CCU Rack

General Overview and Operation Manual

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1. General

1.1. Introduction

The CCUR provides a local Inter-Communication point between CCU modules within a CCU Net system. The CCUR gives customers the advantage of using multiple types of CCU while been able to have them communicate together using one common protocol (CCUNet).
The functionality of the CCUR is to provide power, communication and CCU fault reporting between numerous and varied CCU's.

This document is aimed at a technical audience so that they may be able to understand and evaluate the operation of a CCUR.
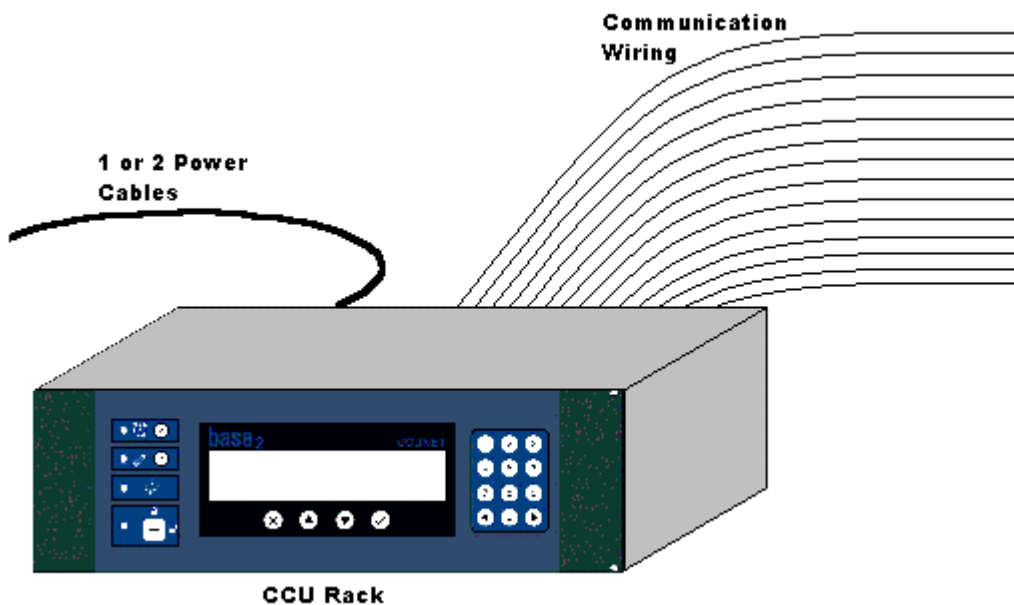
Figure 1: Overall CCUR Integration

1.2. Scope of this document

The purpose of this document is to give a simplified outline of the complete configuration of a CCUR. The text below should provide a once off referral to be read by a technical audience that has little knowledge of a CCUR. A clarified description of the CCUR's operation, including both hardware and software, shall be combined to display the racks full integration.

1.3. Intended Audience

Incheon International Airport Korea Technical Staff, Base 2.

2. *Hardware Components*

The CCUR has 3 main hardware components. These being the User Interface with LCD display, the power supply and the backplane with CCU card slots. Each of which integrate to implement the CCUR's functionality.

2.1 CCUR Power Supply

There are two power supply configurations supported by the CCUR. The first being a single primary supply and the second, a primary supply with a redundant backup supply (used in the event of a primary supply failure). Each power supply populates 3 slots in the rack and is combined with a power supply CCU. Multiple CCUR systems utilise this CCU for communication between
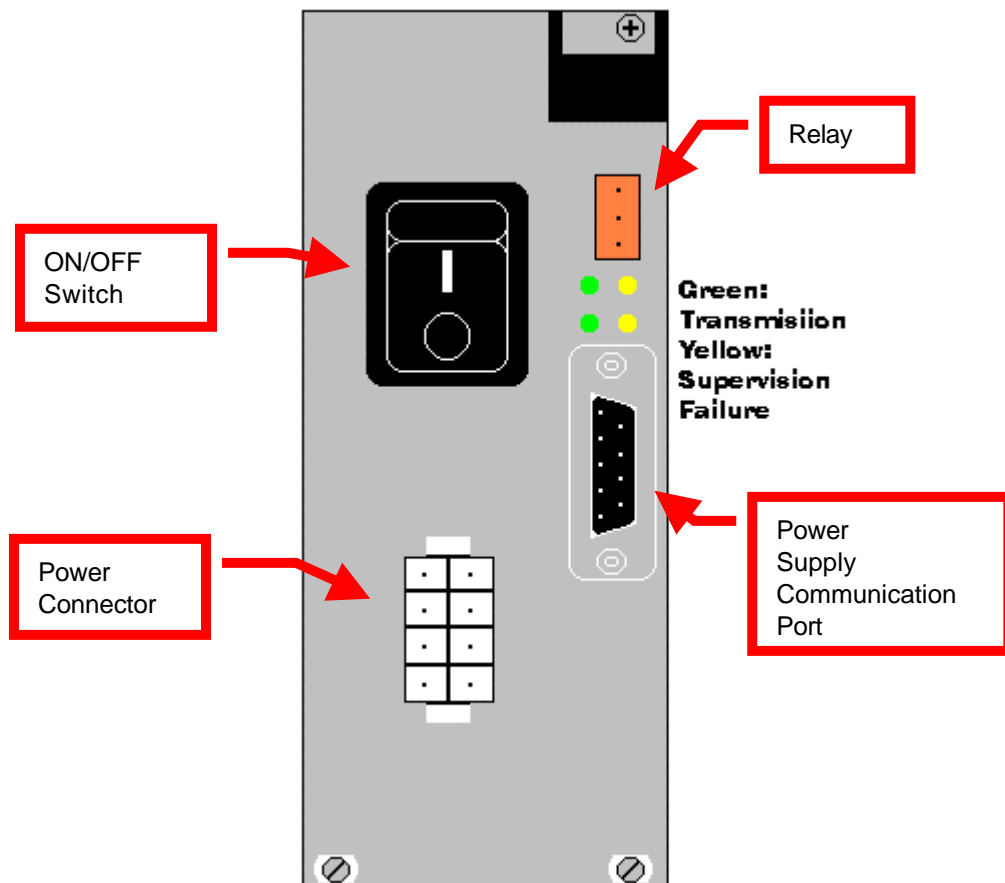
racks. The diagram above shows the CCUR power supply and the appropriate indicators.

Figure 2.1: CCUR Power Supply

Looking at the left side of each power supply face plate there is an ON/OFF switch (I/O) and an external power source input. The ON/OFF switch controls flow of power from the external power source to the backplane. It is possible to have the switch OFF and the board still running if a secondary CCUR/PSU board is installed. On the right, from the top, there is a relay for failure annunciation. Below the relay are the CCU power supply LED indicators and under the LED's is the CCU power supply communication port. The Power Supply Communication Port is standard DCE RS232 communication. See Appendix A for pin wiring.

ATTN: The external power supply cable must be plugged into the connector and the rack power switch must be turned off before powering on the external power supply.

2.2 CCUR Backplane and Slots

The CCU Rack consists of 21 slots. Depending on the configuration of the rack slots 4-21 will have a custom configuration. Slots 1, 2 and 3 will always be the same. The CCU primary power supply will reside in slot 1, the CCU/LCD card will be in slot 2 and slot 3 will be empty. Therefore with a single power supply up to 18 additional CCU cards can be fitted in the rack.

Shown below is a demonstration implementation. It can be seen that this is a 2 power supply configuration (primary and redundant supplies, slots 1-3 and slots 19-21). A bank of CCUR/422 cards sit next to the primary power supply and are used for external communication with 8 devices. A CCUR/232 card resides in slot 18 and provides RS232 communication with another external device. Each of these cards connect to the backplane and use CCUNet protocol for intercommunication. Hence providing 18 separate connections to the CCUNet.
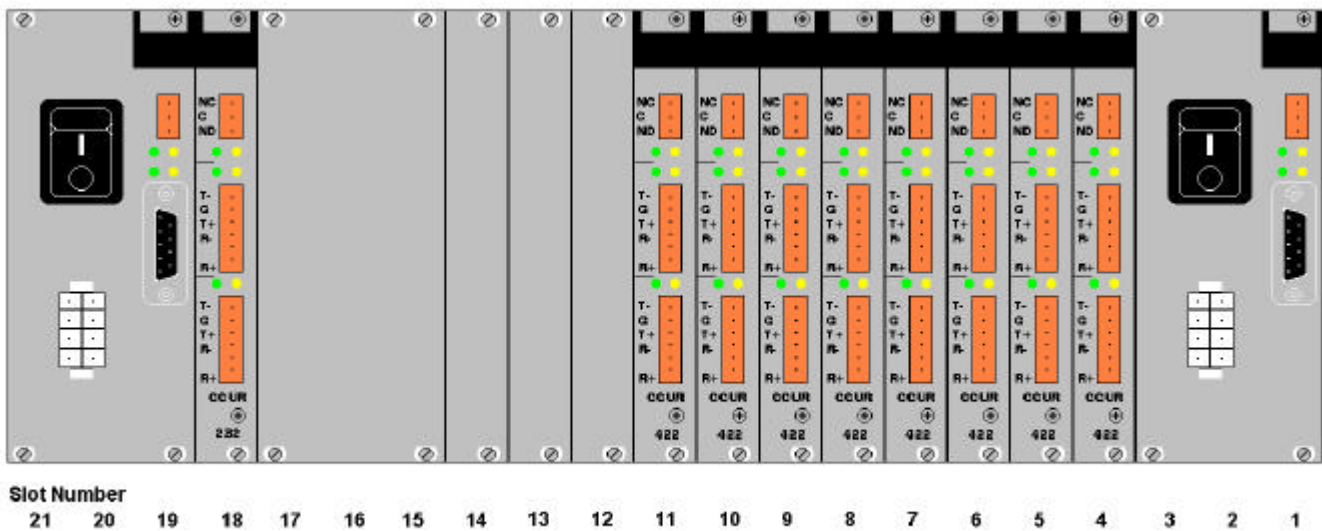

Figure 2.2: Back of CCU Rack

2.5 CCUR LCD

The CCUR/LCD board's primary objective is to supervise the CCUR cards in the rack and to provide visual and audible annunciation if any are in fault.
Below is a diagram of the CCUR/LCD board. Descriptions of the ports are shown as well as the jumper pins.
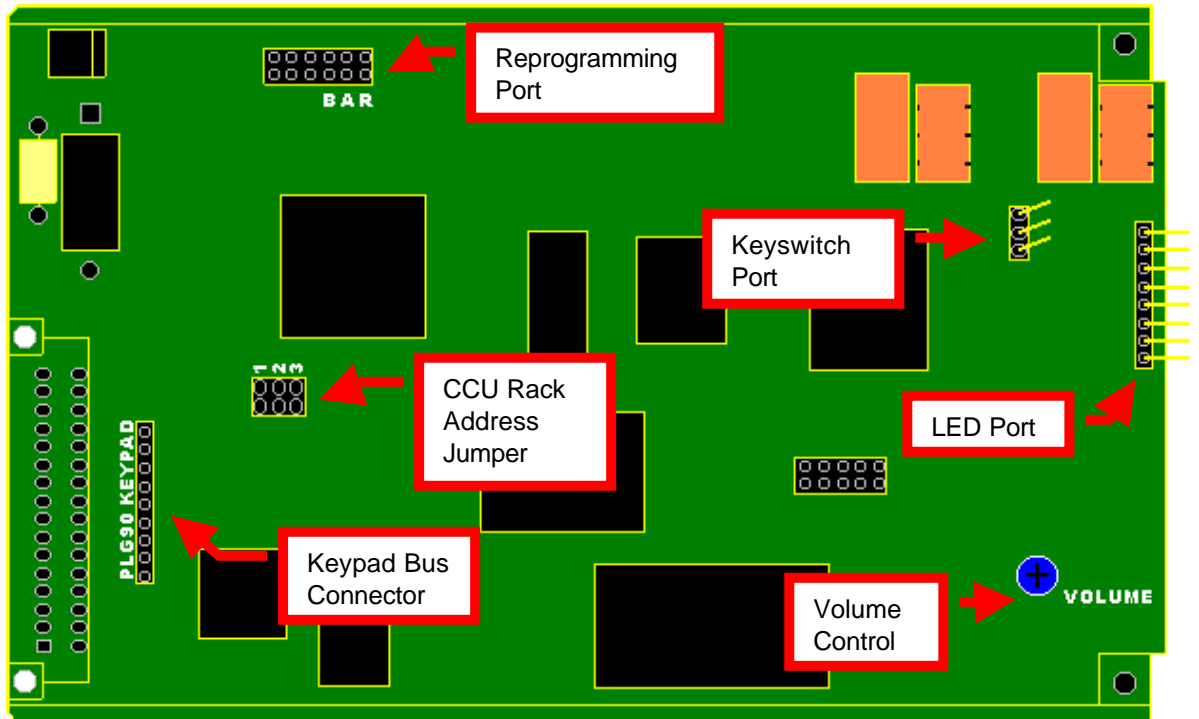

Figure 2.5: CCUR/LCD board

2.5.1   Reprogramming Port

The reprogramming port has the 3 CPU settings on the top 3 pairs of jumpers. R is the RESET jumper, A is MOD A and B is MOD B jumper. The remaining 6 pins are the port connections to the reprogramming PC's COM port (RS232).

ATTN: The reprogramming port must only be used by a qualified service engineer with appropriate training and experience.

2.5.2   LED Port, Keyswitch Port and KeyPad Port

Each of these ports have bus cables connected to them which come from the CCUR LCD face plate.

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2.5.3   CCU Rack Address Jumper

The 3 jumpers, numbered 1-3, are the jumper selectable addresses of the CCU rack the CCUR LCD board is plugged into. CCUR addresses can be specified from 0 to 7 and must be the same for every card on the rack. The following diagram shows the jumper selection for the appropriate addressing.
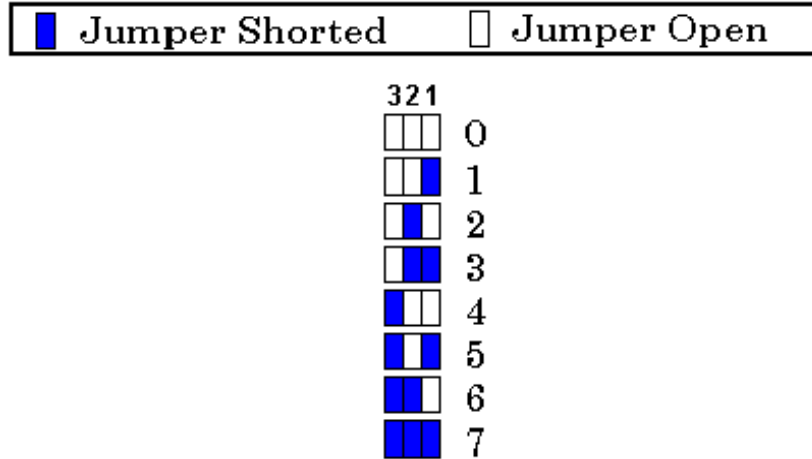
Figure 2.2.3: CCUR Fibre HUB address jumper settings

These jumpers set the 3 high address bits of the CCU address (8 bits long). The remaining 5 bits are determined by the slot number the card is plugged into.

NOTE: Each of the cards in the rack must have the same rack address jumper settings. If the address of the rack is to be changed then the rack should be powered **OFF** before changing each of the address jumpers on the CCUR cards.

DO NOT ALLOCATE OTHER CCU NODE ADDRESSES WITHIN THE 1-32 ADDRESS RANGE (ie. lower 5 bits) SELECTED BY THE RACK ADDRESS.

2.5.4   Volume Control

Using a philips(star) head screw driver the loudness of the fault buzzer can be adjusted to suit your needs. The total rotation of the screw is only 360° so please rotate the screw slowly.

2.3 User Interface with LCD Display

The front of each rack has a keyswitch, a LCD display and various buttons. While the keyswitch is in the LOCK (OFF) position the rack will not respond to any button being pressed and will show limited system information on the LCD.

2.3.1   Button description
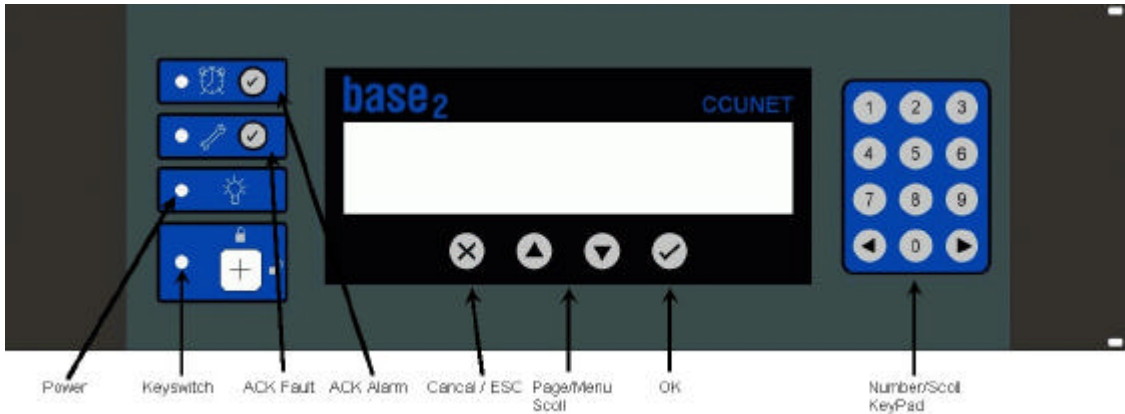
Figure 2.3.1: CCUR Button Description

Left side indicators
ACK Alarm: Used to Acknowledge any alarms annunciated in the rack.

ACK Fault: This button stops the CCUR fault Audible sounding.
                LED is FLASHING when fault is Unacknowledged.
                LED is **SOLID** when fault is Acknowledged.

Power LED: LED is **SOLID** when **power is on** and stable.

Key-switch: LED is **SOLID** when key is in the unlock position.

Middle LCD buttons
An operator may use these to step through the CCUR menus or enter values as prompted.

Cancel/ESC: Exits current page/menu option.

Page/Menu Scroll: Scrolls page or menu on LCD.

OK: Enters values, acknowledges messages or confirms changes.

Right button keypad
Number/Scroll Keypad: Enter numbers and move cursor.

2.3.2   Error messages and Fault Procedures

There is one fault "error message" that is displayed on the CCUR LCD display
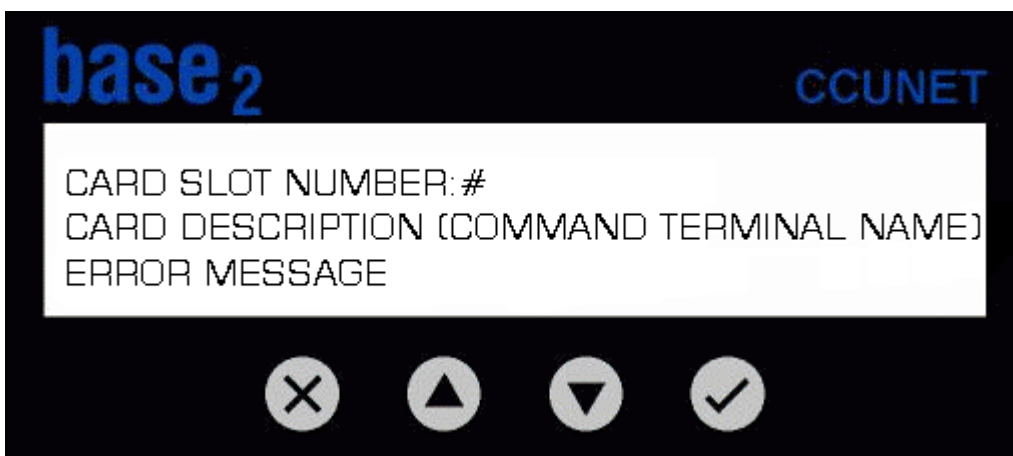1. CARD NOT PRESENT OR FAULTY

Figure 2.3.2: CCUR LCD Display

1. CARD NOT PRESENT OR FAULTY
This error message is displayed if a slot that would normally be occupied is not plugged in properly or the card is faulty. The latter meaning there is no communication to or from that card – probable cause a chip has blown or the firmware has encountered an erroneous state.

To rectify this problem, firstly try pushing the card in again so that it is secure and will clip in. If this does not clear the message then the card should be replaced immediately and the faulty card should be checked and fixed by a service engineer.

2.4 Adding and Removing CCUR Cards

In the event of a CCUR card becoming faulty it will need to be replaced. To complete the replacement there are 4 steps to follow.
**NOTE:** Although all cards in the CCU Rack are "hot swappable", some require a specific procedure to remove them. The CCUR/PSU, for instance, must have it's ON/OFF switch in the **OFF** position and the external power for that card must be powered down before card removal. If unsure check the specific manual for the CCUR card.

1. **Check and ensure you have correctly identified the card that is faulty.** This should have been done by inspecting the CCUR's LCD for the slot number and the card's name.
2. **Unplug the cable(s) from the CCU PORT(s).**
3. **Unscrew Top most and Bottom most screws.** The top one will be a philips (or star) screw and the bottom one will be a blade (or flat) screw.
4. **Use the black clip above the card to pop the card out.** Quickly and firmly raise the top clip. Carefully slide the card out.
5. **Slide the replacement card in until it has 1 centimetre left to go. Then confidently push the card in the rest of the way until the top black clip has locked the card into place.**
6. **Screw in the Top most and Bottom most screws.**
7. **Reconnect the cable(s) to the card.**

If successful, the fault message will disappear from the CCUR LCD.

3. Glossary

CCUR   - CCU Rack
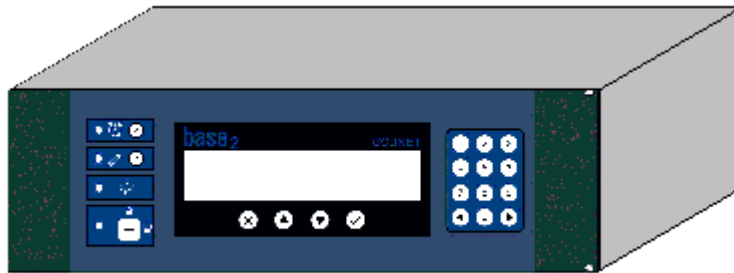
CCU Rack

4. *Appendix A*

Connecting CCUR/PSU RS232 Port to the CCU network:

First Determine which two ports you are connecting using the following table:

CCU BOARD	PORT A	PORT B	PORTC
CCU/232	DTE	DTE	DCE
CCU/M	DCE	DTE	DTE
CCU/F CCU/422	n/a	n/a	DCE

Connecting a DTE to DCE uses a straight through cable. Connecting a DTE-DTE or DCE-DCE requires a null modem cable (pins 2 and 3 swapped on a D9 connector).
If you are connecting to a PC COM port then this is a DTE port.

CCU/232 9PIN (DTE)	DCE port of a CCU Board	DTE Port of a CCU Board	PC COM 25PIN (DTE)	PC COM 9PIN (DTE)
2	2	3	2	3
3	3	2	3	2
5	5	5	7	5