# Table of Contents

Table of Contents .................................................................................................................. 2  
Table of Figures ...................................................................................................................... 5  
Product Manuals ..................................................................................................................... 6  
Objective ................................................................................................................................. 7  
Introduction ............................................................................................................................ 7  
Prerequisites ........................................................................................................................... 8  
Connectivity to Canara 550 Controller .................................................................................. 9  
Quick Configuration Guide .................................................................................................. 11  
Configure Canara Manager .................................................................................................. 14  
All Commands ......................................................................................................................... 17  
  Front Panel LED Commands ............................................................................................... 17  
  Set Front Panel LED Command ......................................................................................... 17  
  Get Front Panel LED Command ......................................................................................... 17  
  CSB Commands .................................................................................................................... 17  
  Get CSB Channel Enable ..................................................................................................... 17  
  Set CSB Channel Enable .................................................................................................... 18  
  Get CSB Channel Configuration ....................................................................................... 18  
  Set CSB Channel Configuration ....................................................................................... 18  
  Get CSB Channel Data ....................................................................................................... 19  
  Get CSB Channel Volt ....................................................................................................... 19  
  Save CSB Configuration ..................................................................................................... 19  
  Node Commands ................................................................................................................ 20  
  Node Ping Command ......................................................................................................... 20  
  Node Auto Ping Command ............................................................................................... 20  
  Node Get LED Command .................................................................................................. 20  
  Node Set LED Command .................................................................................................. 21  
  Node Ohmic Command ....................................................................................................... 21  
  Node Ohmic Info Command .............................................................................................. 21  
  Node Volt Command .......................................................................................................... 21  
  Node Volt Info Command ................................................................................................. 22  
  Node Auto ID Command for Controller FW Versions 5.5.18 and 5.5.19 ......................... 22  
  Node Auto ID Command for Controller FW Versions 5.5.20 and all 5.6.X versions .......... 23  
  Node Last ID Command .................................................................................................... 24  
  Node Reset Command ....................................................................................................... 25  
  Node Serial Command ....................................................................................................... 25
<table>
<thead>
<tr>
<th>Command Type</th>
<th>Command Name</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Node Version Command</td>
<td>26</td>
<td></td>
</tr>
<tr>
<td>Node Set Version Type Command</td>
<td>26</td>
<td></td>
</tr>
<tr>
<td>Node Get Version Type Command</td>
<td>26</td>
<td></td>
</tr>
<tr>
<td>Node Write Jar Balance Configuration</td>
<td>27</td>
<td></td>
</tr>
<tr>
<td>Node Read Jar Balance Configuration</td>
<td>29</td>
<td></td>
</tr>
<tr>
<td>Node Read Jar Balance Status</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>CAN Commands</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td>Get CAN Bus Clock Command</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td>Set CAN Bus Clock Command</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>Firmware Upgrade Commands</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>Firmware Switch</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td>Firmware Status Command</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td>Firmware Write Command</td>
<td>34</td>
<td></td>
</tr>
<tr>
<td>Firmware Delete Command</td>
<td>34</td>
<td></td>
</tr>
<tr>
<td>Housekeeping Commands</td>
<td>35</td>
<td></td>
</tr>
<tr>
<td>Help Command</td>
<td>35</td>
<td></td>
</tr>
<tr>
<td>Matchport Serial Pipe Command</td>
<td>35</td>
<td></td>
</tr>
<tr>
<td>Default Configuration Command</td>
<td>35</td>
<td></td>
</tr>
<tr>
<td>Default Status Command</td>
<td>35</td>
<td></td>
</tr>
<tr>
<td>Reboot Command</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>Version Command</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>Status Command</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>Status and Error Codes</td>
<td>37</td>
<td></td>
</tr>
<tr>
<td>Appendix A:</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td>Installation &amp; Configuration of the Multitel Float Charging Current Probe (FCCP)</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td>Introduction</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td>Requirements</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td>Parts</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td>Wiring Analog Cable</td>
<td>39</td>
<td></td>
</tr>
<tr>
<td>Typical Installation Configurations:</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>Config 1: Installation to a single battery string</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>Config 2: Installation on 2 battery strings from one UPS system</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td>Config 3: Installation on single batteries on two different UPS systems</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>Multitel FCCP / Canara Controller Configuration</td>
<td>43</td>
<td></td>
</tr>
<tr>
<td>Appendix B:</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>Canara Output Relay Module</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>How to install a relay module</td>
<td>46</td>
<td></td>
</tr>
<tr>
<td>How to configure a relay module</td>
<td>47</td>
<td></td>
</tr>
<tr>
<td>To map a relay channel to a Canara Battery Controller</td>
<td>49</td>
<td></td>
</tr>
</tbody>
</table>
Table of Figures

Figure 1 - Canara Battery Monitor Hardware installed on batteries..........................................................8
Figure 2 - Connecting to Canara Controller requires a USB type A to B cable........................................9
Figure 3 - Using Putty to connect to Canara Controller using a Serial connection.....................................10
Figure 4 – Configuring analog settings, battery node IDs, confirm battery data and finding
Controllers Serial #........................................................................................................................................12
Figure 5 - Matchport showing the IP configuration of Controller................................................................13
Figure 6 - Configuring IP/subnet & default gateway in the matchport menu..................................................13
Figure 7 - Canara Manager login screen........................................................................................................15
Figure 8 - Battery Controllers tab.................................................................................................................15
Figure 9 - Add Canara Hybrid 550 Controller form......................................................................................16
Product Manuals

This manual is part of the Canara Product line manuals shown below. It will be necessary to reference other manuals when installing or configuring Canara products. The Manager must be configured before any other Canara products are configured. This manual is highlighted in the flow chart below.

Manager Hardware Installation Manual

Manager Configuration Manual

Battery Monitor Hardware Installation Manual

Battery Monitor 500 or 550 Configuration Manual

Battery Monitor End User Guide

BCM Hardware Installation Manual

BCM Configuration Manual

BCM End User Guide
Objective

The goal of this document is to provide Canara programmers and technical engineering the command interface to the CANARA 550 CONTROLLER. This command set is a subset of the original CANARA CONTROLLER command set. This command set is concise, minimal, and efficient. The client of the CANARA CONTROLLER will use the command set to automate measurement processes. The engineer will use the command set to test and configure current sensors and measurement function and precision in the field.

Introduction

The following sections will cover hardware installation prerequisite, connecting to the Canara Controller, quick configuration of the Controller, quick configuration of the Canara Manager and finally all possible commands for the Controller. The quick configuration portions allow the user to configure a system in minimal time. To access advanced commands for the Controller refer to the All Commands section of the Manual.

The 550 Controller provides client services through the Lantronix Matchport LAN adapter and a USB adapter. These are reference as the LAN client and the USB client. The USB client is accessible locally at the 550 Controller while the LAN client provides global access to the 550 Controller. The USB client communicates at 115k baud rate.
Prerequisites

The hardware portion of the Canara Battery Monitoring system must be complete at this point. A typical installation includes tab washers installed on all battery posts, battery nodes connected to batteries and powered, battery nodes daisy chained together via CANbus cables, CT connected to Sensor-1 on Controller, ambient temperature sensor connected to Sensor-5 on Controller, power supplied to the Canara Controller and network drop or WiFi antenna connected. Refer to Canara Battery Monitor Hardware Installation Manual for further assistance with the hardware installation portion. The Canara Manager must also be installed and communicating on the same network as all the Canara Battery Controllers.

![Figure 1 - Canara Battery Monitor Hardware installed on batteries.](image-url)
Connectivity to Canara 550 Controller

Establish USB client connectivity to Canara 550 Controller:

1. Connect PC to the USB port on the back of the Canara 550 Controller, refer to Figure 2
2. On the PC go to ‘Devices Manager’ and see which COM port is being used
3. Open a terminal program such as PUTTY
4. In the ‘serial line’ field enter the COM port, refer to Figure 3
5. In the ‘speed’ field enter 115200
6. Make sure ‘serial’ connection type is selected then click ‘open’

Figure 2 - Connecting to Canara Controller requires a USB type A to B cable.
Figure 3 - Using Putty to connect to Canara Controller using a Serial connection.
Quick Configuration Guide

This portion will outline the most basic and necessary items to configure on the Canara 550 Controller in order to get it ready to be configured on the Canara Manager. To see detailed descriptions of all commands refer to All Commands section, if the Multitel FCCP unit is used refer to Appendix A and if an optional relay module is to be used refer to Appendix B. To change Battery Node LED priorities refer to Appendix C.

Five different actions must be carried out in order to confirm system is fully operational. Commands are entered as ASCII strings, when it is successfully entered and executed an ok acknowledgement will be returned. Refer to Figure 4 and Figure 5.

NOTE: Commands that are to be typed into Putty followed by enter are colored yellow.

1. Configure Analog Settings (CT & ambient temp probe, refer to Appendix A for FCCP option)
   a. Command: csb setch exxxexxx
   b. Command: csb setcfg 1,0,5,0
   c. Command: csb save

2. Configure Battery Node IDs aka AutoID function, this example will AutoID 4 battery nodes. The numbers separated by commands represent: first node, start node, last node, total nodes, delay mS between IDs.
   a. Command: node autoid 1,1,4,4,100

3. Confirm Battery data is being observed and returned
   a. Command: node ohmic all
   b. Command: node ohmicinfo all

4. Note Canara Controller Serial # it is a 12 digit hexadecimal number, for config on Manager
   a. Command: status
   b. Take note of Serial #: 68F51C040000

5. IP settings must be checked or changed, these commands will show the IP address, then exit. Reference Figure 5.
   a. Command: matchport
   b. Command: dpmc
   c. Command: show (shows current configuration in each sub menu)
   d. Command: matchport
   e. IP Address: 192.168.2.151
   f. To view all possible commands in the matchport use question mark:
      i. Command: ?
   g. To change IP/subnet & gateway on Controller’s Ethernet device to an ip-192.168.2.151/24, gateway-192.168.2.2 or any other ip config follow this procedure(refer to Figure 6)
      i. Command: matchport (to enter into matchport config)
ii. Command: dpmc (password)

iii. Command: enable (to enter enable mode)

iv. Command: config (to enter config mode)

v. Command: if eth0 (to enter eth0 device)

vi. Command: ip address 192.168.2.151/24 (to change ip address/subnet)

vii. Command: default gateway 192.168.2.2 (to change gateway)

viii. Command: write (to save changes)

ix. Command: exit (to exit eth0 device)

x. Command: exit (to exit config mode)

xi. Command: reload (to reload NIC & establish new settings)

xii. Command: yes (to confirm reload)

xiii. Command: matchport (to exit matchport config)

xiv. Disconnect USB cable from Canara Controller

---

*Figure 4 – Configuring analog settings, battery node IDs, confirm battery data and finding Controllers Serial #*
**Figure 5** - Matchport showing the IP configuration of Controller.

**Figure 6** - Configuring IP/subnet & default gateway in the matchport menu.
Configure Canara Manager

Now that the Canara Controller is configured and running the Canara Manager must also be configured with the new Controller’s information. The following steps will walk thru configuring a Controller on the Manager.

1. Connect PC to same network as Canara Manager network
2. On the PC open a web browser and point to the IP address of the Canara Manager, usually a pre-commissioned sheet is packed with each Manager and will give IP addresses. Refer Figure 7.
3. Login credentials, refer to Figure 7.
   a. User: admin
   b. Password: ibcbaby
4. Click on Battery Controllers tab, refer to Figure 8.
5. Click on Add Canara 550 Hybrid Controller button, the following fields are required use information gathered while configuring Canara Controller. Refer to Figure 9.
   a. System Name: Canara UPS1
   b. Filename: canaraups1
   c. IP Address: 192.168.2.151
   d. Serial Number: 68F51C040000
   e. # of battery strings: 1
   f. Units per string: 4
   g. ModBus ID 31
6. Click Add Controller button at the bottom
7. Click on Dashboard tab to view system and run on demand functions if desired
8. Done
Figure 7 - Canara Manager login screen.

Figure 8 - Battery Controllers tab.
Figure 9 - Add Canara Hybrid 550 Controller form.
All Commands

This section covers every command possible in the Canara Controller and should only be used for advanced configuration or troubleshooting. Commands are entered as ASCII strings. Commands are organized by section. CSB represents functions for the current sense hardware. Node commands represent functions for B-Nodes on the CAN bus. Housekeeping commands have no module identifier prefix. A command that executes successfully returns an OK. A command that fails returns ERROR and an error code. The backspace key can be used to edit the command line. The CR terminates the string and causes the command to be executed.

Front Panel LED Commands

Set Front Panel LED Command

This command will set the specified front panel LED to a color; red, green, orange, or off.

- fp setled n,c
- fp setled n,c:OK:
- fp setled n,c:ERROR:<err>
- n = led 1-8
- c = led color 0 = off, 1 = red, 2 = green, 3 = orange

Get Front Panel LED Command

This command will return the current color of the specified front panel LED.

- fp getled n
- p getled n:OK:c
- p getled n:ERROR:<errstr>
- n = led 1-8
- c = led color 0 = off, 1 = red, 2 = green, 3 = orange

CSB Commands

The current sense command set.

Get CSB Channel Enable

This command returns the channel enable string for all channels.

- csb getch
- csb getch:OK:xxxxxxx
• csb getch:ERROR:<errstr>

• e = enable
• x = disabled

Set CSB Channel Enable

This command sets the channel enable string for all channels.

• csb setch exxxexxx
• csb setch exxxexxx:OK
• csb setch exxxexxx:ERROR:<errstr>

• e = enable
• x = disabled

Get CSB Channel Configuration

This command returns the channel configuration for channels 1–4.

• csb getcfg n
• csb getcfg n:OK:i,mva,off
• csb getcfg n:ERROR:<errstr>

• n = channel (channel 1-4 only)
• i = invert (1 = invert, 0 = don't invert)
• mva = millivolt per amp (current)
• off = offset

Set CSB Channel Configuration

This command sets the channel configuration for channels 1-4.

• csb setcfg n,i,mva,off
• csb setcfg n,i,mva,off:OK
• csb setcfg n,i,mva,off:ERROR:<errstr>

• n = channel (channel 1-4 only)
• i = invert (1 = invert, 0 = don't invert)
• mva = millivolt per amp (current conversion factor)
• off = offset in millivolts

**Get CSB Channel Data**

This command returns the channel measurement data as specified according to channel. Current is returned on channels 1-4. Temperature in Fahrenheit is returned on channels 5-8.

- `csb getdata n`
- `csb getdata n:OK:155.423`
- `csb getdata n:ERROR:<err>

- 1st parameter is channel #. 1-4 Current is in Amperes
- 5-8 Temperature is in Fahrenheit

- `csb getdata all`
- `csb getdata all:OK:155.423,67.233`
- `csb getdata all:ERROR:<err>`

- Retrieve active current sense channel data.

**Get CSB Channel Volt**

This command returns the measured voltage at the channel. This is useful for expanding the function of the CSB to other sensor types.

- `csb getvolt n`
- `csb getvolt n:OK:2.4953`
- `csb getdata n:ERROR:<err>

- 1st parameter is channel #(1-8).

**Save CSB Configuration**

This command will commit CSB channel configuration to nonvolatile memory.

- `csb save`
- `csb save:OK`
- `csb save:ERROR:<err>`
Node Commands

The B-node command set.

Node Ping Command

This command issues a ping to the specified node ‘n’.

- node ping n
- node ping n:OK
- node ping n:ERROR:<err>

- node ping all
- node ping all:OK
- node ping all:ERROR:<err>

Node Auto Ping Command

This command causes the IBC hybrid to issue a ping to all nodes at specified period ‘n’ intervals automatically if ‘n’ is valid.

- node autoping n
- node autoping n:OK
- node autoping n:ERROR:<err>

- n = 0 = off
- n = 500 - 5000 in milliseconds auto ping interval.

Node Get LED Command

This command will set the LED for the specified node ‘n’.

- node getled n
- node getled n:OK:1=<LEDstr>
- node getled n:ERROR:<errstr>

- LEDstr is the node configuration code, ie 10000000000000010000000000000100
**Node Set LED Command**

This command will set the LED for the specified node ‘n’.

- `node setled s`
- `node setled s:OK`
- `node setled s:ERROR:<errstr>`

- LED data is a set of fields in a string s : 1=10000000000000001000000000000100
  1. left side of = is the node id.
  2. right side of = is the node led configuration code

**Node Ohmic Command**

This command will invoke the Ohmic command on the specified node ‘n’ or ‘all’ nodes. Note that this is the first command of a two or more command sequence. The Ohmic info command is used to retrieve the test results from the invocation of this command. Match these commands in terms of selecting a single node or all nodes.

- `node ohmic n`
- `node ohmic n:OK`
- `node ohmic n:ERROR:<err>`

- `node ohmic all`
- `node ohmic all:OK`
- `node ohmic all:ERROR:<err>`

**Node Ohmic Info Command**

This command will return the data results after invoking the Ohmic command on the specified node ‘n’. The parameters returned are impedance (in milliohms), avg impedance, filtered impedance, avg filtered impedance, battery voltage, avg battery voltage, SNR and battery temperature.

- `node ohmicinfo n`
- `node ohmicinfo n:OK:1`
- `Node n:parm1,parm2`
- `node ohmicinfo n:ERROR:<err>`

- `node ohmicinfo all`
- `node ohmicinfo n:OK:numnodes`
Node Volt Command

This command invokes the volt command on the specified node ‘n’.

- node volt n
- node volt n:OK
- node volt n:ERROR::<err>

- node volt all
- node volt all:OK
- node volt all:ERROR::<err>

Node Volt Info Command

This command will return voltage, temperature, SNR, cs1, cs2, cs3 and cs4 for the specified node ‘n’.

- node voltinfo n
- node voltinfo n:OK:parm1,parm2
- node voltinfo n:ERROR::<err>

Node Auto ID Command for Controller FW Versions 5.5.18 and 5.5.19

This command will auto id the nodes string. The client must know the starting node number and number of nodes to auto id. A delay is placed between node requests to help improve stability on noisy CAN bus.

- node autoid f,n,d
- node autoid f,n,d:OK:
- node autoid f,n,d:ERROR::<errstr>

- f = starting node or first node.
- n = number of nodes to auto-id.
- d = delay in us between node access writes. (usually 5-100us)
Node Auto ID Command for Controller FW Versions 5.5.20 and all 5.6.X versions

This command will auto id the nodes string. With this command it is possible to program either the entire number of nodes of the string or just a subset of it (the subset can be just one node or a group of more than one).

The command syntax is the following:

- `node autoid f,s,l,n,d`
- `node autoid f,s,l,n,d:OK:`
- `node autoid f,s,l,n,d:ERROR:<errstr>`

- `f` = node number to which the IBC shall be connected
- `s` = starting node number to be programmed
- `l` = last node number to be programmed
- `n` = total number of nodes to auto-id
- `d` = delay in us between node access writes. (usually 5-100us)

If the auto ID fails, both the type of failure and the failing node number will be displayed. To complete the programming procedure the starting node can be the one which previously failed. In this case, in order to finish the auto ID procedure of the entire set of nodes, it is not necessary to disconnect the IBC and electrically connect it to the failing node. The IBC can be left connected to the first node and the parameter `f` will be equal to 1, while `s` will be the failing node number.

For example, if the string has 40 nodes and node 11 fails, run the auto ID command with the following parameters:

- `f = 1`
- `s = 11`
- `l = 40`
- `n = 40`
- `d = 50`

To complete the auto ID procedure, as a second possible way, it is also possible to electrically connect the IBC directly to the failing node, setting both the parameters `f` and `s` with its node number.

So, considering the previous example, if node 11 fails, the parameters for the command would be:

- `f = 11`
- `s = 11`
• \( l = 40 \)
• \( n = 40 \)
• \( d = 50 \)

As shown in the two previous examples, in case the programming procedure failed in programming an intermediate node of the string, parameters \( l \) and \( n \) shall have the same values in all the subsequent steps of the auto ID procedure.

As mentioned at the beginning of this command description, also a subset of nodes of the string can be programmed (this subset can be as small as one). Here is an example: let’s suppose there are 40 nodes and the user wants to auto ID just 10 of them, from node 15 to node 25. In this situation the parameters will be set as follows:

• \( f = 1 \) (or 15, in case the IBC is directly connected to this node)
• \( s = 15 \)
• \( l = 25 \)
• \( n = 40 \)
• \( d = 50 \)

In case just one node is to be programmed (node 15, following the previous example), the parameters to be set are:

• \( f = 1 \) (or 15, in case the IBC is directly connected to this node)
• \( s = 15 \)
• \( l = 15 \)
• \( n = 40 \)
• \( d = 50 \)

A delay is placed between node requests to help improve stability on noisy CAN bus systems.

**Node Last ID Command**

This command will return the number of nodes that have been auto identified.

• \( \text{node lastid} \)
• \( \text{node lastid:OK:n} \)
• \( \text{node lastid:ERROR:<err>} \)
**Node Reset Command**

This command will soft reboot the specified node 'n'.

- node reset n
- node reset n:OK
- node reset n:ERROR:<err>

- node reset all
- node reset all:OK
- node reset all:ERROR:<err>

**Node Serial Command**

This command will return the serial number of the specified node 'n'.

- node serial n
- node serial:OK:n
- node serial:ERROR:<err>
**Node Version Command**

This command will return the firmware version, compile date and hardware version for the specified node ‘n’.

- node version n
- node version n:OK:parm1,parm2,parm3
- node voltinfo n:ERROR:<err>

- parm1 = node firmware version
- parm2 = node hardware version
- parm3 = compile date

**Node Set Version Type Command**

This command is implemented in order to make IBC550 Hybrid compatible with jar balance commands of both new and old node firmware versions. With old versions is intended all firmware releases prior to 6.1.0, with new from 6.1.0 version on.

The syntax of this command is the following:

- node set version type vt
- node set version type:OK
- node set version type:ERROR:<err>

This command sets vt parameter into IBC550 non-volatile memory. The values of this parameter are the following:

- vt = 0: jar balance data compatible with firmware node prior to 6.1.0
- vt = 1: jar balance data compatible with firmware node from 6.1.0 on

IBC550 parameter default value is vt = 1.

**Node Get Version Type Command**

This command allows the user to read the node version type parameter stored in IBC550 non-volatile memory. The syntax of this command is the following:

- node get version type
- node get version type:OK:vt
- node get version type:ERROR:<err>

Where vt has the same meaning of the parameter description in the “node set version type” command.
Node Write Jar Balance Configuration

This command writes the jar balance configuration parameters into the specified node (id = ‘n’, with ‘n’ = node number) or to all nodes (id = ‘all’). Depending on the node version type set through the relevant command described in this document (see “node set version type”), two different syntaxes are possible. These two command syntaxes differ just for the following three parameters:

<table>
<thead>
<tr>
<th>Firmware node prior to 6.1.0</th>
<th>Firmware node from 6.1.0 on</th>
</tr>
</thead>
<tbody>
<tr>
<td>vsl: Low balance Voltage</td>
<td>vsp: Desired Voltage Set Point</td>
</tr>
<tr>
<td>vsh: High Balance Voltage</td>
<td>vtw: Voltage Threshold Width(1)</td>
</tr>
<tr>
<td>fcv: Float Current Stage Volts</td>
<td></td>
</tr>
</tbody>
</table>

(1) Equal to half value of the difference between the max and min voltage limit

Command syntax for firmware node prior to 6.1.0 version:

- node wr jarbal cfg id,vsl,vsh,csu,csd,tcs,tcn,fcv,dsv,mbc,jbp,enf,inf,tef
- node wr jarbal cfg:OK
- node wr jarbal cfg id,vsl,vsh,csu,csd,tcs,tcn,fcv,dsv,mbc,jbp,enf,inf,tef:ERROR:<err>

Where:

1. id = Node ID
2. vsl = Low Balance Voltage
3. vsh = High Balance Voltage
4. csu = Current Step Size Up
5. csd = Current Step Size Down
6. tcs = Temperature Compensation Starting Temp
7. tcm = Temp Compensation Offset mV per Deg F
8. fcv = Float Current Stage Volts
9. dsv = Discharge Stage Volts
10. mbc = Max Allowed Balancing Current
11. jbp = JarBalance Period Milliseconds
12. enf = Balance Enable Flag
13. inf = Initialized Flag
14. tef = Temp Compensation Enable Flag

Command syntax for firmware node version from 6.1.0 on:

- node wr javarbal cfg id,vsp,vtw,csu,csd,tcs,tcm,dsv,mbc,jbp,enf,inf,tef
- node wr javarbal cfg:OK
- node wr javarbal cfg id,vsp,vtw,csu,csd,tcs,tcm,dsv,mbc,jbp,enf,inf,tef:ERROR:<err>

1. id = Node ID
2. vsp = Desired Voltage Set Point
3. vtw = Voltage Threshold Width (half value of the difference between the max and min voltage limit)
4. csu = Current Step Size Up
5. csd = Current Step Size Down
6. tcs = Temperature Compensation Starting Temp
7. tcm = Temp Compensation Offset mV per Deg F
8. dsv = Discharge Stage Volts
9. mbc = Max Allowed Balancing Current
10. jbp = JarBalance Period Milliseconds
11. enf = Balance Enable Flag
12. inf = Initialized Flag
13. tef = Temp Compensation Enable Flag
Node Read Jar Balance Configuration

With this command is possible to read the node jar balance configuration for the specified node ‘n’. The syntax of this command is the following:

Command syntax for firmware node version <6.1.2:

- node rd jarbal cfg n
- node rd jarbal cfg:OK

1. Nodeld = id
2. VoltageSetpointLow = vsl
3. VoltageSetpointHigh = vsh
4. CurrentStepSizeUp = csu
5. CurrentStepSizeDown = csd
6. TempCompensationStartingTemp = tcs
7. TempCompensationMvPerDegF = tcm
8. FloatCurrentStageVolts = fcv
9. DischargeStageVolts = dsv
10. MaxAllowedBalanceCurrent = mbc
11. JarBalanceTimeMs = jbp
12. EnableFlag = enf
13. InitialFlag = inf
14. TempCompEnableFlag = tef
15. node rd jarbal cfg:ERROR:<err>

Command syntax for firmware node version >= 6.1.2 on:

- node rd jarbal cfg n

1. Nodeld = id
2. VoltageSetpoint = vsp
3. VoltageThresholdWidth = vtw
4. CurrentStepSizeUp = csu
5. CurrentStepSizeDown = csd
6. TempCompensationStartingTemp = tcs
7. TempCompensationMvPerDegF = tcm
8. DischargeStageVolts = dsv
9. MaxAllowedBalanceCurrent = mbc
10. JarBalanceTimeMs = jbp
11. EnableFlag = enf
12. InitializedFlag = inf
13. TempCompEnableFlag = tef

- node rd jarbal cfg:ERROR:<err>

**Node Read Jar Balance Status**

With this command is possible to read the current node jar balance status for the specified node 'n'. The returned values of this command differs considering node versions prior to 6.1.0 and from 6.1.0 on. The only differences are that in the latter `WindowSizeMillivolts`, `BatteryChargeState` and `ActualBalanceCurrent` are not present because they are not managed (however, in versions prior to 6.1.0 these values were shown for legacy reasons.) The syntax of this command is the following:

Command syntax for firmware node prior to 6.1.0 version:

- node rd jarbal sts n
- node rd jarbal sts:OK

1. BalanceCurrentSetpoint = bcs
2. MeasuredBalanceCurrent = mbc
3. BatteryVolts = bv
4. CurrentSenseOffset = cso
5. WindowSizeMillivolts = wsm
6. CurrentTempCompensationOffsetMv = cto
7. CurrentTempDeltaVDegF = ctd
8. BatteryChargeState = bcs
9. BalanceCurrentStatus = bcs
10. JarBalTimerElapsedMs = jbt
11. ActualBalanceCurrent = abc

- node rd jarbal sts:ERROR:<err>
Command syntax for firmware node from version 6.1.0 on:

- node rd jarbal sts n

1. BalanceCurrentSetpoint = bcs
2. MeasuredBalanceCurrent = mbc
3. BatteryVolts = bv
4. CurrentSenseOffset = cso
5. CurrentTempCompensationOffsetMv = cto
6. CurrentTempDeltaVDegF = ctd
7. BalanceCurrentStatus = bcs
8. JarBalTimerElapsedMs = jbt

- node rd jarbal sts:ERROR:<err>

CAN Commands

Get CAN Bus Clock Command

This command will return the current CAN bus clock speed.

- can getclk
- can getclk:OK:n
- can getclk:ERROR:<errstr>

- n =f failsafe (default)
  1. 50k
  2. 100k
  3. 200k
Set CAN Bus Clock Command

This command sets the CAN bus clock speed. This command will take ½ second to execute. This is because the nodes are updated to the new clock speed. If no nodes are connected they will not be set. This creates a sync problem since the IBC changed but the nodes did not. Always make sure nodes are attached and functional.

- can setClk n
- can setClk n:OK:
- can setClk n:ERROR:<errstr>

- n = f  failsafe (default)
  1. 50k
  2. 100k
  3. 200k

Firmware Upgrade Commands

The Hybrid ships with firmware that provides a firmware repository which is an abstract container for multiple firmware images existing in 33F flash program memory. The repository holds 2 images in low and high memory space. Each firmware release can be built for either repository location. Linker scripts are used to direct the location of the code. A build should include creating Hex files for both repository locations. The Hybrid ships with the first location in the repository containing the firmware. The repository is designed around native Microchip architecture so all build processes remain unchanged.

This set of commands support firmware upgrade of the Hybrid. These processes are transparent to the client and are designed to be efficient and painless to support. The client uses the command control interface to prepare the repository for a new firmware image (if previously existing), select a firmware revision to execute, or write a firmware image to erased flash memory. There are 4 basic operations in the firmware upgrade command suite: status, switch, write, and delete. The following sections detail the control mechanics of the firmware upgrade process.
**Firmware Switch**

The firmware switch command is used to invoke a specific firmware revision. These revisions are referred to by repository index. The client can use the firmware status command to determine how the Hybrid is configured. The firmware image must be resident in the Hybrid. Success is returned if a valid switch operation occurred or if the desired firmware revision is already executing. An error is returned for a bad revision index or attempting to switch to a non-existent firmware revision.

- `firm switch n`
- `firm switch n:OK`
- `firm switch n:ERROR:<errstr>`

- n = 1 firmware revision 1 (default)
- 2 firmware revision 2

**Firmware Status Command**

The firmware status command is used to determine the existing state of the firmware repository in the Hybrid. The repository has a data component which tracks firmware revision data and the state of the repository under client control. Use this command to navigate firmware upgrade operations.

- `firm status`
- `firm status:OK`

- `firm status
- `firm status:OK:d1, d2, d3, PC: x1, LO: d4, s1, HI: d5, s2`

1. d1 = current firmware image
2. d2 = number of firmware images
3. d3 = firmware repository size
4. d4 = repository firmware 1 status code*
5. d5 = repository firmware 2 status code*
6. s1 = repository firmware 1 revision identifier
7. s2 = repository firmware 2 revision identifier
8. x1 = working address of code at point where PC is sampled

address is used to visually distinguish which firmware is running (lo or hi)

*Status Code Map
- 0 FIRM_READY
- 1 FIRM_ACTIVE
Firmware Write Command

The firmware write command will verify writes to flash containing 4 word chunks of program data to a repository location undergoing the firmware upgrade process. The write commands are cached in NV memory to create fail-safe upgrade processes and allow the client application to interlace firmware write commands with normal operating commands. This is essential for measurement systems. Success is returned if the hex string program address is not the one executing this command and flash memory has been previously erased. An error is returned if the hex string is invalid by CRC check, the address conflicts with this executing firmware, or a flash program error occurred. Note that flash programming uses retry logic. A failed flash error code means an expired flash slot. Microchip specifies 10,000 cycles minimum. This should last a lifetime of firmware upgrades for the Hybrid.

- `firm write s`
- `firm write s:OK:
- `firm write s:ERROR:<errstr>`
- `s = Intel Hex32 firmware string`

Firmware Delete Command

The firmware delete command is used to remove an existing firmware revision from the repository. From the factory the second repository location is erased. This command must be called before a firmware write operation can succeed if there is an existing firmware image. Success is returned when the flash program memory for the specified firmware image is erased and the repository entry reflects the erased state. An error is returned if the revision index is bad or the index specifies the existing image that is executing this command. A revision must be available and not executing in order to be removed from the repository.

- `firm delete n`
- `firm delete n:OK:
- `firm delete n:ERROR:<errstr>`
- `n = 1 firmware revision 1 (base default)
  2 firmware revision 2`
**Housekeeping Commands**

The housekeeping command set provides common functions for managing the Hybrid operating condition. These commands do not produce measurement data. These commands can be used for configuration and diagnostics.

**Help Command**

The help command is accessed with the ‘?’ character followed by a CR character. The list of commands is displayed to the client. There is no error for this command.

- ?
- ?:OK (command list)

**Matchport Serial Pipe Command**

This command opens and closes a serial tunnel between client and the Lantronix serial port. This process runs in the background with other Hybrid processes. While the serial tunnel is open no other client commands will be accessible. To exit the serial pipe use the same command on the > command line.

- matchport
- matchport:OK:Connected (Disconnected)
- matchport:ERROR:<err>

**Default Configuration Command**

This command will default the Hybrid configuration. An error indicates the NV memory is either corrupt or has failed. This command now includes initializing the firmware repository with existing images. This command should be used only if there is a sign of corruption. It has been useful during development when the contents of each NV data set were settling. That phase is over. This command is here for diagnostic purposes in case of system failure.

- default config
- default config:OK:
- default config:ERROR:<err>

**Default Status Command**

This command will default the Hybrid status registers as defined in the status command.

- default status
- default status:OK:
**Reboot Command**

This command will reboot the IBC Hybrid software.

- `reboot`
- `reboot:OK`
- `reboot:ERROR:<err>`

**Version Command**

This command will return the IBC Hybrid firmware version number.

- `version`
- `version:OK`
- `version:ERROR:<err>`

**Status Command**

This command will return the IBC Hybrid serial number, up time in minutes, and status error counts for node, current sense, and system errors. System errors include bad command parameters and command syntax. This count may be higher for hand entered commands. Computer to computer control should have no command errors.

- `status`
- `status:OK:s,u,c,a,s`
- `status:ERROR:<err>`

1. `s` = serial id
2. `u` = up time in minutes
3. `n` = node errors (can)
4. `c` = current sense errors
5. `s` = system errors
Status and Error Codes

The following is the current table of error codes the command processor returns. This list is subject to change with future revisions. The errors are categorized in the status message.

O = operator errors  
S = system errors  
N = node and can errors  
C = current sense errors  
F = firmware upgrade errors

<table>
<thead>
<tr>
<th>Status Code</th>
<th>Value</th>
<th>Type</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBC_SUCCESS</td>
<td>0</td>
<td>-</td>
<td>Reserved for internal signaling.</td>
</tr>
<tr>
<td>IBC_ERROR</td>
<td>-1</td>
<td>S</td>
<td>Reserved for internal signaling.</td>
</tr>
<tr>
<td>IBC_TIMEOUT</td>
<td>-2</td>
<td>S</td>
<td>Reserved for internal signaling.</td>
</tr>
<tr>
<td>IBC_BAD_PARM</td>
<td>-10</td>
<td>O</td>
<td>Generated by function bounds and parameter checks.</td>
</tr>
<tr>
<td>IBC_BAD_COMMAND</td>
<td>-11</td>
<td>O</td>
<td>Generated by the command parser.</td>
</tr>
<tr>
<td>IBC_BUFFER_EMPTY</td>
<td>-20</td>
<td>S</td>
<td>Reserved for internal signaling.</td>
</tr>
<tr>
<td>IBC_BUFFER_FULL</td>
<td>-21</td>
<td>S</td>
<td>Reserved for internal signaling.</td>
</tr>
<tr>
<td>IBC_CAN_ERROR</td>
<td>-30</td>
<td>N</td>
<td>Generated by Node and CAN firmware.</td>
</tr>
<tr>
<td>IBC_CAN_TIMEOUT</td>
<td>-31</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>IBC_CAN_CRC_ERROR</td>
<td>-32</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>IBC_CANBUS_TX_TIMEOUT</td>
<td>-35</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>IBC_CANBUS_TX_BUSY</td>
<td>-36</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>IBC_JAR_BAL_CRC_ERROR</td>
<td>-40</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>IBC_JAR_BAL_CFG_ERROR</td>
<td>-41</td>
<td>O</td>
<td></td>
</tr>
<tr>
<td>IBC_A2D_ERROR</td>
<td>-50</td>
<td>C</td>
<td>Generated by CSB and A/D firmware.</td>
</tr>
<tr>
<td>IBC_A2D_RESET_ERROR</td>
<td>-51</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>IBC_A2D_NOT_READY</td>
<td>-55</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>IBC_MATCHPORT_FAILED</td>
<td>-60</td>
<td>S</td>
<td>Opening a serial tunnel to the Matchport failed.</td>
</tr>
<tr>
<td>IBC_FIRM_ERROR</td>
<td>-70</td>
<td>F</td>
<td>Illegal firmware image index.</td>
</tr>
<tr>
<td>IBC_ERASE_ERROR</td>
<td>-71</td>
<td>F</td>
<td>An error occurred during Flash erase function.</td>
</tr>
<tr>
<td>IBC_PROGRAM_ERROR</td>
<td>-72</td>
<td>F</td>
<td>An error occurred during Flash write function.</td>
</tr>
<tr>
<td>IBC_INVALID_IMAGE</td>
<td>-73</td>
<td>F</td>
<td>Reserved for firmware flash CRC failure (not implemented).</td>
</tr>
<tr>
<td>IBC_ILLEGAL_ADDRESS</td>
<td>-74</td>
<td>F</td>
<td>The address specified is currently executing.</td>
</tr>
</tbody>
</table>
Appendix A:

Installation & Configuration of the Multitel Float Charging Current Probe (F CCP)

Introduction
The FCCP unit is an optional add-on to the Canara Battery Monitor system. The FCCP is used to measure the battery string’s float current. This procedure will cover how to install, configure and calibrate the FCCP unit with the Canara Controller.

Requirements
To successfully implement the FCCP with the Canara Battery Monitor system the Canara Controller must be installed and powered. It is recommended to have the Canara Manager installed and configured with the Controller before installing the FCCP unit.

Parts

<table>
<thead>
<tr>
<th>Canara Controller (Installed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Canara Controller Image]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Multitel FCCP unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Multitel FCCP Unit Image]</td>
</tr>
</tbody>
</table>
Multitel Power Adapter

FCCP Sensor (CT)

Analog cable (2 pair, 22AWG-18AWG electrical conductor with attached FCCP analog output)

Kobiconn connector

NOTE: Refer to the Multitel FCCP User Manual for detailed installation and troubleshooting information.

Wiring Analog Cable

1. To wire an Analog cable the Analog negative connection on the Multitel goes to pin 3 on the green Canara Controller connector.
2. The Analog positive connection on the Multitel goes to pin 2 on the green Canara Controller connector. Refer to illustration below.
Typical Installation Configurations:

There are three main installation configurations when using the Multitel FCCP with the Canara Battery Controller System.

**Config 1: Installation to a single battery string**

This config uses one Canara Controller, one Multitel FCCP unit and one FCCP Sensor which will monitor one battery string or one UPS battery system.

1. Mount the Multitel unit near the Canara Controller
2. Connect all necessary cables to back of Multitel FCCP unit, but DO NOT install FCCP Sensor on battery cable at this point.
   a. Connect Power Adapter cable, connects to a 3 pin port labeled PWR on the Multitel. Also plug in Power Adapter to an available power receptacle.
   b. Connect Analog-A output on Multitel to Canara Controller on Sensor-3 port using analog cable. Refer to Wiring Analog Cable section above.
   c. Connect FCCP Sensor to SENSOR A port on Multitel and wire the shielded ground wire from the FCCP Sensor cable to the grounding screw on the Multitel unit.
3. Continue to Multitel FCCP / Canara Controller Configuration section below.
Config 2: Installation on 2 battery strings from one UPS system

This config uses one Canara Controller, one Multitel FCCP unit and two FCCP Sensors which will monitor two battery strings of a UPS battery system.

1. Mount the Multitel unit near the Canara Controller
2. Connect all necessary cables to back of Multitel FCCP unit, but DO NOT install FCCP Sensor on battery cables at this point.
   a. Connect Power Adapter cable, connects to a 3 pin port labeled PWR on the Multitel. Also plug in Power Adapter to an available power receptacle.
   b. Connect Analog-A & Analog-B output on Multitel to Canara Controller on Sensor-3 & Sensor-4 ports respectively using analog cable. Refer to Wiring Analog Cable section above.
   c. Connect FCCP Sensor which will go to 1st battery string to SENSOR A port on Multitel and wire the shielded ground wire from the FCCP Sensor cable to the grounding screw on the Multitel unit.
   d. Connect FCCP Sensor which will go to 2nd battery string to SENSOR B port on Multitel and wire the shielded ground wire from the FCCP Sensor cable to the grounding screw on the Multitel unit.
3. Continue to Multitel FCCP / Canara Controller Configuration section below.
Config 3: Installation on single batteries on two different UPS systems

This config uses two Canara Controllers, one Multitel FCCP unit and two FCCP Sensors which will monitor two different battery strings from separate UPS battery systems.

1. Mount the Multitel unit near the Canara Controllers
2. Connect all necessary cables to back of Multitel FCCP unit, but DO NOT install FCCP Sensors on battery cables at this point.
   a. Connect Power Adapter cable, connects to a 3 pin port labeled PWR on the Multitel. Also plug in adapter to an available power receptacle.
   c. Connect FCCP Sensor which will go to battery string of UPS-A to SENSOR A port on Multitel and wire the shielded ground wire from the FCCP Sensor cable to the grounding screw on the Multitel unit.
   d. Connect FCCP Sensor which will go to battery string of UPS-B to SENSOR B port on Multitel and wire the shielded ground wire from the FCCP Sensor cable to the grounding screw on the Multitel unit.
3. Continue to Multitel FCCP / Canara Controller Configuration section below.
Multitel FCCP / Canara Controller Configuration

1. Before placing the FCCP Sensors on the battery cables, zero them out by first power cycling FCCP unit and then quickly hold down the 2 blue buttons on the front of the Multitel FCCP unit until you see all 4 LEDs light up. Once the LEDs turn off, the FCCP Sensor is zeroed out.
2. Wait until all the LEDs turn off before proceeding to the next step.
3. Connect PC to Canara Controller USB client as described in the Connectivity to Canara 550 Controller section at the beginning of this document.
4. Once in console window Configure Analog Settings to enable the new FCCP Sensors with the following commands:
   a. Command: `csb setch exeeexxx`
   b. Command: `csb setcfg 3,0,10,0`
   c. Run if doing Installation Config 2, command: `csb setcfg 4,0,10,0`
   d. Command: `csb save`
5. To zero out reading on Canara Controller Sensors 3 & 4, (this example zeros out Sensor-3):
   a. Command: `csb getdata 3`
   b. The Sensor-3 reading will be returned:
      i. Example: `csb getdata 3:OK:-0.3681`
      ii. Find the Offset by taking the returned value and multiply by -10.
         1. Offset = -0.3681 x -10 = 3.68
      iii. Use the offset value and incorporate it into the 4th field in the `csb setcfg` command:
         1. Command: `csb setcfg 3,0,10,3.68`
         2. Command: `csb save`
   iv. Sensor-3 reading should now be very close to zero
   v. Repeat steps 5a-b for Sensor-4 if using second FCCP Sensor on one Controller.
6. Unlock the FCCP Sensor by pulling out the white latch. Once the latch is released, the FCCP Sensor can now be placed on the battery cable. Make sure that the arrow on the FCCP Sensor points in the direction of charge current flow.
7. To enable FCCP on the Canara Manager go to Canara Connect → Battery Controllers → Select System to expand → enable FCCP → Save
   a. Now a float graph should be accessible in Canara Connect Dashboard tab under the system with the FCCP.
<table>
<thead>
<tr>
<th>Canara SF10 UPS B: CANARA HYBRID</th>
<th>Status</th>
<th>Heartbeat</th>
<th>Last Scan</th>
<th>Next Scan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Online</td>
<td>Wednesday, Apr 30th 02:46:52 PM</td>
<td>Wednesday, Apr 30th 10:36:46 AM</td>
<td>On Demand</td>
<td></td>
</tr>
</tbody>
</table>

### Voltage Graph

- **Graph Title**: Real Charge Level...
- **Graph Details**:
  - Dates: 03/30/2014 to 04/13/2014
  - Y-axis: Real Charge Level (in %)
  - X-axis: Date

---

**Note**: The image contains a detailed view of the Canara SF10 UPS B configuration within the Canara Connect platform, highlighting the status, heartbeat, last scan, and next scan details. The voltage levels are indicated with online status and battery charge graphs.
Appendix B:

Canara Output Relay Module

The Output Relay Module by SeaLevel is an optional component for use with the Canara Manager. The module offers data acquisition solutions that are perfect for a wide range of applications and environments with easy interfacing to controllers, PLC and BMS and is designed for maximum flexibility and easy field wiring.

The modBus alarm output from each Canara Controller is mapped to a form C relay contact that can be tied to a BMS for local monitoring. The change of state of the form C relay contact is indicative of parameters that have been exceeded such as voltage, impedance, temperature or a battery discharge condition.

The Output Relay Module supports up to 16 SPDT Form C relays while connection to the host device is made via Ethernet 10/100BaseT connection using industry standard Modbus TCP protocol. The output relay module is powered from your 9-30VDC source. The output relay module’s 16 channels of highly reliable SPDT Form C relay outputs are rated for up to 60VDC @ 2A. Each output offers normally-open and normally-closed contact connections via 3.5mm field removable terminal blocks.
How to install a relay module

1. Connect Ethernet port on Output Relay Module to the Canara Monitoring LAN. This should be on the same network as the native Ethernet port on the Canara Manager or where all the Canara Monitoring devices reside, refer to the diagram below.
2. Connect the provided DC power plug/cable into the Output Relay Module power port.
3. Connect the AC side of the power adapter to an available power receptacle.
4. Connect the form C relay outputs to appropriate applications (customer defined).
How to configure a relay module

1. Log in as administrator to Canara Connect on the Canara Manager
2. Navigate to the System tab:

3. Under **System Operations** if Output Relay Module is OFF turn it ON by:
   a. Clicking on Output Relay Module link
   b. In the prompt that appears click Start

4. A new tab will appear next to the System tab labeled Relays
5. Click on the Relay tab
6. To add a new relay module click on Add New. The following information regarding the relay module must be filled out:

   a. **Name** – Select a name for the relay module. This field may contain alpha and numeric values. Blanks are acceptable.

   b. **Model** – this field should contain the model of the relay module.

   c. **IP Address** – The relay box should have an IP address pre-assigned to it and it should be clearly marked on the case of the relay module. If not refer to the SeaLevel Seal/O User Manual to configure an IP on the device manually. Make sure to use an available IP address on the same network as the Canara Manager.

   d. **Modbus ID** – enter the Modbus ID of the relay module being used. This value should always be ‘247’ for all SeaLevel relay modules.

   e. **# of Channels** – select the number of channels on the relay module.

   f. **Save** – click on this button to complete and save the new relay module entry.
7. To delete a relay module click on Delete button next to the relay module.

To map a relay channel to a Canara Battery Controller

1. Log in as administrator to Canara Connect
2. Navigate to the Battery Controllers tab
3. At this point all the Battery Controller systems should be configured and collecting battery data in order to verify functionality.
4. Click on the Battery Controller System for which the relay is to be mapped, it should expand out to show system details.
5. Click on DC Device Name drop down menu and select the relay module & channel # (separate drop down menu just to the right of the DC Device Name menu) that is to be used
in connection with this System. A particular channel # can only be assigned to one Battery Controller System so that each system has a unique channel #.

6. If blank enter a ModBus ID in the ModBus ID field. Typically ModBus ID values start at 31 and ascend from there. Each Battery Controller System must have its own unique ModBus ID.

7. Click Save

8. Done

How it works / example

Any alarms observed in the Dashboard tab in Canara Connect for a particular Battery Controller System will be mapped to the relay module/channel # selected for that system. Both of the systems in the screenshot below are mapped to an output relay module and specific channel.
a. When no alarms are present under the Status indicator as is the case for the system in the screenshot labeled ‘Canara SF10 A01’ the Form C relay output ‘NO’ will be open and the ‘NC’ will be closed with respect to ‘C’ or it can be said that the Form C relay output is in the normal state.

b. When one or more alarms are present under the Status indicator as is the case for the system in the screenshot labeled ‘Canara SF10 A02’ the Form C relay output ‘NO’ will switch to closed position and the ‘NC’ will switch to open position with respect to ‘C’ or it can be said that the Form C relay output is in the switched state.

c. On Canara Connect under the Relay tab there is a summary of the output relay channels states. A ‘0’ means there are no alarms for the system mapped to that relay module/channel # and ‘1’ means there is one or more alarms for the system mapped to that relay module/channel #. As in the example above the system ‘Canara SF10 A01’ has no alarms so Ch1 which is linked to that system displays a ‘0’. In contrast system ‘Canara SF10 A02’ has 2 critical alarms so Ch2 which is linked to that system displays a ‘1’. The ‘0’ and ‘1’ on the Relays tab are indicative of the state of the Form C relay output. Where a ‘0’ indicates that the Form C relay output is in its normal state and a ‘1’ indicates it’s in its switched state.
Appendix C:

Setting Node LED Priority MOC vs Local Manager Thresholds

Typically the Node LED will default to be set by the Canara Monitoring Operations Center (MOC) and the node colors are determined by the thresholds set at the MOC. An alternate option is to have the node LED set by local manager thresholds determined in the Battery Controllers tab. The first thing that must be done is to make sure the Use Local Thresholds option is turned ON. If the thresholds are to be set locally the administrator must change voltage, temperature and impedance thresholds for each system configured in the Canara Manager.

Set Use Local Thresholds

1. Log in as administrator to Canara Connect
2. Navigate to the Battery Controllers tab:
3. Click on Use Local Thresholds located in the upper right side of the Battery Controllers tab and click on Start button when the prompt appears.
4. The Use Local Thresholds should now indicate that it is ON.

5. Click on each System under Battery Controllers tab to set the desired alarm limits for voltage, temperature, impedance and click Save.
6. To force the LEDs to change according to the new local thresholds manually, navigate to the Dashboard tab. Find the system and click on the On Demand button located on the right side of the GUI. If this is not done the LEDs will automatically change on or before the next scan.

7. The On Demand prompt will appear click on the Force Set LED button and the system will start to manually change the LEDs. The actual node LED colors should match the colors observed on the Node View indicators seen in the Dashboard tab.
Technical Support

For further support regarding the Canara Manager Installation and Setup, please call 1-877-4BATTPHONE or email us at support@canara.com

Visit us online at http://www.canara.com
Limited Warranty for Canara Products

Canara, Inc. (“Canara”, “we”, “our”) takes pride in our products and are pleased that you have chosen them. We offer for the Canara products accompanied by this limited warranty statement (“Product”) the following limited warranty for Product hardware components and embedded software (“Warranty”).

Please read this Warranty carefully. This Warranty sets forth our responsibilities in the unlikely event of a defect and tells you how to obtain repair or replacement under this Warranty.

This Warranty is given ONLY to the original purchaser who purchases the Product for commercial or industrial use in the ordinary course of each purchaser’s business (“User”). This Warranty is not transferable or assignable to any subsequent user without Canara’s express, written permission.

ONE YEAR LIMITED HARDWARE WARRANTY:

Terms of Warranty:

Canara warrants to User for a period of one (1) year from the Product shipment date (the “Hardware Warranty Period”) that the Product hardware components (“Hardware”), when used in accordance with the manuals and documentation generally furnished by Canara to its customers (“Documentation”), will be free of material defects in materials and workmanship and will materially conform to the Documentation, provided that (i) the Product installation and start-up was performed by Canara personnel and completed within six (6) months after the Product shipment date, and (ii) the Product was stored correctly in accordance with the Documentation before initial operation.

The date of completion of Product installation and start-up will be determined based on the completed inspection and start-up sheet provided by Canara to User for each site location. The Product shipment date will be determined by the Canara or authorized Canara’s reseller’s bill of lading, as applicable.

If the Hardware (or any part or portion thereof) fails to conform to the Warranty within the Hardware Warranty Period, Canara will, at its own expense and as its sole obligation, and Warranty with respect to the Hardware, (i) use commercially reasonable efforts to repair or replace any defective Hardware using new or refurbished replacement parts, or (ii) if Canara is unable to repair or replace the defective Hardware, accept the return of the Product at issue and refund the fees actually paid by User to Canara or Canara’s authorized reseller for such Product less a reasonable amount for depreciation thereof.

ONE YEAR LIMITED SOFTWARE WARRANTY:

Terms of Warranty:

Canara warrants to User that the software embedded or incorporated into the hardware components of the Product (“Software”), when used as permitted under the applicable end user license agreement and in accordance with the Documentation, will operate in material conformance with the Documentation for a period of two (2) years from the Product shipment date (as determined in accordance to the above) (“Software Warranty Period”). If the Software (or any part or portion thereof) fails to conform to the Warranty within the Software Warranty Period, Canara will, at its own expense and as its sole obligation, and as User’s sole and exclusive remedy, for breach of the Warranty with respect to the Software, (i) use commercially reasonable efforts to correct any reproducible nonconformity in such Software, or (ii) if Canara is unable to correct such nonconformity, accept the return of the Product at issue and refund the fees actually paid by User to Canara or Canara’s authorized reseller for such Product less a reasonable amount for depreciation thereof.

Notwithstanding the foregoing, Canara does not provide any warranty coverage for beta or customized Software (“Beta Software”). CANARA PROVIDES USER ALL BETA SOFTWARE “AS IS” AND MAKES NO WARRANTY THAT THE BETA SOFTWARE IS ACCURATE, FREE OF ERRORS, UP TO DATE, OR COMPLETE. ANY USE OF THE BETA SOFTWARE IS AT USER’S OWN RISK.
WARRANTY PROCEDURE:

In order to obtain warranty service for the Product, User must contact Canara at (877) 422-8874 within the applicable Hardware Warranty Period or Software Warranty Period to determine if the problem can be resolved, a workaround procedure can be used, or if the Product (or any part or portion thereof) needs to be repaired, replaced, or corrected. If Canara determines that the Product (or any part or portion thereof) needs to be repaired, replaced, or corrected, Canara will either, in its sole discretion, provide User a Return Material Authorization (“RMA”) to return such Product or send Canara personnel to User’s site where such Product is located. User must return the defective Product under a RMA and in accordance with Canara’s then current shipping guidelines and provide any Canara personnel with reasonable access to the Product at issue. Warranty coverage will be extended only after Canara inspects and is able to verify or reproduce the claimed defect or nonconformity and Canara determines that the defect or nonconformity was not caused by any of the excluded causes set forth below (such Product not eligible for warranty, “Ineligible Product”). Canara will bear all costs of shipping to and from Canara and labor and transportation costs for Canara personnel to visit User’s site, except with respect to any Ineligible Product, for which User will bear such costs. All defective Products and component parts replaced under this Warranty become the property of Canara.

It is Canara's practice, consistent with its desire to remedy defects in the most prompt and effective manner possible, to cooperate with and utilize the services of third party component manufacturers, suppliers and their authorized representatives in the performance of work to correct defects in the Product components. Accordingly, Canara may utilize third parties in the performance of Warranty work, including repair or replacement hereunder, where, in Canara's opinion, such work can be performed in less time, with less expense, or in closer proximity to the Product.

EXCLUSIONS:

This Warranty does not cover damage, defect or nonconformity caused by: (i) handling, storage, installation or use of the Product not in accordance with the Documentation, including without limitation misuse, abuse, negligence, improper application, installation contrary to Canara's recommendations or specifications, inappropriate or inadequate electrical current or connection, or unsuitable on-site operating conditions, (ii) modifications, alterations, servicing or repair by non-Canara designated personnel, (iii) accident, exposure to the elements, Acts of God, or theft, (iv) change in installed location of Product without Canara's prior written approval, (v) any breakdowns, fluctuations, or interruptions in electric power or the telecommunications network, (vi) any use of a version of the Software other than the current version or the immediately preceding version, (vii) any use of the Product in a computing environment not meeting the system requirements set forth in the Documentation, (viii) any issues arising from the failure of the Software to interoperate with any other software other than any interoperability set forth in the Documentation, and (ix) any defect or nonconformance that is not reproducible by Canara.

This Warranty is void if the Canara serial number has been altered, defaced, or removed from the Product.

Except as expressly provided herein, this Warranty does not cover and User is responsible for shipping costs, installation costs, external circuit breaker resetting or maintenance or service items, labor costs or transportation charges arising from the replacement of the Product or any part thereof or charges to remove or reinstall the Product at any premises of User.

This Warranty is void if User allows any battery used with the Product to discharge below the minimum battery voltage cutoff point specified in the Documentation. This Warranty is void if the User does not start recharging a discharged, or partially discharged, battery within forty-eight (48) hours of the discharge period.

This Warranty is void if the Product is installed by an unauthorized third party.

REPAIR, REPLACEMENT OR CORRECTION OF A DEFECTIVE OR NONCONFORMING PRODUCT OR PART THEREOF DOES NOT EXTEND THE ORIGINAL WARRANTY PERIOD.

DISCLAIMER:

THIS WARRANTY IS PROVIDED IN LIEU OF ALL OTHER WARRANTIES AND CANARA HEREBY DISCLAIMS ALL OTHER WARRANTIES AND CONDITIONS WITH RESPECT TO THE PRODUCT, HARDWARE OR SOFTWARE, WHETHER EXPRESS, IMPLIED OR STATUTORY, INCLUDING THE IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, TITLE AND NONINFRINGEMENT OF THIRD-PARTY RIGHTS. CANARA DOES NOT WARRANT THAT THE OPERATION OF THE PRODUCT WILL BE ERROR-FREE OR UNINTERRUPTED OR THAT THE
SOFTWARE WILL IN EVERY CASE PROCESS ALL DATA CORRECTLY.

THE PRODUCT IS NOT INTENDED FOR USE, AND USER MAY NOT USE OR ALLOW OTHERS TO USE THE PRODUCT, IN CONNECTION WITH ANY PRODUCT OR APPLICATION REQUIRING FAIL-SAFE PERFORMANCE SUCH AS THE OPERATION OF NUCLEAR POWER FACILITIES, AIR TRAFFIC CONTROL OR NAVIGATION SYSTEMS, WEAPONS CONTROL SYSTEMS, LIFE SUPPORT SYSTEMS, OR ANY OTHER SYSTEM WHOSE FAILURE COULD LEAD TO INJURY, DEATH, ENVIRONMENTAL DAMAGE OR MASS DESTRUCTION. USER AGREES THAT CANARA WILL HAVE NO LIABILITY OF ANY NATURE, AND ANY USER IS SOLELY RESPONSIBLE, FOR ANY EXPENSE, LOSS, INJURY OR DAMAGE INCURRED AS A RESULT OF SUCH USE OF THE PRODUCT.

LIMITATION OF LIABILITY:

IN NO EVENT SHALL (I) CANARA HAVE ANY LIABILITY FOR INDIRECT, SPECIAL, INCIDENTAL, CONSEQUENTIAL OR EXEMPLARY DAMAGES OF ANY KIND WHATSOEVER, INCLUDING WITHOUT LIMITATION LOST PROFITS, BUSINESS INTERRUPTION OR LOSS OF DATA, ARISING FROM OR RELATING TO THIS WARRANTY OR THE PRODUCT, HARDWARE OR SOFTWARE, EVEN IF CANARA KNEW OR SHOULD HAVE KNOWN OF THE POSSIBILITY OF SUCH DAMAGES, AND (II) CANARA’S TOTAL LIABILITY ARISING FROM OR RELATED TO THIS WARRANTY AND THE PRODUCT, HARDWARE AND SOFTWARE, WHETHER ANY CLAIM IS BASED UPON THEORIES OF CONTRACT, NEGLIGENCE, STRICT LIABILITY, TORT, OR OTHERWISE, EXCEED THE FEES PAID BY USER TO CANARA OR CANARA’S AUTHORIZED RESELLER FOR THE PRODUCT AT ISSUE. THIS LIMITATION IS CUMULATIVE AND WILL NOT BE INCREASED BY THE EXISTENCE OF MORE THAN ONE INCIDENT OR CLAIM. CANARA DISCLAIMS ALL LIABILITY OF ANY KIND OF ITS SUPPLIERS. THE FOREGOING LIMITATIONS OF LIABILITY ARE INDEPENDENT OF ANY EXCLUSIVE REMEDIES FOR BREACH OF THIS WARRANTY.

SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OF IMPLIED WARRANTIES OR THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATIONS OR EXCLUSIONS MAY NOT APPLY TO USER. THIS WARRANTY GIVES USER SPECIFIC LEGAL RIGHTS, AND USER MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM JURISDICTION TO JURISDICTION. THE DISCLAIMERS, EXCLUSIONS AND LIMITATIONS OF LIABILITY UNDER THIS WARRANTY WILL NOT APPLY TO THE EXTENT PROHIBITED BY APPLICABLE LAW.

MISCELLANEOUS:

Except as set forth herein, no salesperson, employee or agent of Canara is authorized to add to or vary the terms of this Warranty. Warranty terms may be modified--if at all-- only by a written agreement signed by an authorized Canara officer.

Canara’s obligations under this Warranty are conditioned upon User’s timely and full payment of the Product purchase price and any other amounts due. Canara reserves the right to supplement or change the terms of this Warranty in any subsequent warranty offering to User or others.

In the event that any provision of this Warranty should be or becomes invalid and/or unenforceable during the warranty period, the remaining terms and provisions shall continue in full force and effect.

This Warranty shall be governed by, and construed under, the laws of the State of California, without giving effect to any conflicts of laws principles that would require the application of the laws of another jurisdiction.

Reservations: Note: The images within this guide are for visual purposes only and may not reflect the actual products. Canara reserves the right to change information within this guide without notice.

Node, TeMpEx, Controller, Canara Controller, CB Filter, CIM50 & CPB50 are registered trademarks and copyrights © of Canara, Inc. San Rafael California.

Reservations:

Note: The images within this guide are for visual purposes only and may not reflect the actual products. Canara reserves the right to change information within this guide without notice.
For additional information, please contact:

NORTH AMERICA
181 Third Street, Suite 150
San Rafael, California 94901
T: +1 415 462 8950
+1 877 422 8874
F: +1 415 532 2384

EMEA
Festival House
Jessop Avenue
Cheltenham, Gloucestershire GL50 3SH
T: +44 (0) 208 819 7047

CHINA
Building 18, Area B, No. 1
Disheng North Street
Yizhuang Economic and Technological Development Zone
Beijing, 100176 China
T: +86 10 8712 0457

ONLINE
www.canara.com
sales@canara.com