

# **Installation and Operating handbook**

## **RCU50 Redundancy unit with Waveguide switch Control**

Handbook Issue 3.15, 28<sup>th</sup> July 2015



**EN 55022 CLASS B  
EN 50082-1  
EN 60950**



PEAK COMMUNICATIONS Ltd.  
Unit 1, The Woodvale Centre, Woodvale Road,  
Brighouse, West Yorkshire  
HD6 4AB, England

Phone 01484 714200  
Fax 01484 723666

**IMPORTANT NOTE: THE INFORMATION AND SPECIFICATIONS  
CONTAINED IN THIS DOCUMENT SUPERCEDE ALL PREVIOUSLY  
PUBLISHED INFORMATION CONCERNING THIS PRODUCT**

PEAK COMMUNICATIONS Ltd maintains a continuing programme of product improvement and therefore reserves the right to change specifications without notice

## **INTRODUCTION**

The RCU50 system consists of an integrated LNB driver system with a current monitoring system. The unit is housed in a 1U rack and gives an output to drive a remote waveguide switch.

## **EMC AND SAFETY**

### **EMC**

The RCU50 Redundancy control system has been designed to comply with the following standards;

Emissions : EN 55022 Class B; Limits and methods of measurement of radio interference characteristics of Information Technology Equipment.

Immunity : EN 50082 Part 1; Generic immunity standard, part 1: Domestic, commercial and light industrial environment.

The equipment must be operated with its lid on at all times. If it is necessary to remove the lid for routine servicing or fault finding then it is essential that the lid is fitted back correctly before normal operation.

For the Alarm and Remote Control data interfaces all 'D' type connectors must have grounding fingers on the plug shell to guarantee continuous shielding. The back-shells must comply to the requirements of VDE 0871 and FCC 20708, providing at least 40 dB of attenuation from 30 MHz to 1 GHz.

Connecting cables must be of the shielded

**Operation of the equipment in a non standard manner will invalidate compliancy to these standards.**

### **Safety**

To ensure safety of operator the RCU50 Redundancy control unit has been designed to comply with the following safety standard;

EN 60950 Safety of information technology equipment, including electrical business machines.

Before operation the user must ensure that the installation complies with the information given.

The equipment is designed to operate in a static 19 inch rack system conforming to IEC 297-2. Operation of the equipment in transportable vehicles equipped with the means of providing a stable environment is permissible. Operation of the equipment on board vehicles, ships or aircraft without means of environmental conditioning will invalidate the safety compliancy; please contact the factory for further advice. Operation of the equipment in an environment other than that stated in the specifications will also invalidate the safety compliancy. The equipment must not be operated above 2000 metre altitude, extremes of temperature; excessive dust, moisture or vibration; flammable gases; corrosive or explosive atmospheres.

### **Installation**

The equipment is classified in EN 60950 as a pluggable equipment class A for connection to the mains supply, as such it is provided with a mains inlet cord suitable for use in the country of operation. In normal circumstances this will be of an adequate length for installation in the rack. If the mains cord proves to be too short then any replacement must have a similar type fuse (if fitted) and be manufactured to similar

specification: check for HAR, BASEC or HOXXX-X ratings on the cable. The connector ends should be marked with one of the following : BS1636A (UK free plug 13 amp); BSI, VDE, NF-USE, UL, CSA, OVE, CEBEC, NEMKO, DEMKO, SETI, IMQ, SEV and KEMA-KEUR for the IEC 6 amp free socket. Schuko and North American free plugs must have similar markings.

The installation of the equipment and the connection to the mains supply must be made in compliance to local or national wiring regulations for a category II impulse over voltage installation. The positioning of the equipment must be such that the mains supply socket outlet for the equipment should be near the equipment and easily accessible or that there should be another suitable means of disconnection from the mains supply. The RCU50 unit has 2 power inlets and caution should be taken to avoid high voltages generated from 2 out of phase supplies.

The equipment is designed to operate from a TN type power supply system as specified in EN 60950. This is a system that has separate earth, line and neutral conductors. The equipment is not designed to operate with an IT power system which has no direct connection to earth.

## UNIT DESCRIPTION

### RCU50 Redundancy control unit

#### Overview

The RCU50 is designed to monitor the current taken by 2 redundant external reference LNBS. In the absence of current or in an over current condition the faulting path is failed and the output switched to the other path. Dual power supplies are provided to enable the user to use power as available.

#### LNB units

The 2 LNBS are bolted to a remote waveguide switch. The RCU50 supplies power and a 10MHz reference simultaneously to the LNBS and monitor their health according to the power taken. If a cable becomes disconnected or shorted the power consumption down the feed/L-Band cable will be out of the control band set by the unit. If the current is below 150mA or above 500mA the LNB is deemed not to be working and the system switches to the other LNB if that unit is not also in alarm. Typical types of suitable LNB is a 1000X series from Norsat for Ku Band.

#### Operation

There is an internal transfer switch which works on tandem with the remote waveguide switch. Both of the switches have tellbacks which tell the microprocessor that the switch has successfully changed over. The front panel switches control the state of these switches and set which LNB is being used and the priority for changeover. Remote control is also selectable on the front panel.

Both LNBS are simultaneously fed with power and 10MHz locking frequency to ensure the system is stable and the changeover from one LNB to the other loses minimum traffic. The internal switch only switches the L-Band outputs and not the power or 10MHz reference to the LNBS. LNB1 should be connected to the rear panel N Type connector marked A1. LNB2 should be connected to the rear panel N Type connector marked B1.

Internally the 10MHz reference is split for each LNB and each half is then fed to a combiner which combines the input 10MHz with the L-Band output from that LNB. A low pass filter in the 10MHz line ensures the L-Band output does not pass from one side to another through the 10MHz link. The L-Band output from each combiner/splitter is fed to the 2 input ports of the transfer switch. A high pass filter is in each output line to remove any 10MHz that may be present on the outputs. The 2 outputs from the transfer are fed to the rear panel and are labeled UA1 (L-BAND OUTPUT) and UB1 (MONITOR)

#### RCU50 front panel

The RCU50 Redundancy control unit front panel has five indicator LED's marked:

POWER	Lit GREEN when status of 5 Volt supply is OK
SUMMARY ALARM	Normally lit GREEN but will turn RED with any internal unit failure or external failure from a converter which causes an alarm
REMOTE	Lit Orange when in REMOTE mode
AUTO	Lit Orange when in AUTO mode
PSU OK	PSU Failure - cuts power to internal coaxial switch to prevent unwanted 'grey' switching.

### RCU50 Rear panel connections

INTERFACE Interface to remote waveguide switch is through a chassis mounted 15-way D-Type male connector. Connection of the waveguide switch should be done with the RCU power off where possible.

A Pulsed	1	9	A Pulsed
A Pulsed	2	10	A Pulsed
Ground	3	11	Ground
Ground	4	12	Ground
B Pulsed	5	13	B Pulsed
B Pulsed	6	14	B Pulsed
A Online Tellback	7	15	Common Tellback
B Online Tellback	8		

### Internal configuration of Redundancy control unit

RS485 - 232 address/ baud rate configuration switches

No	Colour	Function
1	Brown	RS485 address select
2	Red	RS485 address select
3	Orange	RS485 address select
4	Yellow	RS485 address select
5	Green	Baud Rate select
6	Blue	Baud Rate select
7	Violet	Not used
8	Grey	Not used

Baud rate selection with switches 5 & 6 (0=off)

5	6	Baud rate
0	0	300
0	1	2400
1	0	4800
1	1	9600

RS485 unit address with switches 1 - 4 (0=off)

Note addresses have been started at 32 to avoid any possible conflict in reading data

4	3	2	1	Address
0	0	0	0	32
1	0	0	0	33
0	1	0	0	34
1	1	0	0	35
0	0	1	0	36
1	0	1	0	37
0	1	1	0	38

1	1	1	0	39
0	0	0	1	40
1	0	0	1	41
0	1	0	1	42
1	1	0	1	43
0	0	1	1	44
1	0	1	1	45
0	1	1	1	46
1	1	1	1	47

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The Telltales are grounding signals from the waveguide switch to show position

The Summary Alarm gives a switched indication of the alarm status. Note If Normally closed is joined to Common then the unit is in alarm.

The outputs to power the waveguide switch on pins 1,2,9,10 and 5,6,13,14 should be wired so within each set, the four pins are connected together to give lower contact resistance. Ground can be taken from pins 3,4,11,12 and should all be wired together to again give lower contact resistance. The power out on pins 1,2,9,10 or 5,6,13,14 is at 24Volts pulsed for 1 second and can have a maximum current drain of 1.75 Amperes.

If the waveguide switch does not change (the tellbacks are not detected) the unit will continue to pulse the power and alarm the RCU50 unit.

**Mains Power connections**

The unit is supplied with dual power supplies. Whichever side is powered first latches the internal relays and uses power from that side. Voltage selection (235/110) is done by the pull out part of the mains connector.

Note! If you connect to 110 Volts make sure you put it back again as 235 volts will blow the fuses and may cause damage

## REMOTE CONTROL INTERFACING

RCU50 Redundancy control system unit may be monitored and controlled remotely either via a RS485 multidrop bus or RS232. The connection is made via the 15 way D type on the rear of the RCU Redundancy control unit and configured as described earlier. If the Redundancy control unit has the Ethernet option fitted then the unit cannot be controlled via RS232/485 however it can be controlled via its inbuilt web page, TCP and SNMP these are described in the next section.

The unit transmits and receives data serially in an asynchronous format using the standard ASCII character set. The serial data consists of message frames composed of the following message characters: STX, BYTE COUNT, DEVICE ADDRESS, INSTRUCTION, BODY, CHECKSUM, ETX. All characters are compulsory except for the message body. The presence of a message body is determined by the message type (INSTRUCTION). The total number of message characters in a message frame may range from a minimum of 6 to a maximum of 255.

The remote control follows the following protocol: (in byte form)

[STX] start of message character #02.

[B] char defining how many characters are in the message including the STX & ETX parts.

[A] **Address of unit.** Address ranges from ASCII character 32 to 47. (configurable via dip switches - see earlier)

[I] **Instruction number.**

The possible instructions are:

STATUS REQUEST character 32

STATUS REPLY character 33

CONFIGURE character 34

ETHERNET character 4

[MESSAGE]

numerous characters from length 0 upwards. If no message present enter a 0.

[CHKSUM]

The checksum is used to verify the accuracy of the message frame. The checksum is defined as the summation of all the bytes in the message, *beginning* with the 3rd byte (DEVICE ADDRESS) and extending through the body of the message, *ending* with the last byte before the checksum. The total of the bytes is then ANDed with 255 so that the checksum is truncated to a single byte.

[ETX] End of transmission character #03

All message to and from the unit follow the above protocol with a character format of 8 data bits, one stop bit, no parity, baud rate 300, 2400, 9600 or 19200. Note that all numeric values are shown as **decimal**.

## Message Information

Status Request message:

In order to find out the STATUS of the unit a status request message must be sent.

Message Byte No.	Set Value / (example)	Length (bytes)	Description
1	02	1	STX
2	6	1	No of bytes in message
3	?	1	Address
4	32	1	Message instruction
5	?	1	Checksum
6	03	1	ETX

The unit would then reply with a STATUS REPLY message.

### Status Reply message

This message tells the host computer the status of the unit.

#### RCU50PO reply:

Message Byte No.	Set Value / (example)	Length (bytes)	Description
1	02	1	STX
2	14	1	No of bytes in message
3	?	1	Address
4	33	1	Message instruction
5	'O'	1	Position of the UNIT SELECT switch 'A' or 'B' or 'O' ( 'O' = AUTO) ( 'A' = UNIT A) ( 'B' = UNIT B)
6	'R'	1	Position of the remote/local switch 'R' or 'L' ( 'R' = Remote) ( 'L' = Local )
7	'A'	1	Coax switch position 'A', 'B' or 'S', ( 'A' = UNIT A) ( 'B' = UNIT B) ( 'S' = Standby)
8	'1'	1	Summary alarm status '0' or '1' (0 = Alarm) (1 = OK)
9	'1'	1	Unit A online status '0' or '1' (0 = Offline) (1 = Online)
10	'1'	1	Unit A alarm status '0' or '1' (0 = Alarm) (1 = OK)
11	'0'	1	Unit B online status '0' or '1' (0 = Offline) (1 = Online)
12	'1'	1	Unit B alarm status '0' or '1' (0 = Alarm) (1 = OK)
13	?	1	Checksum
14	03	1	ETX



## Configure Message

This message is sent to the unit, when the host computer wishes to change which unit or units are to be on line. When the message has been received by the unit a Status reply message will be sent back by the unit.

The command will only change the state of the unit IF the unit is in REMOTE mode. The actual position of the switch is overridden but the indicators on the front panel show the actual status.

Message Byte No.	Set Value / (example)	Length (bytes)	Description
1	02	1	STX
2	7	1	No of bytes in message
3	?	1	Address
4	34	1	Message instruction
5	'O'	1	Position of the UNIT Select switch "O" or "A" or "B"
6	?	1	Checksum
7	03	1	ETX

### Ethernet Settings Status Message

This message is sent to the unit, when the host computer wishes to query the Ethernet settings, subject to the fitting of the Ethernet option.

Message Byte No.	Set Value / (example)	Length (bytes)	Description
1	02	1	STX
2	7	1	No of bytes in message
3	?	1	Address
4	4	1	Message instruction
5	'1'	1	Ethernet Message sub instruction
6	?	1	Checksum
7	03	1	ETX

The unit then responds with the following message:

Message Byte No.	Set Value / (example)	Length (bytes)	Description
1	02	1	STX
2	7	1	No of bytes in message
3	?	1	Address
4	5	1	Message instruction
5	'1'	1	Ethernet Message sub instruction
6	'0'	1	DHCP (0 = Disabled) (1 = Enabled)
7	' '	1	Separator character
8	"192.168.000.025"	15	Ipv4 address
23	' '	1	Separator character
24	"255.255.255.0"	15	Subnet mask
39	' '	1	Separator character
40	"192.168.000.010"	15	Gateway address
55	' '	1	Separator character
56	'0'	1	SNMP (0 = Disabled) (1 = Enabled)
57	' '	1	Separator character
58	"192.168.000.032"	15	SNMP trap address
73	?	1	Checksum
74	03	1	ETX

## Ethernet Configure Message

This message is sent to the unit, when the host computer wishes to change the Ethernet settings of the unit, subject to the fitting on the Ethernet option. The unit does not need to be in remote mode for this to be achieved.

The layout of the configure message follows that of the status reply shown above.

Message Byte No.	Set Value / (example)	Length (bytes)	Description
1	02	1	STX
2	7	1	No of bytes in message
3	?	1	Address
4	6	1	Message instruction
5	'1'	1	Ethernet Message sub instruction
6	'0'	1	DHCP (0 = Disabled) (1 = Enabled)
7	' '	1	Separator character
8	"192.168.000.025"	15	Ipv4 address
23	' '	1	Separator character
24	"255.255.255.0"	15	Subnet mask
39	' '	1	Separator character
40	"192.168.000.010"	15	Gateway address
55	' '	1	Separator character
56	'0'	1	SNMP (0 = Disabled) (1 = Enabled)
57	' '	1	Separator character
58	"192.168.000.032"	15	SNMP trap address
73	?	1	Checksum
74	03	1	ETX

When changing IP address or DHCP the unit will have to restart, it may take a few seconds for you to be able to communicate with it again.

### TCP Port Status Message

This message is sent to the unit, when the host computer wishes to query the TCP port number, subject to the fitting of the Ethernet option.

Message Byte No.	Set Value / (example)	Length (bytes)	Description
1	02	1	STX
2	7	1	No of bytes in message
3	?	1	Address
4	4	1	Message instruction
5	'2'	1	TCP port sub instruction
6	?	1	Checksum
7	03	1	ETX

The unit then responds with the following message:

Message Byte No.	Set Value / (example)	Length (bytes)	Description
1	02	1	STX
2	7	1	No of bytes in message
3	?	1	Address
4	5	1	Message instruction
5	'2'	1	TCP port sub instruction
6	"4000"	4	TCP Port number
7	?	1	Checksum
8	03	1	ETX

### TCP Port Status Message

This message is sent to the unit, when the host computer wishes to change the TCP port setting of the unit, subject to the fitting on the Ethernet option. The unit does not need to be in remote mode for this to be achieved.

The layout of the configure message follows that of the status reply shown above.

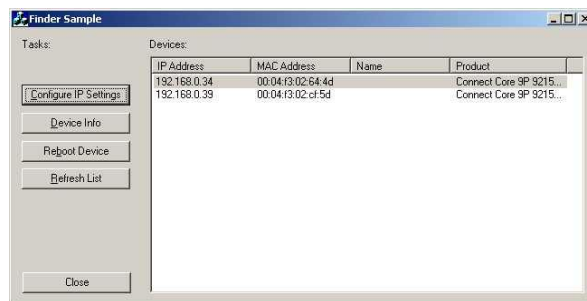
Message Byte No.	Set Value / (example)	Length (bytes)	Description
1	02	1	STX
2	7	1	No of bytes in message
3	?	1	Address
4	6	1	Message instruction
5	'2'	1	TCP port sub instruction
6	"4000"	4	TCP Port number
7	?	1	Checksum
8	03	1	ETX

## ETHERNET CONTROL

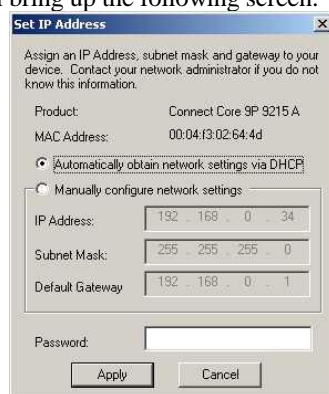
As mentioned previously, if the RCU50 Redundancy control system unit has been fitted with the Ethernet option the unit can be controlled via its in built web page, TCP or SNMP.

Due to a lack of front panel on these units, it is not possible to display the IP address and other Ethernet settings to the user easily. In order to discover the IP address and other Ethernet settings, initially only, the Peak discovery windows programme needs to be run.

This software is available off the Peak website, when run it lists the units on the network, and allows the user to view and modify, if necessary, the Ethernet settings to suit the user's network



The Configure IP settings button will bring up the following screen:



This allows the changing of the Ethernet settings, the initial password is "password", after the initial settings change, it will change to "PEAKpass123", and is case sensitive.

In order for the new settings to be used the unit must be restarted by cycling the power.

## Webpage

The webpage is essentially split into two screens, Status and Configure, each one accessible via the links part way down the screen. The webpage is displayed by entering the unit's IP address into a normal web browser.



## TCP

The units can be controlled via TCP, this involves sending the normal RS232/485 commands to the unit through a TCP port. The TCP port to be used is set by the user via one of the remote control interfaces.

## SNMP

The units can be controlled via SNMP, the MIBS necessary for this have been provided with the unit on CD. Please refer to the Peak-Agents.MIB file, as this shows which of the MIBS supplied is used for the unit in question.