

***MCN Monitoring and Control Network  
Comparator Display System***

***Channel Control Unit  
CCU  
Hardware Reference Manual***

**S2-61085-105**

***Note:***

***Jumpers & switch settings vary  
depending upon the system.***

***Be sure to verify jumper and switch settings  
before installation***

***Be sure to set the rotary address switches to the  
proper addresses before installing the system.***



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Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

## DOC Statement

*This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.*

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# CCU Hardware Reference CTI Products, Inc.

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**Manual Revisions:**

- S2-61085-100 Original Release for CCU Version 100 (with two toggle inputs).  
S2-61085-105 Covers CCU Version 105 (with three sets of toggle inputs).

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# 1. Introduction

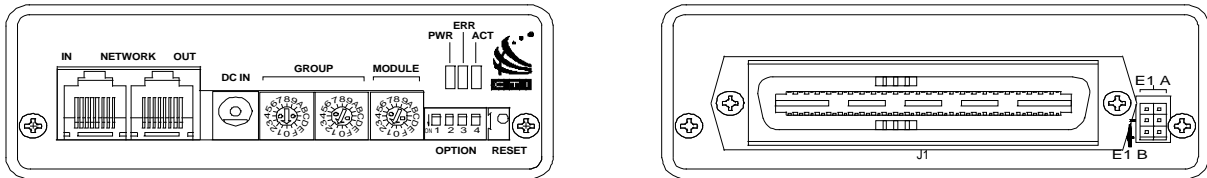
The CCU Channel Control Units are used to control functions in a Land Mobile Radio System such as:

- Main / Standby Base
- Repeat On/Off
- Comparator A / Comparator B
- Receive: Normal / Emergency Control Station (ECS)
- Transmit: Normal / ECS

The CCU allows three independent consoles to control the above functions. It allows each console to toggle the functions and provides feedback to the consoles to indicate the state of each function. If one console fails, the others may continue to control the system functions.

The CCU provides status indication of each function on the MCN (Monitoring and Control Network), similar to a CIB module. It also allows the functions to be toggled from a PC running the MCN Remote Comparator Display (MCNRCD) software.

The CCU is a CIB Comparator Interface Module with special firmware.



CA-80023-105

Figure 1 - CCU Front and Rear View

## 1.1 Reference Documents

1. Monitoring and Control Network System Manual  
Part Number S2-60425

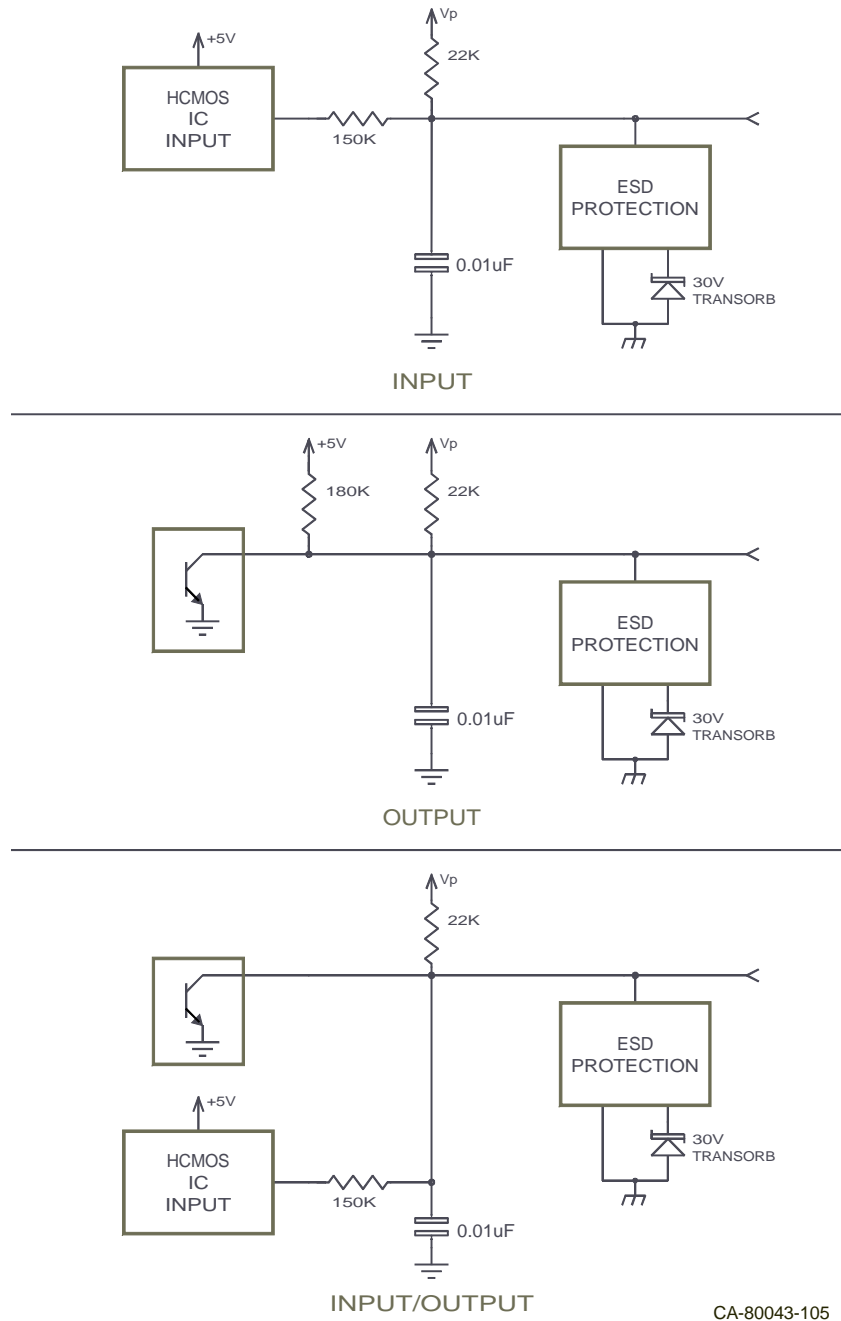
## 2. Specifications

Size	5.5" x 4.2" x 1.5" (140 x 107 x 38 mm)
Weight	16 oz (455 gm)
Temperature	0 - 50 °C
Humidity	10 - 95% non-condensing
Module Power	10 - 32 Vdc / 2 Watts max.
Number of Sections Supported	5 Toggle Sections 1 TSAM Force Select Section
Open Circuit Voltage (all I/O pins) jumper E1B removed jumper E1B installed	+15 Vdc nominal +5 Vdc nominal
Inputs per Toggle Section active low, pull-up to +5 or +15 Vdc	(3), Toggle 1, Toggle 2, & Toggle 3
Input Voltage (Input and In/Out pins)	-0.6 to 30 Vdc max
Input Current (Input and In/Out pins): jumper E1B removed (Vin = 0 Vdc) jumper E1B installed (Vin = 0 Vdc)	-720 µA max (source) -270 µA max (source)
Outputs per Toggle Section (active low)	(4): Normal 1, Normal 2 Inverted 1, Inverted 2 (See circuit description for specific Output names)
Outputs per TSAM Force Select Section	(1) Force Select
Output Saturation Voltage (Outputs and In/Out pins) with Iout = 100 mA	550 mV max.
Output Pin Current (Outputs and In/Out pins)	100 mA max per pin (sink) Each output can drive (1) relay on an RYB-8 board.
Maximum Power Dissipation	2 Watts
Input/Output Connection	50 pin Telco style
Network Connector	(2) RJ-45 (1 in, 1 out)
Safety Approvals	UL 1950 CSA 1950 EN 60950-1992
Emissions Compliance	FCC Part 15, Class A DOC Class A EN55022
Susceptibility Compliance	IEC 801-2 IEC 801-3 IEC 801-4 EN50082-1

**Table 1 - Module Specifications**

Figure 2 shows the equivalent circuits of the CCU I/O pins. The pull-up voltage  $V_p$  is controlled by jumper E1B, located on the rear of the module.

- $V_p = 15\text{ Vdc}$  with jumper E1B out (Default setting)
- $V_p = 5.0\text{ Vdc}$  with jumper E1B in



CA-80043-105

Figure 2 - I/O Equivalent Circuit

### 3. Theory of Operation

The CCU contains 5 similar toggle sections:

- Main / Standby Base Select
- Repeat On/Off
- Comparator A / Comparator B Select
- Receive: Normal / Emergency Control Station (ECS) Select
- Transmit: Normal / ECS Select

Each section is essentially a Toggle Flip-Flop with multiple inputs and outputs. Depending upon the Option Switch setting, the 5 sections can operate independently, or there may be some interaction between sections.

There is a sixth section that provides a Force Select output for a TSAM unit.

#### 3.1 Toggle Section Overview

Each of the toggle sections has (3) toggle inputs, (2) "Normal" outputs and (2) "Inverted" outputs. Normal and inverted outputs are available to drive the console inputs to allow flexibility in implementation. In most sections, one of the Inverted outputs will be used as feedback to the console, since it is active in the "abnormal" condition (Such as Standby, Repeat Disable, ECS, etc.).

Refer to **Figure 3 – Main / Standby Base Section Logic** for details of a typical toggle section.

The Toggle inputs are active low. The Flip-Flop will toggle when either input makes a high to low transition (after a debounce time).

The debounce is followed by a one-shot, and only the leading edge (high to low) transition is seen from the console. Thus a stuck Toggle output from the console will not prevent the other console from toggling the function in the CCU.

Outputs are active low. The Normal outputs are active on power-up

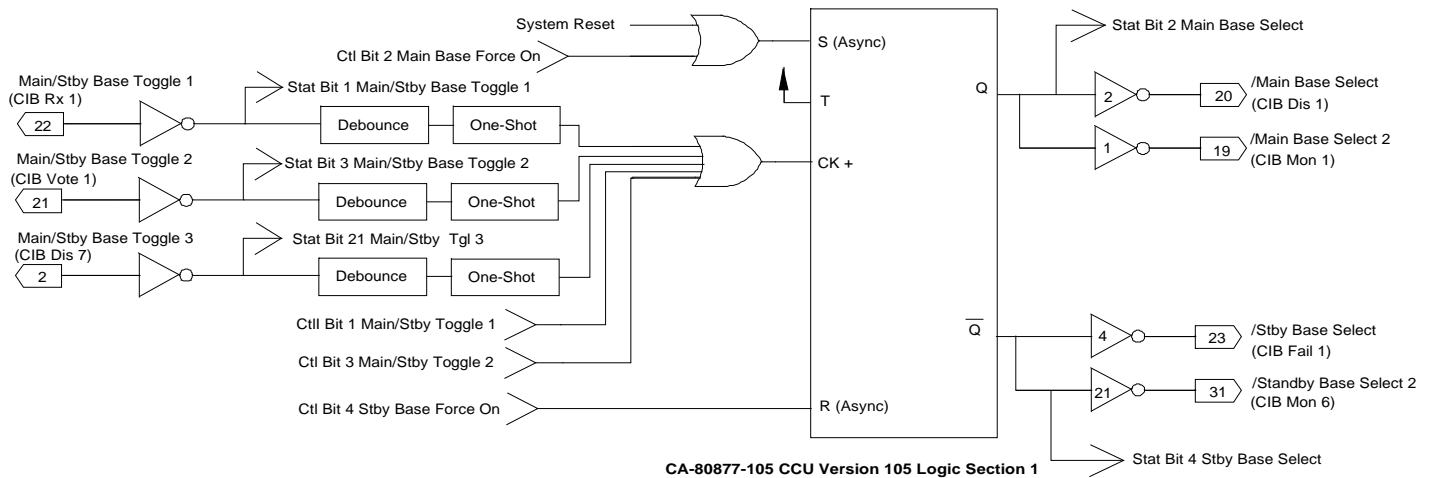
Typically, the #1 outputs drive the system control units and the #2 outputs provide feedback to the consoles.

Status bits provide feedback to PCs on the MCN network. Depending upon the Display Table used for the particular function, the state of the output(s) and / or the input(s) can be seen.

Control bits provide input from PCs on the MCN network. Depending upon the Display Table used for the particular function, the operator may either toggle the function or explicitly Set or Reset the function.

### 3.2 Section 1 - Main / Standby Base Selection

The following logic diagram of the Main / Standby Base Select section shows the basic section logic.



**Figure 3 – Main / Standby Base Section Logic**

There are three external inputs:

- /Main/Standby Toggle 1 (from Console 1)
- /Main/Standby Toggle 2 (from Console 2)
- /Main/Standby Toggle 3 (from Console 3)

There are four logic outputs:

- /Main Base Select 1 (Normal) to TSAM TXS1
- /Main Base Select 2 (Normal)
- /Standby Base Select 1 (Inverted) To TSAM TXS2
- /Standby Base Select 2 (Inverted) To Console Input

### 3.3 Section 2 - Repeater Control

The Repeater Control Section has a similar Toggle function as the Main/Standby function.

There are three external inputs:

- /Repeat Toggle 1 (from Console 1)
- /Repeat Toggle 2 (from Console 2)
- /Repeat Toggle 3 (from Console 3)

There are four logic outputs:

- /Repeat On 1 (Normal)
- /Repeat On 2 (Normal)
- /Repeat Off 1 (Inverted) To Comparator Repeat Disable Input
- /Repeat Off 2 (Inverted) To Console Input

#### 3.3.1 Forced Repeater Disable

The Repeater Control Section can be set up to automatically disable repeat operation if the Transmit or Receive ECS Station is selected.

Option Switch	Up	Down
2	Forced Repeat Disable when RX ECS is selected	No Forced Repeat Disable on RX ECS
3	Forced Repeat Disable when TX ECS is selected	No Forced Repeat Disable on TX ECS

**Table 2 – Forced Repeat Disable Switches**

If the Forced Repeat Disable option is enabled and you set the TX & RX Norm/ECS selection back to Normal, the Repeat will remain disabled until the operator re-enables the repeat from the PC or by toggling one of the Repeat Tgl lines.

### 3.4 Section 3 – Comparator A/B Select

The Comparator A/B Select section has a similar Toggle function as the Main/Standby function.

There are three external inputs:

- /Comp Toggle 1 (from Console 1)
- /Comp Toggle 2 (from Console 2)
- /Comp Toggle 3 (from Console 3)

There are four logic outputs:

- /Comp A Select 1 (Normal)
- /Comp A Select 2 (Normal)
- /Comp B Select 1 (Inverted) To Comp B Select Relay
- /Comp B Select 2 (Inverted) To Console Input

Note that each output can drive only (1) RYB-8 relay. If you need to control multiple relays (for TX Audio, Rx Audio & COR), you will have to use one relay to buffer the coils for the other relays.

### 3.5 Section 4 – RX Normal / ECS Select

The Rx Normal / ECS Select section has a similar Toggle function as the Main/Standby function.

There are three external inputs:

- /Rx Toggle 1 (from Console 1)
- /Rx Toggle 2 (from Console 2)
- /Rx Toggle 3 (from Console 3)

There are four logic outputs:

- /Rx Normal Select 1 (Normal)
- /Rx Normal Select 2 (Normal)
- /Rx ECS Select 1 (Inverted) To RX ECS Select Relay
- /Rx ECS Select 2 (Inverted) To Console Input

The RX ECS select can be used to disable the comparator repeat function. See details in Section 2 - Repeater Control.

### 3.6 Section 5 – TX Normal / ECS Select

The Tx Normal / ECS Select section has a similar Toggle function as the Main/Standby function.

There are three external inputs:

- /Tx Toggle 1 (from Console 1)
- /Tx Toggle 2 (from Console 2)
- /Tx Toggle 3 (from Console 3)

There are four logic outputs:

- /Tx Normal Select 1 (Normal)
- /Tx Normal Select 2 (Normal)
- /Tx ECS Select 1 (Inverted) To TX ECS Select Relay
- /Tx ECS Select 2 (Inverted) To Console Input

The TX ECS select can be used to disable the comparator repeat function. See details in Section 2 - Repeater Control.

#### 3.6.1 Slaved TX Select

The TX Normal / ECS Select section can be forced to be controlled by Section 4 - Rx Normal / ECS Select as shown below:

Option Switch	Up	Down
1	Slave Mode: TX Normal / ECS Select controlled by the Rx Normal / ECS Section	Independent Mode: TX Normal / ECS Select operates independently from the Rx Normal / ECS Section

**Table 3 – Slaved TX Select**

If the Slaved mode is used, the Toggle inputs to the TX section are not connected.

### 3.7 Section 6 – TSAM Force Select Output

When one of the Toggle sections (typically the TX Main/Standby) is used to control the TX Select (TXS1 & TXS2) inputs on the TSAM Transmitter Steering Unit, the TSAM requires an additional Force Select input. Section 6 provides a square wave output with a period of about 1 Hz. This ensures that the TSAM's outputs will switch within 1 second of the output change in the CCU.

The Force Select output is not fed back to the MCNRCD network, since it would only add a lot of unnecessary channel traffic.

## 4. Option Switches & Jumpers

Three sets of option switches are provided for module configuration. The module must be power cycled or reset after these switches are set so that the options will take effect.

### 4.1 Group & Module Switches

The Group and Module selector switches are used to set the node address during module installation. Refer to the Monitor and Control Network System Manual for details about setting these switches.

SWITCH	DESCRIPTION	DEFAULT
GROUP	unit address setting (00-FE) refer to the MCN System Manual	00
MODULE	unit address setting (0-F) refer to the MCN System Manual	0

Table 4 – Group & Module Switches

### 4.2 Option Switches

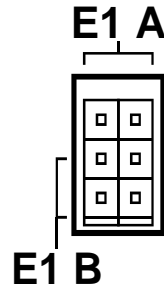
The Option switches control special functions of the CCU.

OPTION SWITCH	DESCRIPTION	Up	Down
1	TX Normal / ECS Slave Mode	Slaved to RX	Independent
2	Force Repeat Disable when Rx ECS selected	Forced	Normal
3	Force Repeat Disable when Tx ECS selected	Forced	Normal
4	not used		

Table 5 - Option Switches

### 4.3 Jumper Options

Figure 4 shows the configuration of the two jumper options available on the rear of the CCU. These jumpers should be installed at system installation time with power removed from the CCU.



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**Figure 4 - Jumper Options**

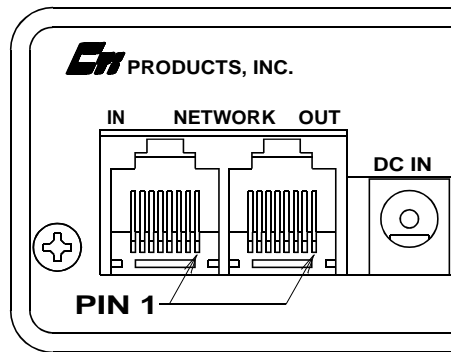
Jumper E1A is located across the top 2 terminals of the 6 pin terminal block. Jumper E1B is located across the left side middle and bottom terminals of the 6 pin terminal block. The remaining 2 terminals of the block are unused.

Jumper	Function	Default
E1A	In to enable output TX ECS Select 2.	IN
E1B	In for inputs pulled up to +5 Vdc. Out for inputs pulled up to +15 Vdc.	OUT

**Table 6 - Jumper Options Description**

## 5. Connectors

The **NETWORK IN/OUT** ports on the front of the CCU are used to connect the CCU with other MCN modules. These ports carry both the network data signals as well as DC power for power distribution with other modules. Table 7 gives the pinout for these connectors. Figure 5 shows the location of pin 1 for each port.



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Figure 5 - Network IN/OUT Ports

Pin	Function
1	DATA +
2	DATA -
3	+ POWER
4	No Connect
5	No Connect
6	- POWER
7	- POWER
8	+ POWER

Table 7 - Network Connector Pinout

The **DC IN** port provides the primary power connection to the module. Power is distributed through the **NETWORK OUT** connector to provide power to the **NETWORK IN** connector of the MCN unit it is connected to. Each power supply can power up to four units total. See reference 1 for complete details of connections to the network and DC IN connectors.

Connector J1 provides the discrete I/O signals. The following tables show the pinouts in Logical and Punch-Block order. Since this module uses CIB hardware, the old CIB functions and Hardware Pin I/O types are listed for all pins.

Table 8 - CCU Connector J1 Pinout in Logical Order

CCU J1	HW Pin I/O	CIB Funct.	CCU Sect.	CCU I/O	CCU I/O Function	Default	Connects To:	Function
22	I	Rx 1	1	In	Main/Stby Tgl 1		CEB 1	Main/Stby Tgl
21	I/O	Vote 1	1	In	Main/Stby Tgl 2		CEB 2	Main/Stby Tgl
2	I/O	Dis 7	1	In	Main/Stby Tgl 3		CEB 3	Main/Stby Tgl
20	I/O	Dis 1	1	Out	Main Sel	Active	TSAM	/TXS1 Pin 11
19	O	Mon 1	1	Out	Main Sel 2	Active		
23	I/O	Fail 1	1	Out	Stby Sel		TSAM	/TXS2 Pin 37
31	O	Mon 6	1	Out	Standby Sel 2		CEB Input	Stby Indication
47	I	Rx 2	2	In	Repeat Tgl 1		CEB 1	Repeat Tgl
46	I/O	Vote 2	2	In	Repeat Tgl 2		CEB 2	Repeat Tgl
28	I/O	Vote 8	2	In	Repeat Tgl 3		CEB 3	Repeat Tgl
45	I/O	Dis 2	2	Out	Repeat On	Active		
44	O	Mon 2	2	Out	Repeat On 2			
48	I/O	Fail 2	2	Out	Repeat Off		Comparator	Rpt Disable
33	I/O	Dis 6	2	Out	Repeat Off 2		CEB Input	Rpt Off Indication
16	I	Rx 3	3	In	Comp A/B Tgl 1		CEB 1	Comp A/B Tgl
15	I/O	Vote 3	3	In	Comp A/B Tgl 2		CEB 2	Comp A/B Tgl
3	I/O	Vote 7	3	In	Comp A/B Tgl 3		CEB 3	Comp A/B Tgl
14	I/O	Dis 3	3	Out	Comp A Sel	Active		
12	O	Mon 3	3	Out	Comp A Sel 2			
17	I/O	Fail 3	3	Out	Comp B Sel		Comp Ry	Comp B Ry Ctrl
34	I/O	Vote 6	3	Out	Comp B Sel 2		CEB Input	Comp B Indication
41	I	Rx 4	4	In	Rx Norm/ECS Tgl 1		CEB 1	Rx Norm/ECS Tgl
40	I/O	Vote 4	4	In	Rx Norm/ECS Tgl 2		CEB 2	Rx Norm/ECS Tgl
29	I	RX8	4	In	Rx Norm/ECS Tgl 3		CEB 3	Rx Norm/ECS Tgl
39	I/O	Dis 4	4	Out	Comp Rx Sel	Active		
37	O	Mon 4	4	Out	Comp Rx Sel 2	Active		
42	I/O	Fail 4	4	Out	ECS Rx Sel		Rx Source Ry	ECS RX RY Ctrl
36	I/O	Fail 6	4	Out	ECS Rx Sel 2		CEB Input	ECS Rx Indication
10	I	Rx 5	5	In	Tx Norm/ECS Tgl 1		CEB 1	Tx Norm/ECS Tgl
9	I/O	Vote 5	5	In	Tx Norm/ECS Tgl 2		CEB 2	Tx Norm/ECS Tgl
4	I	Rx 7	5	In	Tx Norm/ECS Tgl 3		CEB 3	Tx Norm/ECS Tgl
8	I/O	Dis 5	5	Out	Norm TX Sel	Active	TX	
6	O	Mon 5	5	Out	Norm TX Sel 2	Active	CEB Input	
11	I/O	Fail 5	5	Out	ECS TX Sel		Tx Ry	ECS TX RY Ctrl
18	O	Mon 7	5	Out	ECS Tx Sel 2		CEB Input	ECS Tx Indication
26	O	Mon 8	6	Out	Force Sel	Toggles	TSAM	/ForceSel Pin 28
35	I	Rx 6						
5	I/O	Fail 7						
27	I/O	Dis 8						
30	I/O	Fail 8						
1	Gnd	Ground			Ground		System	All Grounds

Table 9 - CCU Connector J1 Pinout in Punch Block Order

CCU J1	HW I/O	CIB Funct.	CCU Sect.	CCU I/O	CCU I/O Function	Default	Connects To:	Function
26	O	Mon 8	6	Out	Force Sel	Toggles	TSAM	/ForceSel Pin 28
1	Gnd	Ground			Ground		System	All Grounds
27	I/O	Dis 8						
2	I/O	Dis 7	1	In	Main/Stby Tgl 3		CEB 3	Main/Stby Tgl
28	I/O	Vote 8	2	In	Repeat Tgl 3		CEB 3	Repeat Tgl 3
3	I/O	Vote 7	3	In	Comp A/B Tgl 3		CEB 3	Comp A/B Tgl 3
29	I	Rx 8	4	In	Rx Norm/ECS Tgl 3		CEB 3	Rx Norm/ECS Tgl
4	I	Rx 7	5	In	Tx Norm/ECS Tgl 3		CEB 3	Tx Norm/ECS Tgl
30	I/O	Fail 8						
5	I/O	Fail 7						
31	O	Mon 6	1	Out	Standby Sel 2		CEB Input	Stby Indication
6	O	Mon 5	5	Out	Norm TX Sel 2	Active	CEB Input	
32		unused						
7		unused						
33	I/O	Dis 6	2	Out	Repeat Off 2		CEB Input	Rpt Off Indication
8	I/O	Dis 5	5	Out	Norm TX Sel	Active	TX	
34	I/O	Vote 6	3	Out	Comp B Sel 2		CEB Input	Comp B Indication
9	I/O	Vote 5	5	In	Tx Norm/ECS Tgl 2		CEB 2	Tx Norm/ECS Tgl
35	I	Rx 6						
10	I	Rx 5	5	In	Tx Norm/ECS Tgl 1		CEB 1	Tx Norm/ECS Tgl
36	I/O	Fail 6	4	Out	ECS Rx Sel 2		CEB Input	ECS Rx Indication
11	I/O	Fail 5	5	Out	ECS TX Sel		Tx Ry	ECS TX RY Ctrl
37	O	Mon 4	4	Out	Comp Rx Sel 2	Active		
12	O	Mon 3	3	Out	Comp A Sel 2			
38		unused						
13		unused						
39	I/O	Dis 4	4	Out	Comp Rx Sel	Active		
14	I/O	Dis 3	3	Out	Comp A Sel	Active		
40	I/O	Vote 4	4	In	Rx Norm/ECS Tgl 2		CEB 2	Rx Norm/ECS Tgl
15	I/O	Vote 3	3	In	Comp A/B Tgl 2		CEB 2	Comp A/B Tgl
41	I	Rx 4	4	In	Rx Norm/ECS Tgl 1		CEB 1	Rx Norm/ECS Tgl
16	I	Rx 3	3	In	Comp A/B Tgl 1		CEB 1	Comp A/B Tgl
42	I/O	Fail 4	4	Out	ECS Rx Sel		Rx Source Ry	ECS RX RY Ctrl
17	I/O	Fail 3	3	Out	Comp B Sel		Comp Ry	Comp B Ry Ctrl
43		unused						
18	O	Mon 7	5	Out	ECS Tx Sel 2		CEB Input	ECS Tx Indication
44	O	Mon 2	2	Out	Repeat On 2			
19	O	Mon 1	1	Out	Main Sel 2	Active		
45	I/O	Dis 2	2	Out	Repeat On	Active		
20	I/O	Dis 1	1	Out	Main Sel	Active	TSAM	/TXS1 Pin 11
46	I/O	Vote 2	2	In	Repeat Tgl 2		CEB 2	Repeat Tgl
21	I/O	Vote 1	1	In	Main/Stby Tgl 2		CEB 2	Main/Stby Tgl
47	I	Rx 2	2	In	Repeat Tgl 1		CEB 1	Repeat Tgl
22	I	Rx 1	1	In	Main/Stby Tgl 1		CEB 1	Main/Stby Tgl
48	I/O	Fail 2	2	Out	Repeat Off		Comparator	Rpt Disable
23	I/O	Fail 1	1	Out	Stby Sel		TSAM	/TXS2 Pin 37
49		unused						
24		unused						
50		unused						
25		unused						

## 6. Mounting

Various mounting kits are available to mount the CCU module.

<b>Mounting Kits</b>	
Rack Mount - 4 A size modules 1 Rack Unit (1.75") High	S2-60435
Rack Mount - 2 A size modules plus 1 B size module 1 Rack Unit (1.75") High (Used to mount 2 CCUs and 1 EXB module.)	S2-60443

Refer the reference 1, section *Mounting Options*, for physical details about mounting the CCU module.

## 7. Operation in an MCN Network

The CCU can be seen in an MCN network as a CIB unit or as a CCU unit. If the MCNRCD software is configured to see it as a CIB unit, only the first 5 (toggle) sections will be active as Function Blocks.

For each function block (section) of the CCU, you will have to select an appropriate Display Table to use. Standard CCU Display Tables are:

Section	Type	Display Table	Typical Display
1	Main/Standby Base	CCU Base	Main / Stby
2	Repeater On/.Off	CCU Rptr	On / Off
3	Comparator A/B	CCU Comparator	Comp A / Comp B
4	RX Norm/ECS	CCU ECS	Norm / ECS
5	TX Norm/ECS	CCU ECS	Norm / ECS

**Table 10 – MCNRCD CCU Display Tables**

Each of these Display Tables allow the user to toggle the function with the left or right mouse function. These tables may be customized if desired. See the MCNRCD Software Manual for details. The bit values for display and mouse functions are shown below.

Table	Bit			
	3	2	1	0
Display	Toggle 1 In	Q (Norm)	Toggle 2 In	/Q (Inverted)
Mouse	Toggle 1	Force Set	Toggle 2	Force Reset

**Table 11 –CCU Display Table & Mouse Bit Functions**

The Toggle 1 In and Toggle 2 In reflect the state of the Tgl 1 & Tgl 2 inputs for the particular section of the CCU being monitored. They will normally be "Don't Care" bits in dispatch displays. They can be displayed (in a special bit-wise display table) for use by a technician to verify that the Toggle signals from the consoles are being seen at the CCU.

Normally the Toggle mouse actions will be used. The Force Set and Force Reset functions are available to explicitly set and reset the functions. They are provided to allow a special CCU device descriptor to be made for the MCNRCD software.

The Display Table entries for the CCU can be configured to generate logging or alarms if desired.

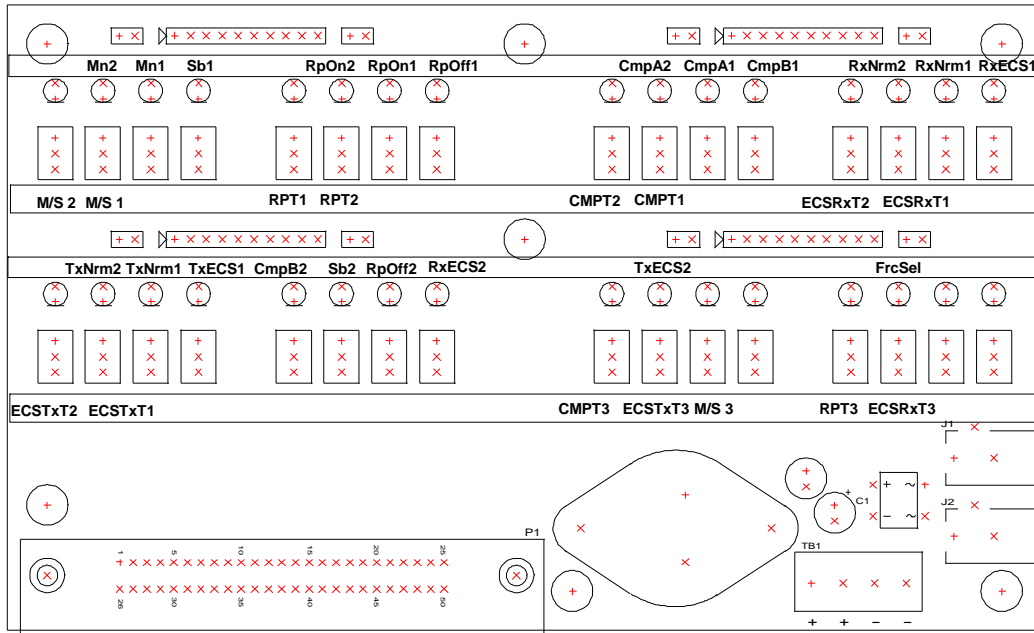
## 8. Troubleshooting

This table is a list of troubleshooting tips specific to the CCU module. For additional troubleshooting tips, refer to the troubleshooting section found in the *Monitoring and Control Network System Manual*, reference 1.

Due to the high percentage of surface-mount components, the CCU is treated as a field replaceable unit. If any system problems are the result of a malfunctioning CCU unit, the entire unit must be replaced and returned for repair.

PROBLEM	CAUSE
Signals do not toggle	Verify that the appropriate inputs are going to ground. If you are using relay contacts to drive the Toggle inputs, be sure the common side of the relay contacts are grounded and connected to Pin 1 of the CCU.
TX ECS doesn't change when TX ECS Toggle inputs are changed	You may have TX ECS slaved to RX ECS. Check Option Switch 1.
Can't enable the Repeater from the PC or with the Rpt Toggle inputs.	You may have Force Repeat enabled. (Switches 2 & 3). If so, when the Rx ECS Select or the TX ECS Select is active, you will not be able to turn the Repeat On until the RX and/or TX ECS is turned off.
TSAM not switching audio outputs	Be sure that /TXS1, /TXS2, /Force Sel, and Ground are connected to the TSAM and are acting properly..
Data from CCU changes, when I/O lines are static	You probably have multiple CCUs programmed for the same Group/Module address. Reset the addresses and reset the appropriate CCUs.  For instance, one CCU may have Comparator A selected and another may have Comparator B selected. You will see the indication change between Comp A & Comp B.
The ACT LED on the CCU is off	This is a normal condition if there is no PC accessing the CCU at any given time.

The standard CIB-T Switch & LED Test Board may be used to test the functionality of the CCU module. Switch and LED assignments appear below.



**CIB-T Labeling for CCU Testing**

**CA-80704-110**

Signal names were shortened to fit them on the labels:

Main/Stby Tgl 1	M/S1
Main/Stby Tgl 2	M/S2
Main/Stby Tgl 3	M/S3
Main Sel	Mn1
Main Sel 2	Mn2
Stby Sel	Sb 1
Standby Sel 2	Sb 2
Repeat Tgl 1	RPT1
Repeat Tgl 2	RPT2
Repeat Tgl 2	RPT3
Repeat On	RpOn1
Repeat On 2	RpOn2
Repeat Off	RpOff1
Repeat Off 2	RpOff2
Comp A/B Tgl 1	CMPT1
Comp A/B Tgl 2	CMPT2
Comp A/B Tgl 3	CMPT3
Comp A Sel	CmpA1
Comp A Sel 2	CmpA2
Comp B Sel	CmpB1
Comp B Sel 2	CmpB2

Rx Norm/ECS Tgl 1	ECSRxT1
Rx Norm/ECS Tgl 2	ECSRxT2
Rx Norm/ECS Tgl 3	ECSRxT3
Comp Rx Sel	RxNrm1
Comp Rx Sel 2	RxNrm2
ECS Rx Sel	RxECS1
ECS Rx Sel 2	RxECS2
Tx Norm/ECS Tgl 1	ECSTxT1
Tx Norm/ECS Tgl 2	ECSTxT2
Tx Norm/ECS Tgl 3	ECSTxT3 2
Norm TX Sel	TxNrm1
Norm TX Sel 2	TxNrm2
ECS TX Sel	TxECS1
ECS Tx Sel 2	TxECS2
Force Sel	FrcSel

