

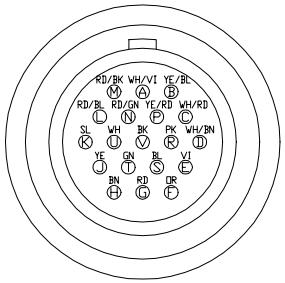
A4

DRAWING/DOC NO.
08-05159

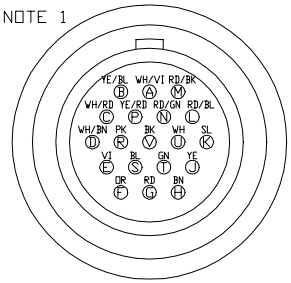
ISS									
A	1	2	3						SHT. 1 OF 1

DO NOT SCALE





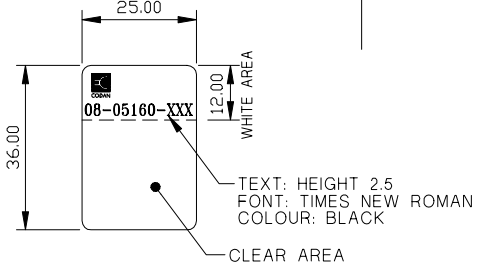
J1 - REAR VIEW



P1 - REAR VIEW

COLOUR	FROM	TO
WHITE/VIOLET	J1/A	P1/A
YELLOW/BLUE	B	B
WHITE/RED	C	C
WHITE/BROWN	D	D
VIOLET	E	E
ORANGE	F	F
RED	G	G
BROWN	H	H
YELLOW	J	J
SLATE	K	K
RED/BLUE	L	L
RED/BLACK	M	M
RED/GREEN	N	N
YELLOW/RED	P	P
PINK	R	R
BLUE	S	S
GREEN	T	T
WHITE	U	U
BLACK	V	V
BLACK	SHELL	SHELL

ITEM	DESCRIPTION	MANUFACTURER	MANUFACTURERS PART No	CODAN PART No	QTY
1	CABLE, 19 CORE 16/0.20 SCREENED	A. F. BAMBACK	01-00471	67-01916-000	A/R
2	LUG, SOLDER 3.5mm	W. CLIFORD	G410 CODE 330	61-30200-025	2
P1	PLUG, 19WAY MIL	ITT-CANNON	MS3116J-14-19P	60-00191-580	1
J1	SOCKET, 19WAY MIL	ITT-CANNON	MS3116J-14-19S	60-00194-000	1
3	LABEL	BRADY	THT-10-427-3		1



LABEL DETAIL (ITEM 3)

NOTES

1. LENGTH IS DEFINED BY SUFFIX OF P/No IN METRES, eg 08-05160-005 IS 5.0m LONG.
2. J1 & P1 MUST BE FITTED TO THE CORRECT END OF THE CABLE TO ALLOW ALL CONNECTIONS TO BE MADE WITHOUT WIRES CROSSING.
3. WHERE 2 COLOURS ARE SPECIFIED AS THE WIRE COLOUR, THE FIRST COLOUR IS THE BODY & THE SECOND IS THE STRIPE COLOUR.
4. THE SCREEN WIRES AT EACH END SHOULD BE SOLDERED TO A SOLDER LUG. THIS LUG IS PLACED BETWEEN THE RUBBER GROMMET & THE CABLE CLAMP & ATTACH TO THE CONNECTOR SHELL WITH THE CLAMP SCREW.

CCT DIAG REF 04-03065

ISSUE 2
J1 & P1 PIN DETAIL ADDED.
C/R 24606
21-8-96 DSB

ISSUE 3:
ITEM 2 & NOTE 4 ADDED.
SCREEN ADDED TO TABLE.
C/R 25940
ADB 27-4-99

ISSUE 4:
J1 REDRAWN.
C/R 26225
23-8-99 ADB

ISSUE 5
PARTS LIST ADDED.
C/R 26361
21-12-99 GZ

ISSUE 6
LABEL (ITEM 3) ADDED.
C/R 26799
06-12-00 HKJ

FILE No.
08\05160__6.DWG

CODAN

MATERIAL

FINISH

SCALE 1:1

DRN	DB	DATE 6-2-95
CHKD	DB	9-3-95
APPD	DSB	3-5-96

TOLERANCES UNLESS OTHERWISE STATED

2 PLACES DEC.	±0.25
1 PLACE DEC.	±0.5
0 PLACE DEC.	±1
ANGULAR	±2

TITLE

CABLE, CONTROL - 19 WAY

A3

DRAWING/DOC NO.

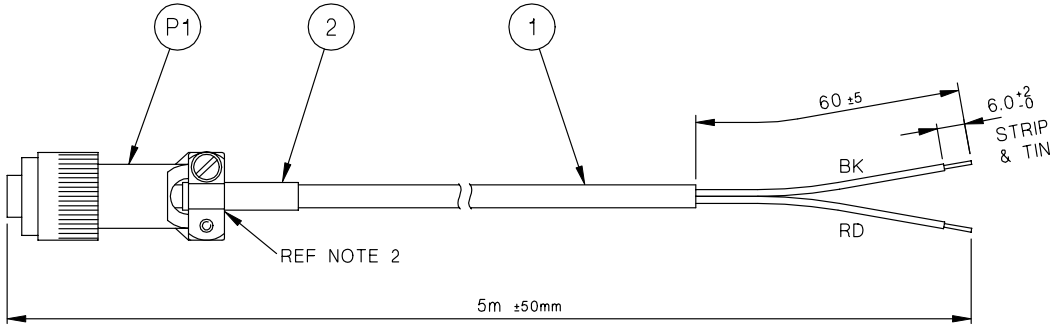
08-05160

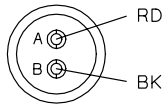
ISS 5 6

SHT. 1 OF 1

DO NOT SCALE

ISSUE B
DIM 60 TOL ADDED,
DIM 6.0 WAS 7.0 &
TOL ADDED.
C/R 25864
22-12-98 VS





P1 - REAR VIEW
SCALE 2:1

ITEM	DESCRIPTION	MANUFACTURER	MANUFACTURERS PART No	QTY
1	CABLE, 2 CORE	HARTLAND	HC2032	5m
2	TUBING, HEATSHRINK	3M	FP-301, 1/4"	25mm
P1	PLUG, 2WAY	ITT-CANNON	MS3116F8-2P	1

NOTES

1. ASSEMBLY No 08-05641-001
2. DISCARD GROMMET SUPPLIED WITH CONNECTOR.
3. INJECT A SMALL AMOUNT OF SILICON SEALANT AROUND THE SOLDERED JOINTS BEFORE CLOSING THE CONNECTOR, TO ENSURE MOISTURE CANNOT CONTACT JOINTS.
4. CAN USE AMP BOOT-LACE TERMINAL (0-0926933-1) IN LIEU OF 'TWIST & TIN'.
5. MAY USE SELF-POLYMERISING TAPE IN LIEU OF TUBING TO INCREASE CABLE DIAMETER SO THAT THE CABLE IS FIRMLY SECURED BY P1 CABLE CLAMP.

DIMENSIONS IN mm

FILE No.
08\05641__1.DWG

CODAN

MATERIAL

FINISH

SCALE 1:1

		DATE
DRN	DB	13-11-98
CHKD	NP	19-11-98
APPD	VS	21-01-99

TOLERANCES
UNLESS OTHERWISE STATED
2 PLACES DEC. ±0.25
1 PLACE DEC. ±0.5
0 PLACE DEC. ±1

TITLE
CABLE, POWER

A3

DRAWING/DOC NO.
08-05641

ISS B 1

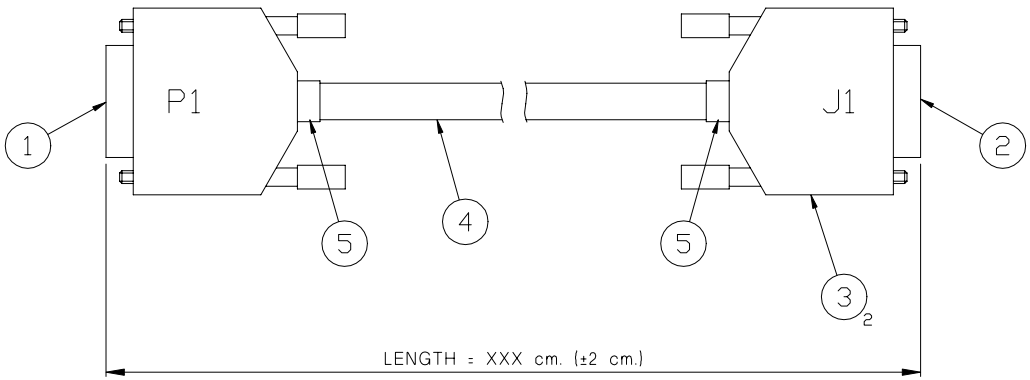
SHT. 1 OF 1

DO NOT SCALE

ITEM	DESCRIPTION	MANUFACTURER	MANUFACTURERS PART No	CODAN P/No	QTY
1	PLUG, 15 WAY D SOLDER POT FIXED	ITT-CANNON	DA-15P-K83	60-00150-092	1
2	SOCKET, 15 WAY D SOLDER POT FIXED	ITT-CANNON	DA-15S-K83	60-00153-270	1
3	COVER, 15 WAY SCREW-LOCK PLASTIC	ITT-CANNON	DA11 5500-1U	60-91638-001	2
4	CABLE, 6 CORE PLUS SCREEN	MM CABLES	B3006CS	67-00607-000	x
5	SLEEVE, HELSYN H50X19mm	HELLERMAN	5X1X19mm	71-95010-190	2
6	SLEEVING, TERYLENE (SEE NOTE 2)	JONES-STROUD	VIDAFLEX	71-80304-604	0.04m

'x' SEE NOTE 1 AND VARIANT TABLE

COLOUR	FROM	TO
WHITE	J1/2	P1/2
YELLOW	J1/3	P1/3
GREEN	J1/5	P1/5
RED	J1/8	P1/8
BLACK	J1/10	P1/10
BLUE	J1/11	P1/11
SCREEN	J1/15	P1/15



CODAN PART No.	LENGTH XXX
08-05686-050	0.5m

NOTES :

(1) FOR VARIANTS 08-05686-XXX
XXX = LENGTH IN cm.
e.g. "050" = 50 cm. OR 0.5 m.

(2) USE ITEM 6 TO INSULATE THE SCREEN CONNECTIONS TO PIN 15.

DIMENSIONS IN mm

FILE No.
08\05686__1.DWG

CODAN

MATERIAL

FINISH

SCALE 1:1

		DATE
DRN	DHB	09-02-99
CHKD	ADB	29/3/99
APPD	MJC	21/3/00

TOLERANCES
UNLESS OTHERWISE STATED
2 PLACES DEC. ±0.25
1 PLACE DEC. ±0.5
0 PLACE DEC. ±1

TITLE
CABLE,
15-WAY CONTROL, SCREW

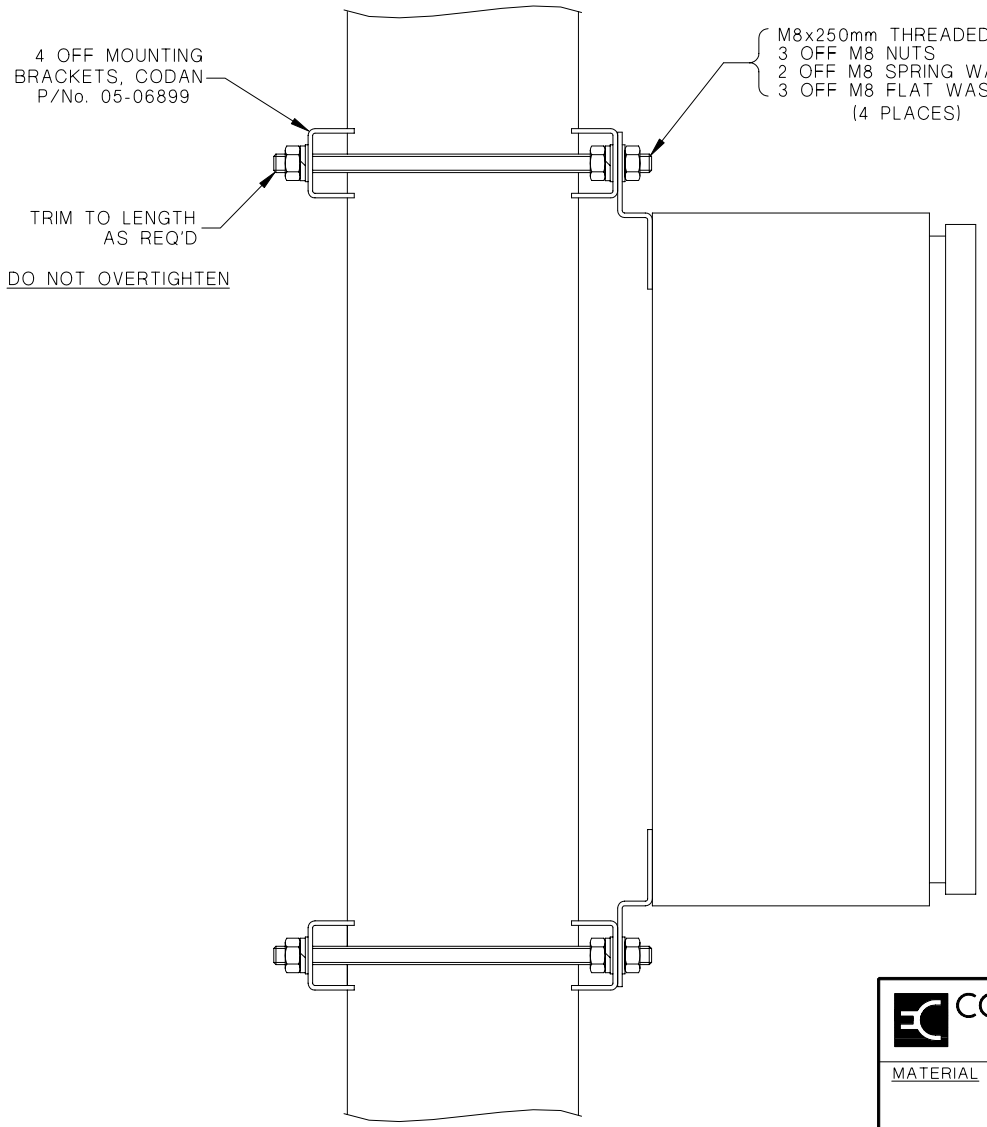
A3

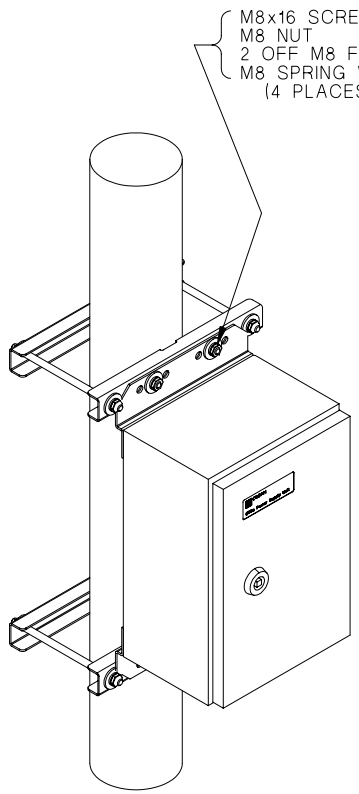
DRAWING/DOC NO.
08-05686

ISS 1

SHT. 1
OF 1

DO NOT SCALE





POWER SUPPLY SHOWN
(SCALE 1:5)

DIMENSIONS IN mm

ISSUE 2:
BALLOONS DELETED
PART DESCR ADDED
C/R 24686
DB 08-08-96

ISSUE 3:
TITLE WAS"SUPPLY MODULE/ ETC."
5580/5581 POWER SUPPLY
ISO VIEW ADDED.
C/R 25153
28-10-97 DB

ISSUE 4
TITLES MADE GENERIC
C/R 26542
02-08-01 GHZ

FILE No.
15\40128__4.DWG

CODAN

MATERIAL

FINISH

SCALE		1:2 1:5
DRN	DB	DATE 28-06-95
CHKD	DBr	29-06-95
APPD	CM	01-11-95

TOLERANCES UNLESS OTHERWISE STATED

2 PLACES DEC.	±0.25
1 PLACE DEC.	±0.5
0 PLACE DEC.	±1
ANGULAR	±2°

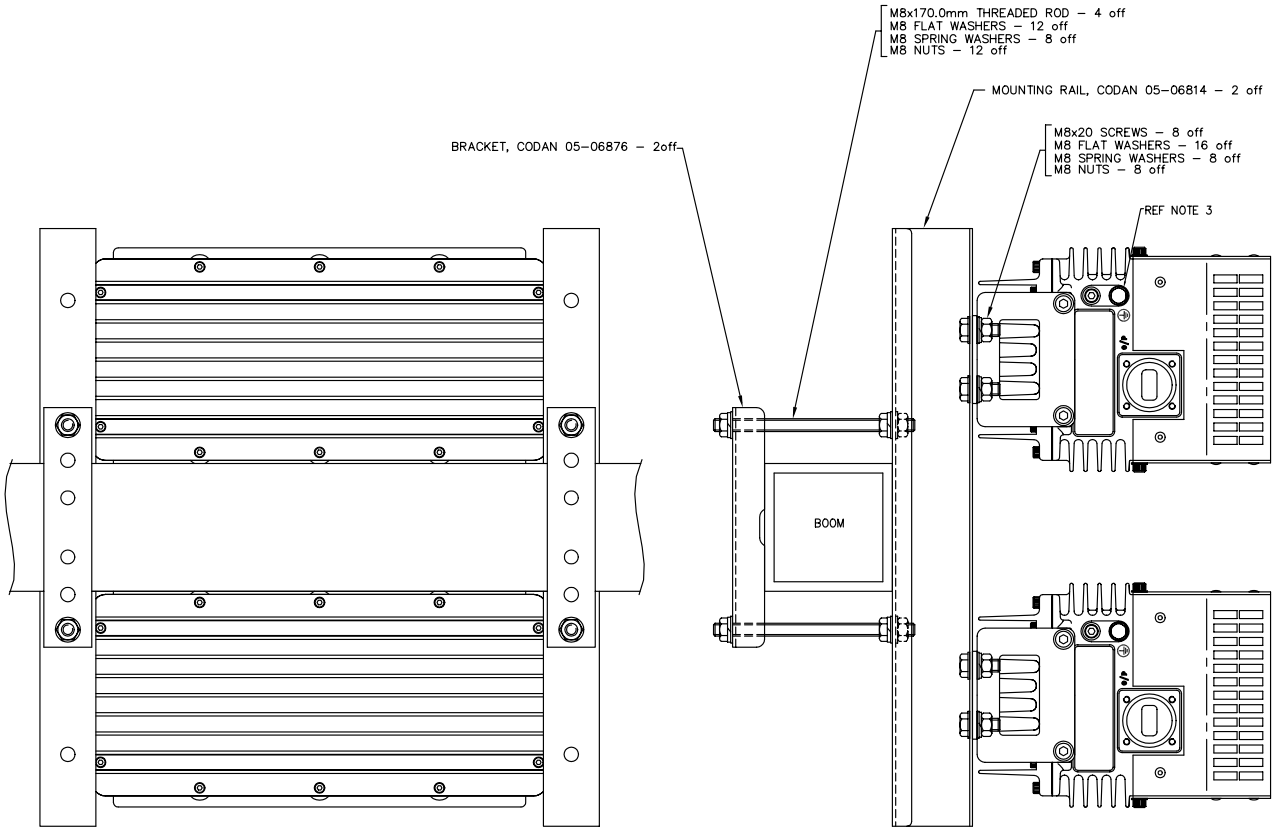
TITLE
POWER SUPPLY/ REDUNDANCY CONTROLLER FITTING INSTRUCTIONS

A3

DRAWING/DOC NO.
15-40128-001

ISS											
1	2	3	4								SHT. 1 OF 1

DO NOT SCALE



ISSUE 2
SHEETS 1 & 4 DELETED.
THIS SHEET WAS 3 of 4.
NOTE 1 UPDATED.
NOTE 2 ADDED.
TITLE WAS "SSPA MODULE,TYPE 5705,BOOM MOUNTING DETAILS".
SSPA DETAIL CHANGED.
ALSO REFER SHEET 2.
C/R 26043
29–4–99 DJM

ISSUE 3
LABEL DETAILS DELETED
EARTH SYMBOL CHANGED. NOTE 3 ADDED
ALSO REFER SHEET 2.
C/R 27075
PMK 13–09–01

FILE No.
15\401043__3.DWG

REMOVE BURRS & SHARP EDGES

NOTES:
1. REDUNDANCY BOOM MOUNTING KIT PART No. 15–40143.
2. SSPA MODULES SHOWN ARE Ku–BAND MODEL 5908.
3. PROTECTIVE EARTH MUST BE CONNECTED TO GROUND

DIMENSIONS IN mm

CODAN

MATERIAL

FINISH

SCALE NTS

		DATE
DRN	DB	16–8–96
CHKD	DSB	19–8–96
APPD	JB	19–8–96

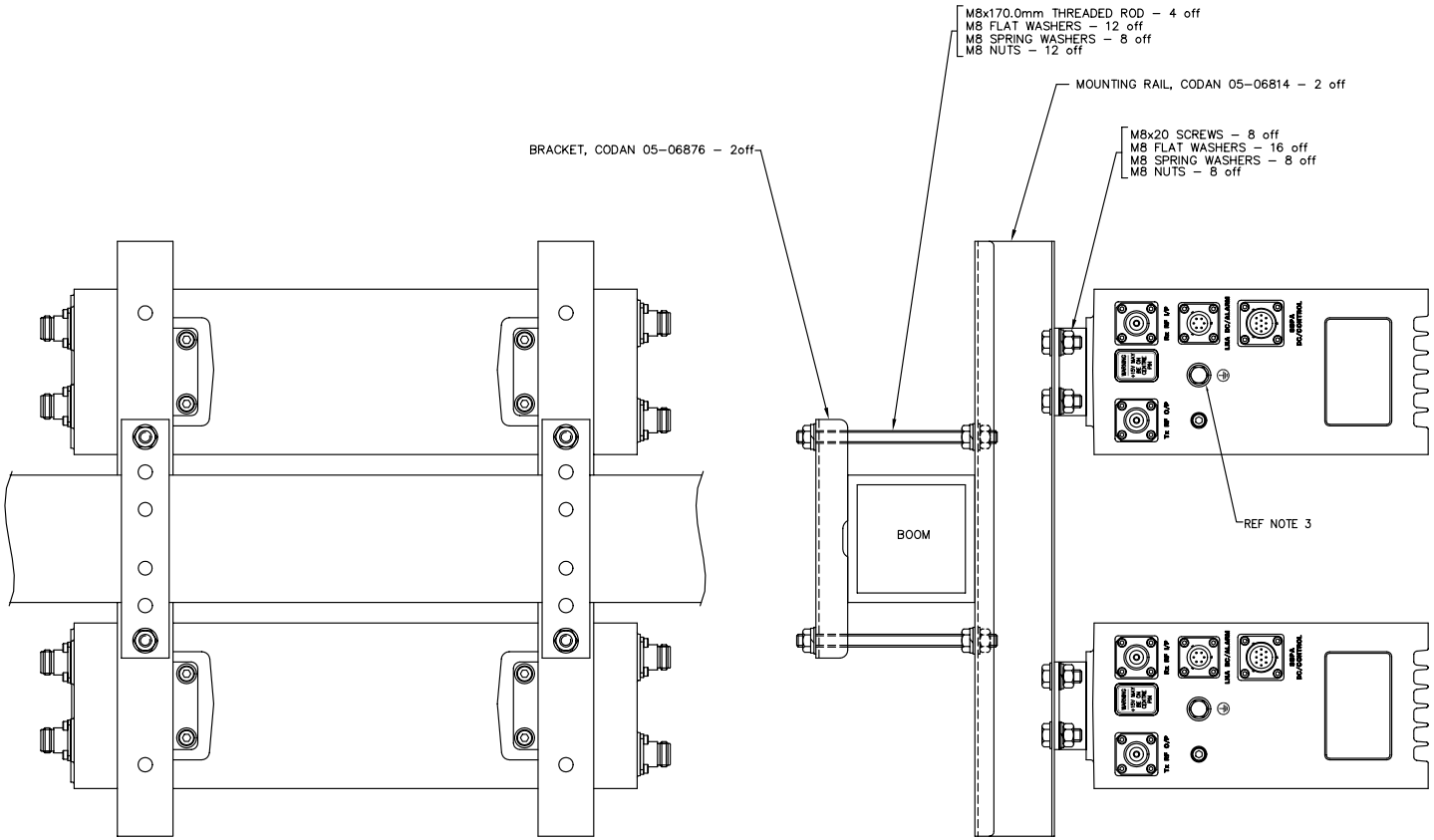
TOLERANCES
UNLESS OTHERWISE STATED
2 PLACES DEC. ±0.25
1 PLACE DEC. ±0.5
0 PLACE DEC. ±1

TITLE
SSPA MODULES
REDUNDANCY
BOOM MOUNTING DETAILS

DRAWING/DOC NO.
A3 15–40143–001

ISS K Y 2 3
SHT. 1 OF 2

DO NOT SCALE



ISSUE 2
THIS SHEET WAS 2 of 4.
NOTES 1 & 2 ADDED.
TITLE WAS "CONVERTER MODULE,TYPE 5700,BOOM MOUNTING DETAILS".
ALSO REFER SHEET 1.

ISSUE 3
LABEL DETAILS DELETED
EARTH SYMBOL CHANGED. NOTE 3 ADDED
ALSO REFER SHEET 1.
C/R 27075
PMK 13–09–01

FILE No.
15\40143__3.DWG

REMOVE BURRS & SHARP EDGES

NOTES:
1. REDUNDANCY BOOM MOUNTING KIT PART No. 15–40143.
2. CONVERTERS SHOWN ARE C–BAND MODEL 5700.
3. PROTECTIVE EARTH MUST BE CONNECTED TO GROUND

DIMENSIONS IN mm

CODAN

MATERIAL

FINISH

		SCALE NTS
DRN	DB	DATE 16–8–96
CHKD	DSB	19–8–96
APPD	JB	19–8–96

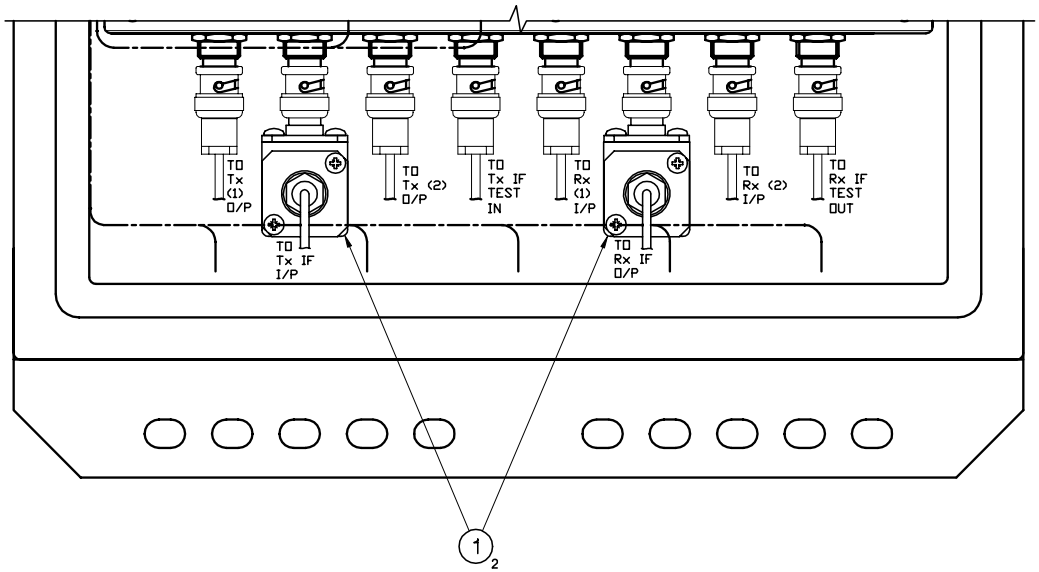
TOLERANCES UNLESS OTHERWISE STATED
2 PLACES DEC. ±0.25
1 PLACE DEC. ±0.5
0 PLACE DEC. ±1

TITLE
CONVERTER MODULES
REDUNDANCY
BOOM MOUNTING DETAILS

DRAWING/DOC NO.
A3 15–40143–001

ISS											SHT. 2 OF 2
X	Y	2	3								

DO NOT SCALE



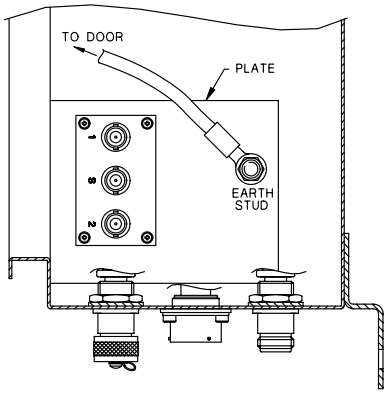
NOTES

1. DISCONNECT 2 EXISTING COAX CABLES FROM INNER PANEL.
2. FIT 75 Ohm OPTION (ITEM 1, 2off) UNDER EXISTING LOOM, AS SHOWN.
3. RECONNECT 2 COAX CABLES AS DETAILED.

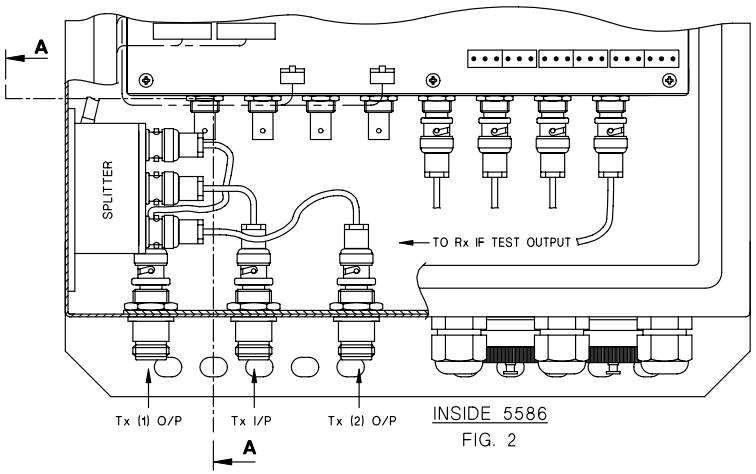
FILE No. 08\05156XAO.DWG

CODAN		SCALE 1:1	© CODAN PTY LTD, A.C.N. 007 590 605, 1996
MATERIAL	DRN DB	DATE 22-8-96	TITLE 75 Ohm OPTION FITTING DETAIL
	CHKD DSB	22-8-96	
	APPD DSB	22-8-96	A2 DRAWING/DOC NO. 15-40144-001
FINISH	TOLERANCES UNLESS OTHERWISE STATED		
	2 PLACES DEC. ±0.25		
	1 PLACE DEC. ±0.5		
	0 PLACE DEC. ±1		
	ANGULAR ±2		ISS 1 SHT. 1 OF 1

DO NOT SCALE



SECTION A-A
FIG. 1



INSIDE 5586
FIG. 2

5586 Redundancy Controller
Tx IF Splitter Option - Fitting Instructions

1. Fitting The Splitter

1.1 Completely remove the internal BNC to BNC coaxial cable connected to the Tx IF Test Input. (This cable is no longer needed)

1.2 Locate the internal BNC to BNC cable connected to the Rx IF Test Output. Temporarily disconnect the end closest to the N connector.

1.3 Remove the base from the two way splitter by carefully undoing the four corner screws.

1.4 Inside the 5586 Redundancy Controller locate a plate, fitted to the left hand wall, with four threaded holes in it.

1.5 Using the four original screws, fix the splitter to this plate with splitter port number 1 closest to the PCB. (See Fig 1)

2. Connecting the coaxial cables (See Fig 2)

2.1 Locate the coaxial cable coming from the connector marked Tx (1) O/P. Disconnect the end closest to the circuit board.

2.2 Connect this to the splitter port labelled 1.

2.3 Disconnect the BNC plug on the far end of the coaxial cable coming from the connector marked Tx I/P.

2.4 Connect this to the splitter port labelled S.

2.5 Disconnect the BNC plug on the far end of the coaxial cable coming from the connector marked Tx (2) O/P.

2.6 Connect this to the splitter port labelled 2.

2.7 Reconnect the cable originally attached to the Rx IF Test Output.

This completes the installation.

Note that the splitter will introduce a loss of between 3 dB and 3.5 dB to each transmit path. Also note that both transmit paths will now be driven continuously.

Important: Make sure you have an adequately rated load or termination for the off-line SSPA.

DIMENSIONS IN mm

FILE No.
15\40185__1.DWG

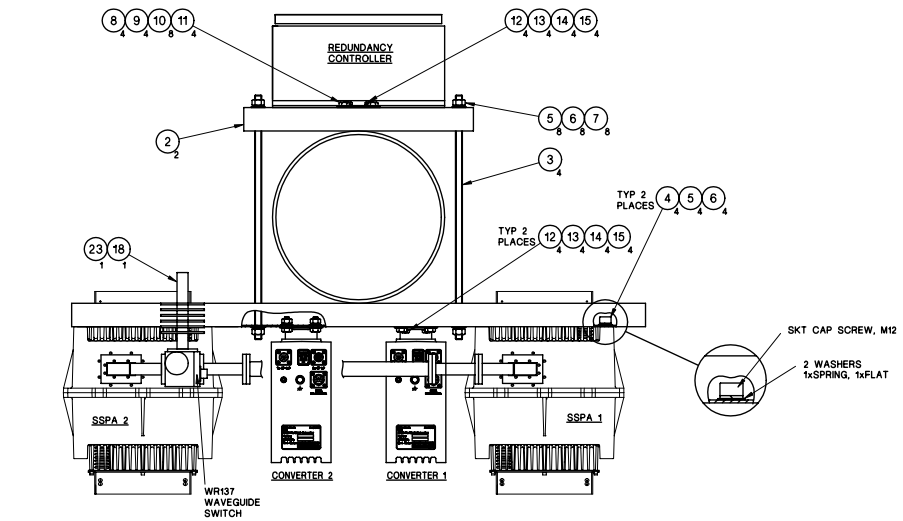
CODAN		SCALE	1:2
MATERIAL	DRN	SMC	DATE 26-5-99
	CHKD	ADB	23-6-99
FINISH	APPD	AHSI	22-09-99
	TOLERANCES UNLESS OTHERWISE STATED		
	2 PLACES DEC. ±0.10		
	1 PLACE DEC. ±0.5		
	0 PLACE DEC. ±1		

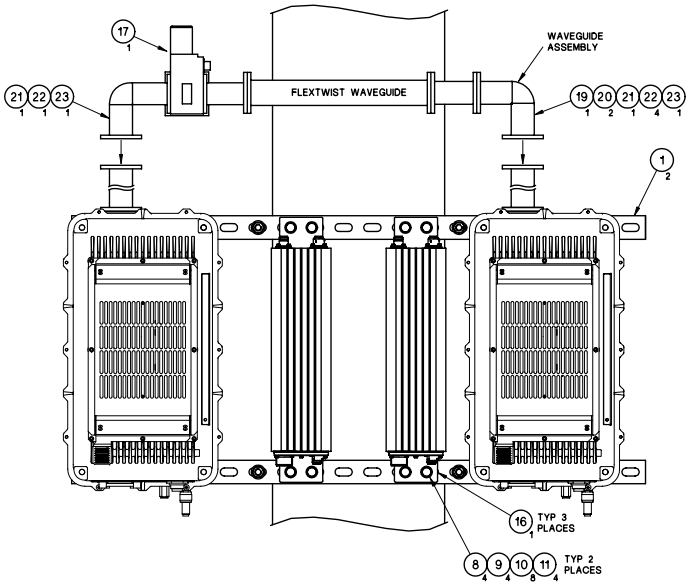
TITLE
OPTION, Tx IF
SPLITTER FITTING INSTRUCTIONS

DRAWING/DOC NO.
A3 15-40185-001

ISS A 1 | SHT. 1 OF 1

DO NOT SCALE





SUGGESTED FITTING INSTRUCTIONS

1. ASSEMBLE OUTPUT WAVEGUIDE, HIGH POWER TERMINATION AND WAVEGUIDE AS SHOWN.
2. ATTACH UPPER SLOTTED CHANNELS (ITEMS 1&2) TO POLE WITH M12 THREADED ROD (ITEM 3), M12 NUTS, FLAT WASHERS & SPRING WASHERS (ITEMS 5-7).
3. ATTACH SSPA's TO 1000mm SLOTTED CHANNEL (ITEM 1) AS SHOWN WITH M12 SCREWS, FLAT & SPRING WASHERS (ITEMS 4-6). MAKE SURE THAT THE SPACING BETWEEN THE SSPA's ALLOWS FOR THE ATTACHMENT OF THE WAVEGUIDE SUB-ASSY.
4. ATTACH LOWER SLOTTED CHANNELS (ITEMS 1&2) TO POLE WITH M12 THREADED ROD (ITEM 3), M12 NUTS, FLAT WASHERS & SPRING WASHERS (ITEMS 5-7). DO NOT OVERTIGHTEN.
5. SLIDE LOWER SLOTTED CHANNEL UNTIL LOWER MOUNTING HOLES ON SSPA's ALIGN WITH SLOTTED CHANNEL & FIT SSPA WITH M12 SCREWS, FLAT & SPRING WASHERS (ITEMS 4-6).
6. FIT 2xWIDE-SPACING BRACKETS (ITEM 16) BETWEEN SSPA's WITH M10 SCREWS, NUTS, FLAT & SPRING WASHERS (ITEMS 8-11) & TIGHTEN.
7. LOOSEN SSPA's ON SLOTTED CHANNELS & ATTACH WAVEGUIDE SUB-ASSY TO OUTPUTS OF SSPA's. TIGHTEN SSPA's ON SLOTTED CHANNELS TAKING EXTREME CARE NOT TO STRAIN WAVEGUIDE SUB-ASSY. MAKE SURE THAT THE POLE DOES NOT FOUL THE PORTS OF THE WAVEGUIDE SWITCH.
8. ATTACH 5700 CONVERTERS TO WIDE-SPACING BRKTS (ITEM 16) WITH M8 SCREWS, NUTS, FLAT WASHERS & SPRING WASHERS (ITEMS 12-15).
9. ATTACH REMAINING WIDE-SPACING BRKT (ITEM 16) ON OPPOSITE SIDE OF POLE WITH M10 SCREWS NUTS, FLAT WASHERS & SPRING WASHERS (ITEMS 8-11).
10. ATTACH 5586 REDUNDANCY CONTROLLER TO THIS WIDE-SPACING BRKT WITH M8 SCREWS, NUTS, FLAT WASHERS & SPRING WASHERS (ITEMS 12-15).
11. TIGHTEN ALL THREADED RODS & SCREWS.
12. SEAL ALL CONNECTORS WITH SELF-AMALGAMATING TAPE. ENSURE TAPE STARTS AT THE CABLE SHEATH AND CONTINUES ALL THE WAY TO THE FIXED CONNECTOR BODY ON THE EQUIPMENT.

ITEM	DESCRIPTION	QTY	ITEM	DESCRIPTION	QTY
1	SLOTTED CHANNEL, 1000mm	2	17	WR137 WAVEGUIDE SWITCH	1
2	SLOTTED CHANNEL, 400mm	2	18	WR137 HI PWR TERMINATION	1
3	M12x500mm THREADED ROD	4	19	WR137 FLEX/TWIST WG, 12"	1
4	M12x25 SKT CAP SCREW	8	20	WR137 RIGID W/G, 3"	2
5	M12 SPRING WASHER	16	21	WR137 W/G BEND, 3" x 3"	2
6	M12 FLAT WASHER	16	22	WR137 FLANGE KIT, C/W NUTS FULL	5
7	M12 HEX NUT, SELF LOCKING	8			
8	M10x40 HEX SCREW	12	23	WR137 FLANGE KIT, 12mm SCREWS FULL	4
9	M10 SPRING WASHER	12			
10	M10 FLAT WASHER	24			
11	M10 HEX NUT	12			
12	M8x20 HEX SCREW	12			
13	M8 SPRING WASHER	12			
14	M8 FLAT WASHER	24			
15	M8 HEX NUT	12			
16	WIDE SPACING BRACKET	3			

NOTES:
1. ADDITIONAL ITEMS OF HARDWARE TO THOSE LISTED ABOVE MAY BE SUPPLIED THOUGH NOT NECESSARILY USED IN ASSEMBLY.
2. WAVEGUIDE FROM WR137 WAVEGUIDE SWITCH TO ANTENNA TRANSMIT FLANGE NOT SHOWN. USE REMAINING FLANGE KIT (ITEM 23) TO MAKE THIS CONNECTION TO SWITCH.

DIMENSIONS IN mm

FILE No. 15\40197_A.DWG

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MATERIAL

FINISH

SCALE 1:4

DRN DB DATE 21-11-01

CHKD GZ 30-11-01

APPD

TOLERANCES UNLESS OTHERWISE STATED
2 PLACES DEC. ±0.25
1 PLACE DEC. ±0.5
0 PLACE DEC. ±1

TITLE
FITTING INSTRUCTION
HI-POWER C-BAND
TCVR, (CE) - REDUNDANT

DRAWING/DOC. NO.
A1 15-40197-001

ISS A

SHT. 1 OF 1

Index

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