



**OPERATION MANUAL**

**FOR**

**MODEL 66259**

**EXTENDER CONTROL UNIT**

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## 1. INTRODUCTION

The Model 66259 Extender Control Unit is designed to allow the use of the 6623A Series of Current Sources and High Current Range Extenders without the need for a Model 6622A DCC Bridge or as an interface controller to allow the use with older DCC Bridge models. This manual is a guide to the use, setup and operation of the Control Unit for controlling the current source of the 6623A and providing a means of using the 6623A Series of Range Extenders with older models of DCC Bridges such as the models 6675A and 6622.

### 1.1. SUPPLIED PARTS

The following items are supplied to make up the Model 66259:

- GPN 31151-01-09 Model 66259 Extender Control Unit, main assembly.
- GPN 320-12018 Isolated power supply (& line cord GPN 250-03040).
- GPN 31168-01-21 Extender interconnection cable for the 6623A Series of Range Extenders.
- GPN 31167-02-21 Bridge interconnection cable for DCC Bridges.
- GPN 31219-02-21 Bridge Terminator for use without a DCC Bridge.

### 1.2. PRELIMINARY

The main assembly of the Model 66259 Extender Control Unit is contained in a plastic molded case and contains the electronics and interconnections to provide a means of connection to the 6623A Series of Range Extenders and control of the current source. The front panel includes a touch screen display, switches, connectors and indicators such that the operator has control of the operation of the unit and indication of its operational state.

The Control Unit may be used simply as a means to independently control the current output of the Model CS1000 Current Source normally used with the 6623A Range Extender models above 600 Amperes. The Control Unit can also be used as a means of utilizing the 6623A Series of Range Extenders with older models of the Guildline DCC Bridges or as a stand-alone High Current Source with a means of monitoring the output current.

## 1.3. WARRANTY

Each Model 66259 Extender Control Unit provided includes a two (2) year warranty in which Guildline Instruments warrants that the unit is free from defects in material, workmanship, manufacturing, and design and will perform to or exceed specifications, if operated properly, for the duration of the two (2) year warranty coverage. This warranty only extends to the intended original purchaser.

Guildline will repair or replace any failed unit at no additional cost to the customer. Guildline will be responsible for returning warranty standards to the owner and will bear transportation costs from the repair center back to the user. It will be the customer's responsibility for transportation costs for equipment returned to Guildline for repair or replacement. Warranty repairs will be provided in Canada.

**Guildline does not provide warranty service or file claims due to shipping damage. Customers are responsible for properly packaging instruments and insuring instruments, to account for the possibility of shipping damage.**

These warranties will not, in any way, be voided by any customer performed routine maintenance accomplished in accordance with Guildline's service procedures (e.g. replace fuses, adjust instrument in accordance with calibration instructions, lubrication, cleaning, etc.).

## 1.4. TO OBTAIN WARRANTY SERVICE

Before returning any warranty equipment to Guildline Service Center, a Return Authorization Number (RMA) and shipping instructions from Guildline Instruments is required. Guildline Service Center information is as follows:

The phone number in the USA and Canada to obtain Product Support, Calibration Service or Replacement Parts is (800) 310-8104.

To Contact Guildline Instruments, the following information is provided.

USA and Canada Telephone: (613) 283-3000

USA and Canada Fax: 1-613-283-6082

Outside US and Canada Telephone: + [0] [1] 613 283-3000

Outside US and Canada Fax: + [0] [1] 613 283-6082

You can also contact Guildline Instruments Limited via their Email or Website.

Email is: [sales@guildline.com](mailto:sales@guildline.com)

Website is: [www.guildline.com](http://www.guildline.com)



## 2. INSPECTION AND SETUP

### 2.1. INSPECTION

The Model 66259 Extender Control Unit is provided with the necessary accessories to allow utilization of the 6623A Series of Current Sources and High Current Range Extenders in the various modes as described in Section 1.2. During the opening of the shipping box ensure that the components specified in Section 1.1 have been received.

Note that for some special applications additional cables may be included which are required for the special application. An application note or a specific operation manual would be provided in such instances to describe the use of the additional cables.

#### Notes:

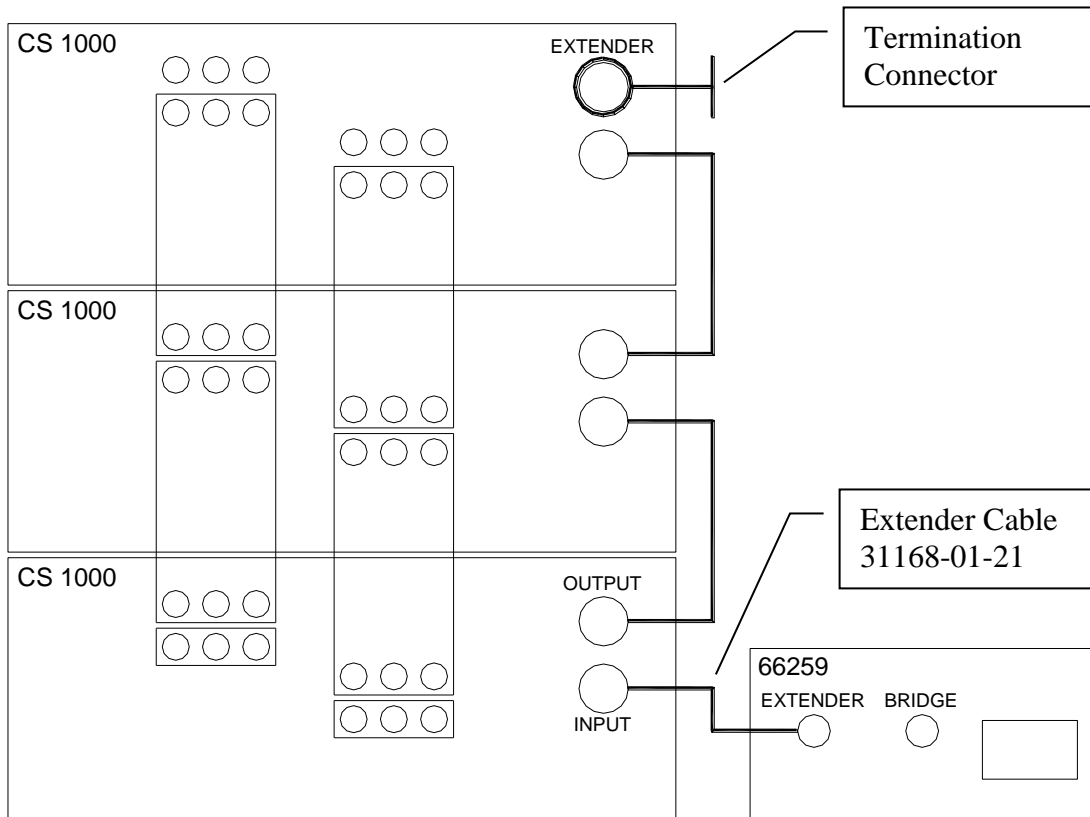
- 1. Do not operate the 6623A, DCC3000, or the DCC10000 Comparator without an Extender Output termination resistance or a Bridge Terminator connector or a DCC Bridge.**
- 2. Do not operate DCC3000 without the 3A Range Extender as the extender output current of the DCC3000 can be as high as 3 A, which can damage the Bridge Terminator or DCC Bridge. The Model 6623A-3 must be used to further divide the extender output current to a maximum value of 0.150 A.**
- 3. Do not operate DCC10000 without the 10A Range Extender as the extender output current of the DCC10000 can be as high as 10 A, which can damage the Bridge Terminator or DCC Bridge. The Model 6623A-10 must be used to further divide the extender output current to a maximum value of 0.150 A.**
- 4. DO NOT connect or disconnect a load from the current output when the current output is active.**

## 2.2. SETUP FOR CS1000/6623A-PCS CURRENT SOURCE CONTROL

For operation of the CS1000 Current Source(s) independently such as in a 6623A-PCS system, the Extender cable, GPN 31168-01-21 is connected between the Control Unit “Extender” circular connector and the CS1000 “Bridge” circular connector. Multiple units of the CS1000 may be connected such that the current output buses are connected in parallel and the control inputs in daisy chain fashion. The last CS1000 unit in the chain must have a termination connector or emergency shut off switch installed.

See Figure 2-1 for details of connections.

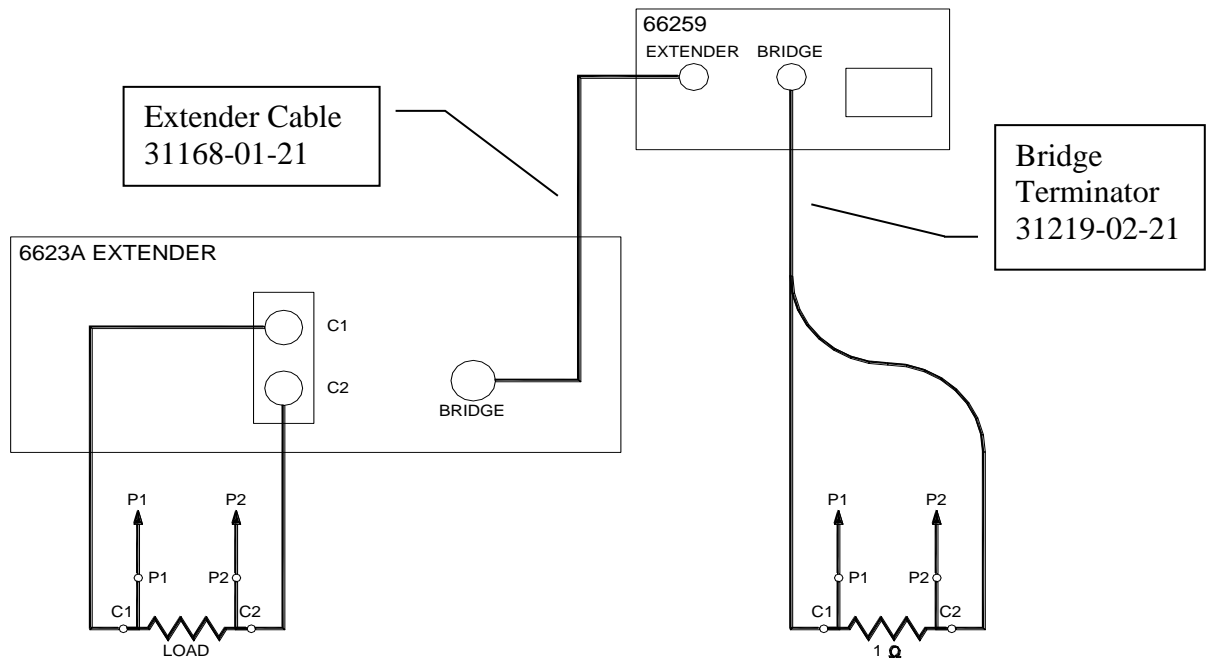
If the DCC3000 or DCC10000 Comparator is also to be connected then the setup in Section 2.3 or 2.4 for 6623A systems must be followed.



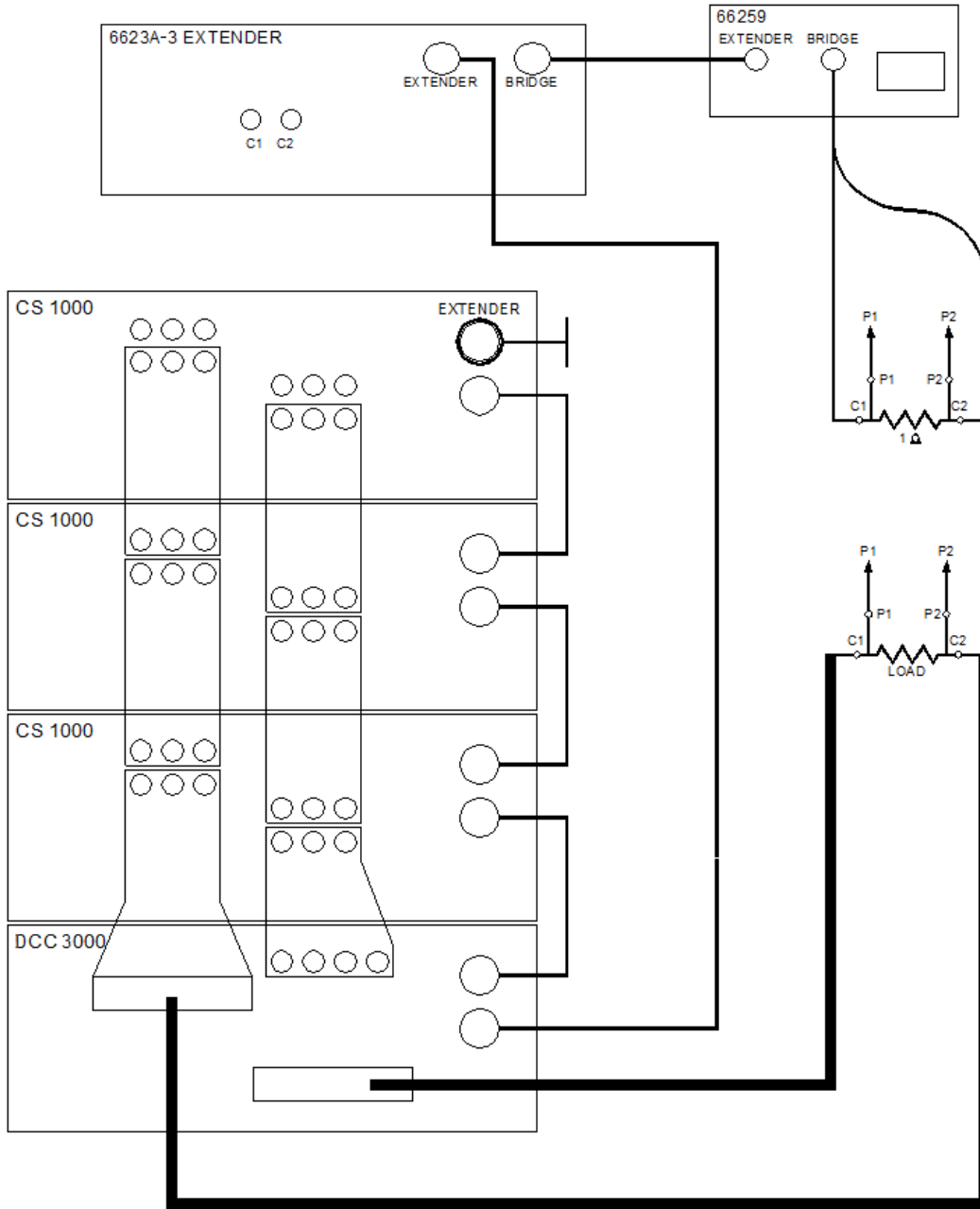
**Figure 2-1: Model 66259 Interconnection Diagram for CS1000**

## 2.3. SETUP FOR 6623A CONTROL WITHOUT A BRIDGE

For operation of the 6623A Series Range Extenders, the Extender cable, (GPN 31168-01-21) is connected between the Control Unit “EXTENDER” circular connector and the 6623A, “BRIDGE” circular connector. Where the 6623A uses a DCC3000, or the DCC10000 Comparator, ensure that the connection is to the 6623A-3A or 6623A-10A respectively and that the DCC3000, or the DCC10000 Comparator is also powered on. The Bridge Terminator GPN 31219-01-21 must be used to connect the Extender Output signal to a termination resistance in order to prevent current saturation and possible damage of the current comparator. See Figure 2-2 for details of connections.



**Figure 2-2 : Model 66259 Interconnection Diagram for 6623A Extenders Less Than 1000A**



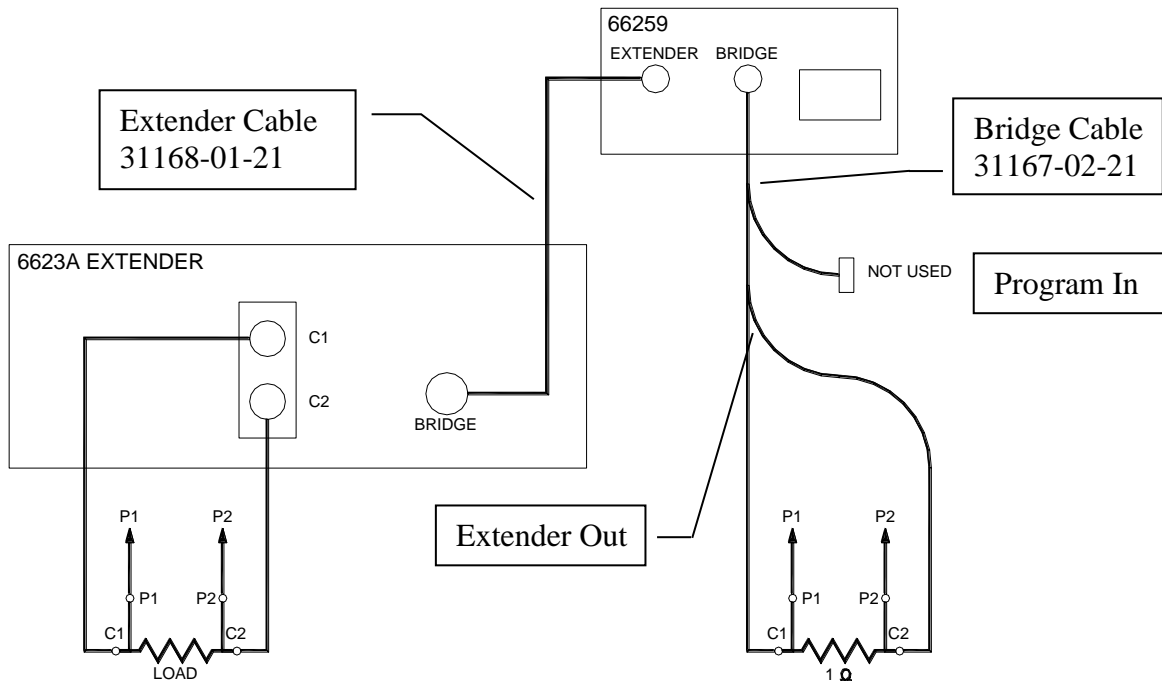
**Figure 2-3 : Model 66259 Interconnection Diagram for 6623A Extenders 1000A or Greater**

## 2.4. SETUP FOR 6623A CONTROL WITH CURRENT MONITORING

For operation of the 6623A Series Range Extenders, the Extender cable, (GPN 31168-01-21) is connected between the Control Unit “EXTENDER” circular connector and the 6623A, “BRIDGE” circular connector. Where the 6623A uses a DCC3000, or the DCC10000 Comparator, ensure that the connection is to the 6623A-3A or 6623A-10A respectively and that the DCC3000, or the DCC10000 Comparator is also powered on. The Bridge interconnection cable GPN 31167-02-21 must be used to connect the Extender Output to a 0.1 ohm or 1.0 ohm resistance standard for current monitoring purposes. See Figure 2-3 for details of connections. By measuring the potential across the resistance standard the magnitude of the current source can be calculated by using the following formula;

$$I\text{-out} = \text{Extender Ratio} \times (V_s / R_s)$$

Where  $V_s$  is the measured voltage on the resistance standard and  $R_s$  is the ohms value of the resistance standard.

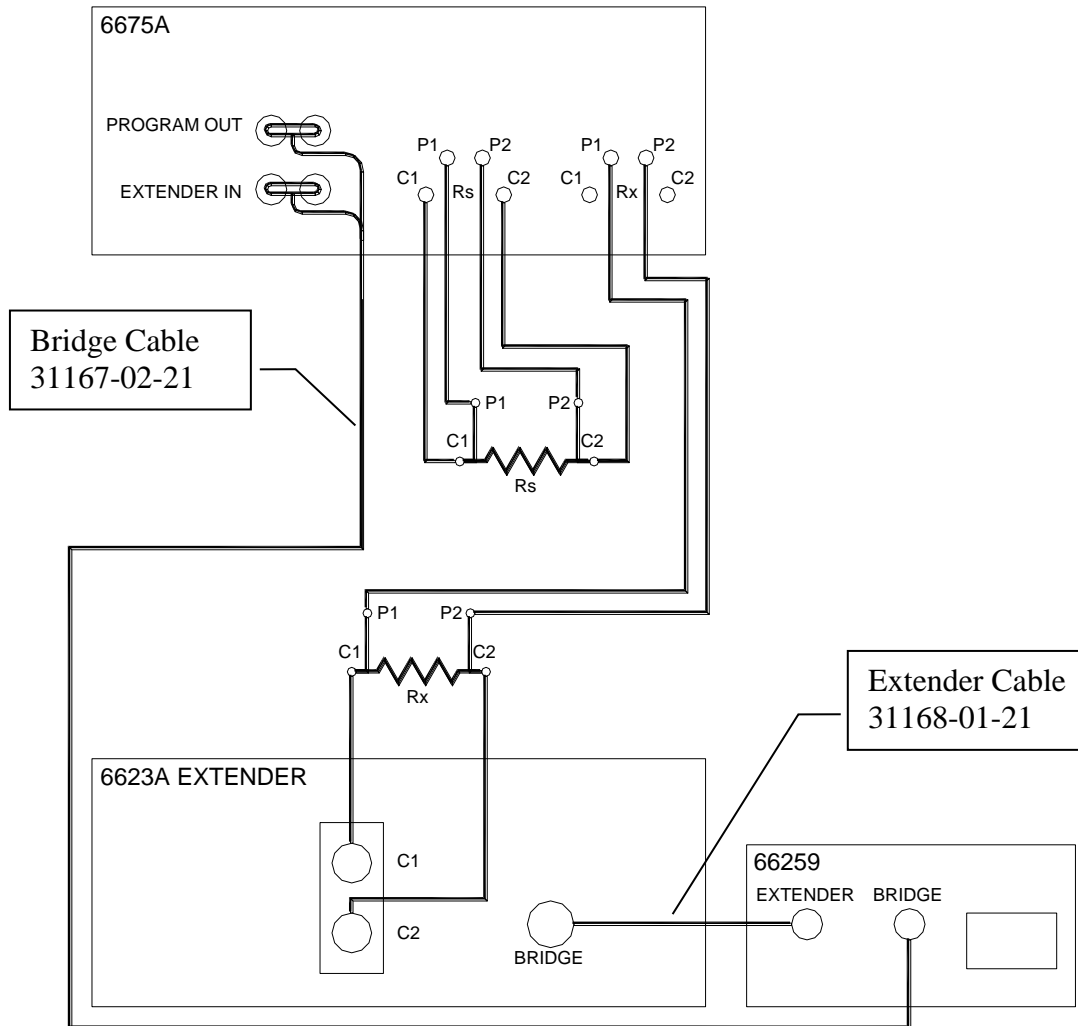


**Figure 2-4 : Model 66259 Interconnection Diagram with Current Monitoring**

## 2.5. SETUP FOR OPERATION OF 6623A WITH OLDER BRIDGES

For operation of 6623A Series Range Extenders with older model DCC Bridges such as a Guildline 6675A, the Extender cable, (GPN 31168-01-21), is connected between the Control unit “EXTENDER” connector and the “BRIDGE” connector of the 6623A. The Bridge cable, (GPN 31167-02-21), is connected between “BRIDGE” connector of the control unit and the Extender Input and Program Output of the DCC Bridge. See Figure 2-3 for typical connection details.

Note that an Application Note may be provided with additional connection details for a specific DCC Bridge application.



**Figure 2-5 : Model 66259 Interconnection Diagram with DCC Bridges**

### 3. CONTROL UNIT FUNCTIONS AND INDICATORS

The 66259 is mounted inside a ruggedized plastic case. When you open the lid you will see the front panel shown below in Figure 3-1. All connections to the 66259 and operation of the 66259 are provided with this panel.



**Figure 3-1 : Model 66259 Front Panel**

### 3.1. FRONT PANEL CONNECTORS, CONTROLS AND INDICATORS

#### 3.1.1 Power

The power input, power indicator and power switch are located at the top right hand corner of the front panel. The POWER indicator is lit when the power supply is connected to the front panel and the power switch is on.

#### 3.1.2 Display

The display below the power indicator and switch will be active when the unit is turned on. The display is a touch sensitive device and provides a means to input commands to the control unit and show the status of the controller and device it is controlling.

#### 3.1.3 Bridge Connector

The BRIDGE circular connector provides a means of connection to the program current input from and the extender output current to a DCC Bridge. Specific details of the bridge connections are provided in the specific application note or manual for a particular bridge.

#### 3.1.4 Extender Connector

The EXTENDER connector provides a means of connection to the 6623A Range Extender and supplies all the signals required to control the Range Extender.

#### 3.1.5 Current Active Indicator and Control

The CURRENT ACTIVE indicator is lit whenever the Control Unit is sending a program current to the range extender. The PUSH – PUSH switch located below the indicator will toggle the state of the current activation when pushed. If the indicator is off when the switch is pushed the indicator will be on if a current has been programmed into the control unit. If the indicator is on when the switch is pushed the program current to the extender will be immediately deactivated.

**NOTE: The controller when stopped by the “Current Active” button or by the external Emergency Stop Switch will display the message, "current compliance exceeded". This is a normal response for the controller in this condition as these two controls interrupt the program current.**

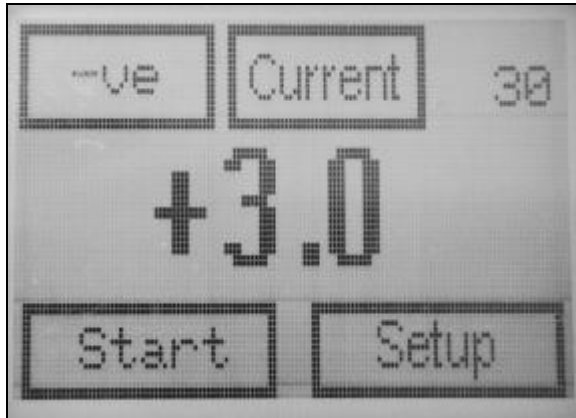
#### 3.1.6 USB Connector

The USB connector is normally not used in front panel operation of the control unit. The USB connector is only used for remote operation of the control unit via software. When connected to a PC the USB appears as a virtual COMM port device and can be accessed through any RS-232 control application. For more information on the remote commands refer to Section 7 of this manual.



### 3.2. TOUCH SCREEN DISPLAY FUNCTIONS

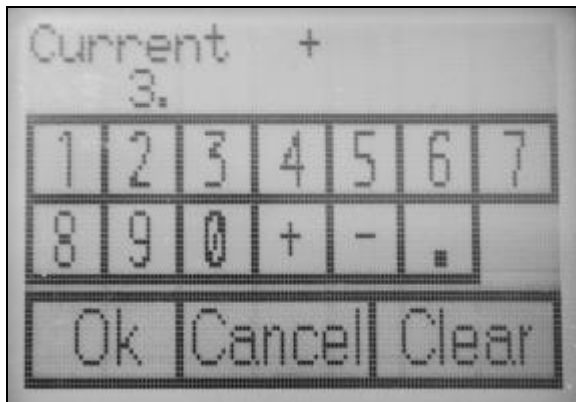
#### 3.2.1 Main Display



The Main Display screen indicates the output current, the polarity of the current as well as whether the current is active. You can access the setup menus to set the current output value, and control the state of the current output by simply pressing on the screen within the boxes. The word inside the boxes indicates what function is executed when touching the screen in that area.

Note that the display responds better with the use of the blunt end of a pencil or pen rather than a finger.

#### 3.2.2 Current - Data Entry Screen



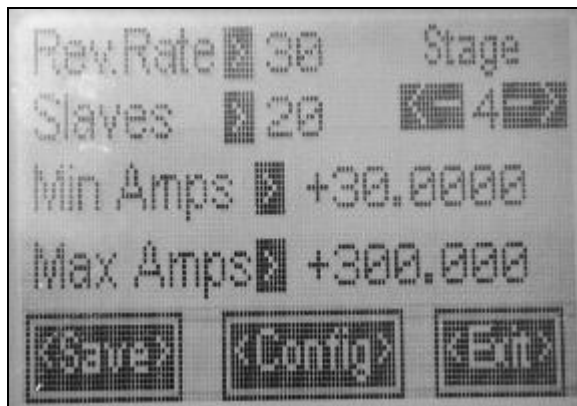
The Current - Data Entry screen allows the user to input the numeric parameters to control the current magnitude. This screen is displayed when the Current field in the Main display is touched. This screen will indicate the name of the value being changed, the value currently in the field, and display the user input value.

Pressing Ok will load the new value and return to the previous screen. Pressing Cancel will return to the previous screen with no change to the value. Pressing clear will clear the entry and remain in the screen to allow fixes to entry errors.

### 3.2.3 Data Entry Screens

Other Data Entry Screens will be displayed after any numeric field is touched. The screen will indicate the name of the value being changed, the value currently in the field, and display the user input value. Pressing Ok will load the new value and return to the previous screen. Pressing Cancel will return to the previous screen with no change to the value. Pressing clear will clear the entry and remain in the screen to allow fixes to entry errors.

### 3.2.4 Setup Screen



The Setup Screen displays and allows changes to be made to the current range for each stage of the current source. There are 5 stages available which will accommodate the current source for all Guildline 6623A models. To modify any parameter you simply touch the number on the screen. This will open a Data Entry screen allowing the user to input the desired value as described in Section 3.2.3. Pressing the arrows allows you to cycle through all the stages.

This screen also allows for setting of some global settings such as the number of slave current sources and an automatic reversal rate function.

**Note: Setting the reversal rate to Zero will disable auto-reverse function and enable manual reversal of the current or control from the DCC Bridge where applicable. Do not set the reversal rate to less than 30 seconds.**

**Note: Not all stages are used for all models of the 6623A.**

## 3.2.5 Configuration Screen



The Configuration Screen displays and allows changes to be made to the minimum and maximum current calibration coefficient values for each stage of the current source. There are 5 stages available which will accommodate the current source for all Guildline 6623A models. To modify any of the parameters you simply touch the number on the screen. This will open a Data Entry screen allowing the user to input the desired value. Pressing the arrows allows you to cycle through all the stages. Note that not all stages are used for all models of 6623A.

**NOTE: Changing these parameters directly affect the calibration. These numbers should correspond to the calibration data supplied with your 6623A and hand controller. Also the data entered here is specific to the combination of the hand controller and the 6623A indicated on the report. This data is not transferable with the data found in a 6622A DCC bridge or any other hand controller.**



### 4. CONTROL UNIT OPERATION

Outlined in this section is the basic front panel operation of the 66259 for the different applications in which it is used to control the 6623A series Range Extenders and Current sources. For software operation, refer to **Section 5**.

**Notes:**

1. **Do not operate the 6623A, DCC3000, or the DCC10000 Comparator without an Extender Output termination resistance or a Bridge Terminator connector or a DCC Bridge.**
2. **Do not operate DCC3000 without the 3A Range Extender as the extender output current of the DCC3000 can be as high as 3 A, which can damage the Bridge Terminator or DCC Bridge. The Model 6623A-3 must be used to further divide the extender output current to a maximum value of 0.150 A.**
3. **Do not operate DCC10000 without the 10A Range Extender as the extender output current of the DCC10000 can be as high as 10 A, which can damage the Bridge Terminator or DCC Bridge. The Model 6623A-10 must be used to further divide the extender output current to a maximum value of 0.150 A.**
4. **DO NOT connect or disconnect a load from the current output when the current output is active.**

### 4.1. EXTENDER PROFILE SETUP

The Model 66259 Extender Control Unit profile for a specific application is normally setup at the factory, before shipment. The profile details and applicable calibration coefficients are provided as a Coefficients Summary Report when the instrument is shipped. It is advisable to verify the coefficients using the following procedure.

- Step 1) Select the “Setup” screen from the main screen.
- Step 2) In the Setup screen cycle through the Stages to ensure the parameters for current ranges and ratios are the same as the report.
- Step 3) Ensure the number of slaves also matches the number of slaves stated on the report.
- Step 4) Select the “Config” screen from the “Setup” screen.
- Step 5) In the Config screen cycle through the Stages to ensure the parameters for current min Coef and max Coef are the same as the Coefficients Summary Report for both positive and negative polarities.
- Step 6) If any changes had to be made then exit the screen using the “Save” function otherwise press “Exit”.

### 4.2. CONTROL PROCEDURE FOR CS1000 CURRENT SOURCE

To control the current in the CS1000, ensure the controller is connected to the “Bridge” Input of the CS1000 as described in Section 2.2 and Figure 2-1. This connection must be made from the “Extender” circular connector on the 66259 Controller.

- Step 1) Select the “Setup” screen from the main screen,.
- Step 2) In the Setup screen cycle through the Stages to select the current range you wish to use then press “Save”.
- Step 3) Select the “Current (A)” option on the main screen and enter the desired current and press “Ok”. At this point the Current is NOT active.

**Note: It is advised that the lowest current for a particular range be initially selected to ensure the result is that which was expected.**

**Note: Set the reversal rate to Zero for manual control of the current polarity.**

- Step 4) Select the desired polarity from the main screen using the polarity function. Note that the button displays what will happen when you press it. The Current will indicate the polarity state by use of the sign in front of the number.
- Step 5) Press the “Start” button to activate the current. This will change to a “Stop” button when the current is activated. Also there will be the yellow light illuminated on the panel indicating the current is activated.
- Step 6) Press the “Stop” button to de-activate the current. In the event of an emergency where the current needs to be shut off, the “Current Active” switch can be used to immediately interrupt the current.

### 4.3. CONTROL PROCEDURE FOR 6623A CONTROL WITHOUT A BRIDGE

To control the current in the 6623A, ensure the controller is connected to the “Bridge” Input of the 6623A using the Extender cable, (GPN 31168-01-21). This connection must be made from the “Extender” connector on the 66259 Controller. The Bridge cable, (GPN 31167-02-21) must be used to connect the Extender Output to a known one ohm or lower, resistance standard as a means of monitoring the Extender Output current as shown in Figure 2-3 of Section 2.4.

Alternately if one does not need to monitor the current the Bridge Terminator connector, (GPN 31219-02-21) can be used instead of the Bridge cable as shown in Figure 2-2 of Section 2.3.

- Step 1) Select the “Setup” screen from the main screen,
- Step 2) In the Setup screen cycle through the Stages to select the current range you wish to use then press “Save”.
- Step 3) Select the “Current (A)” option on the main screen and enter the desired current and press “Ok”. At this point the Current is NOT active.  
**Note: It is advised that the lowest current for a particular range be initially selected to ensure the result is that which was expected.**  
**Note: Set the reversal rate to Zero for manual control of the current polarity.**
- Step 4) Select the desired polarity using the polarity function in the main screen. Note that the button displays what will happen when you press it. The Current will indicate the polarity state by use of the sign in front of the number.
- Step 5) Press the “Start” button to activate the current. This will change to a “Stop” button when the current is activated. Also there will be the yellow light illuminated on the panel indicating the current is activated.
- Step 6) Press the “Stop” button to de-activate the current. In the event of an emergency where the current needs to be shut off, a “Current Active” switch can be used to immediately interrupt the current.

Note that the Extender Control Unit has an auto-polarity reversing function that can be activated as may be appropriate by setting the reversal rate to 30 seconds or longer.



### 4.4. CONTROL PROCEDURE FOR 6623A WITH OLDER DCC BRIDGES

To control the 6623A using older bridges, the Extender cable, (GPN 31168-01-21), is connected between the Control unit “EXTENDER” connector and the “Bridge” connector of the 6623A. The Bridge cable, (GPN 31167-02-21), is connected between “BRIDGE” connector of the control unit and the Extender Input and Program Output of the DCC Bridge. See Section 2.5 and Figure 2-4 for further details of the connections.

- Step 1) Select the “Setup” screen from the main screen,
- Step 2) In the Setup screen cycle through the Stages to select the current range you wish to use then press “Save”.
- Step 3) Select the “Current (A)” option on the main screen and enter the desired current and press “Ok”. At this point the Current is NOT active.

**Note: It is advised that the lowest positive current for a particular range be initially selected to ensure the result is that which was expected.**

**Note: Set the reversal rate to Zero for manual control of the current polarity and to enable the DCC Bridge to control the polarity. The polarity must initially set to be positive.**

- Step 4) Select the desired polarity from the main screen using the polarity function. Note that the button displays what will happen when you press it. The Current will indicate the polarity state by use of the sign in front of the number. Typically the positive initial polarity is required for bridge operation.
- Step 5) Press the “Start” button to activate the current. This will change to a “Stop” button when the current is activated. Also there will be the yellow light illuminated on the panel indicating the current is activated.

- Step 6) The polarity will automatically reverse for bridges that send the polarity trigger to the unit via the Extender In terminals. In some manual bridges this trigger is not sent and the bridge auto detects the current polarity. In this case, the auto-reverse function on the 66259 Controller display may be activated by setting the reversal rate to 30 seconds or longer. For more details refer to the Application Note is normally provided with additional connection details for a specific DC Comparator Bridge.
- Step 7) Press the “Stop” button to de-activate the current. In the event of an emergency where the current needs to be shut off, a “Current Active” switch can be used to immediately interrupt the current.

## 5. 66259 REMOTE CONTROL

### 5.1. REMOTE OPERATION

The 66259 has a USB type A port located on the rear panel which is used for remote operation. The 66259, when powered on and connected to a computer, will install as a virtual COM Port on the computer. This COM Port can be used to communicate with the Guildline 66259 BridgeWorks software plugin, with any COM Port terminal program, or accessed programmatically in any software as a serial port. The communication is bi-directional thus allowing both setting the device and querying the status.

This section supplies a command reference for the 66259.

### 5.2. REMOTE COMMANDS

A brief description of each of the possible remote commands and their syntax in BNF (Backus Naur Form) follows:

- words inside angle brackets (ie. < and > ) are defined items
- ::= means "is defined to be"
- | means "or"
- [] means optional
- required letters are shown in upper case but may be upper or lower case

```

<digit> ::= 0|1|2|3|4|5|6|7|8|9
<letter> ::= A|B|C|...|Z|a|b|c|...|z
<string> ::= <letter> | <letter><string>
<boolean> ::= 0|1
<unsigned> ::= <digit> | <digit><unsigned>
<nr1> ::= [+|-]<unsigned>
<nr3> ::= <nr1>[.[<unsigned>]][E<nr1>]
<?> ::= <letter> | <digit>
<*> ::= <?> | [<*>] : not to be confused with *
<DD> ::= <unsigned> : limited to range 1...31
<MM> ::= <unsigned> : limited to range 1...12
<YYYY> ::= <unsigned> : limited to ranges 1999 and up

```

The STB Bits are as follows:

- bit 7 = (unused)
- bit 6 = SRQ (service request)  
; set when (SRQ\_mask|GPIB\_STAT\_PORT) != 0
- bit 5 = ESB (event summary)  
; set when bitwise AND of ESE, register is not zero
- bit 4 = MAV (message available)  
; set when GPIB Tx buffer has data available  
; cleared when the buffer is empty
- bit 3 = IFL (input buffer full)  
; set when input buffer is over 80 % full  
; cleared when input buffer drops under 20 % full
- bit 2 = CHK (Checksum calculation complete)
- bit 1 = RDY (ready)  
; set when unit has a stable reading  
; cleared when unit is working
- bit 0 = OVR (over range)  
; set when over range detected (in ISR)  
; cleared when over range cleared

<b>COMMAND</b>	<b>COMMENT</b>
*CLS	clear status register
*ESR?	query, display event status register
*ESE?	query, display event status enable
*ESE <unsigned>	set event status enable
*IDN?	query, display identity of unit
*OPT?	query, display any reportable options
*OPC?	query, operation complete
*OPC	set operation complete bit in event status register
*RST	reset the instrument to a known defined state
*STB?	query, display serial poll status byte
*SRE?	query, display service request mask
*SRE <unsigned>	set the service request mask
*TST?	query, display results of self-test
*WAI	set communication wait timeout
 RESET	 reset instrument to power on reset state

COMMAND	COMMENT
MEASure <state>	select the measurement state <state>::= 0 1 type <boolean> 0 ::= OFF 1 ::= ON
MEASure?	query, display the measurement state of the instrument
CURRent <cur>	set the output current <cur>::= value from 0 to 150.000mA type <unsigned>
CURRent?	query, display the channel pre-heat current
Stage <stage>	set the current stage <stage>::= 0 1 2 3 4 5 type <digit>
Stage?	query, display the current stage
ReversalRate <reversalRate>	set the automatic polarity reversal rate <reversalRate>::= 32 bit integer value type <unsigned>
ReversalRate?	query, display the polarity reversal rate
SerialNumber <serial>	set the system serial number <serial>::= 32 bit integer value type <unsigned>
SerialNumber?	query, display the system serial number
SLaves <slaves>	set the number of slaves in the profile <slaves>::= 32 bit integer value type <unsigned>
SLaves?	query, display the number of slaves in the profile

COMMAND	COMMENT
MINCurrent {0 1 2 3 4 5},<minCurrent>	set the minimum current for the profile stage {0 1 2 3 4 5}::= stage selection <digit 0 to 5> <slaves>::= 32 bit integer value type <unsigned>
MINCurrent? {0 1 2 3 4 5}	query, display the minimum current for the profile stage {0 1 2 3 4 5}::= stage selection <digit 0 to 5>
MAXCurrent {0 1 2 3 4 5},<maxCurrent>	set the maximum current for the profile stage {0 1 2 3 4 5}::= stage selection <digit 0 to 5> <slaves>::= 32 bit integer value type <unsigned>
MAXCurrent? {0 1 2 3 4 5}	query, display the maximum current for the profile stage {0 1 2 3 4 5}::= stage selection <digit 0 to 5>
MODE {0 1 2 3 4 5},<maxCurrent>	set the mode for the profile stage {0 1 2 3 4 5}::= stage selection <digit 0 to 5> <mode>::= 32 bit integer value type <unsigned>
MODE? {0 1 2 3 4 5}	query, display the mode for the profile stage {0 1 2 3 4 5}::= stage selection <digit 0 to 5>
RAMP {0 1 2 3 4 5},<ramp>	set the ramp time for the profile stage {0 1 2 3 4 5}::= stage selection <digit 0 to 5> <ramp>::= 32 bit integer value type <unsigned>
RAMP? {0 1 2 3 4 5}	query, display the ramp time for the profile stage {0 1 2 3 4 5}::= stage selection <digit 0 to 5>
RATio {0 1 2 3 4 5},<ratio>	set the ratio for the profile stage {0 1 2 3 4 5}::= stage selection <digit 0 to 5> <ratio>::= 32 bit integer value type <unsigned>
RATio? {0 1 2 3 4 5}	query, display the ratio for the profile stage {0 1 2 3 4 5}::= stage selection <digit 0 to 5>

COMMAND	COMMENT
CONFig:Coef {0 1 2 3 4 5},<PosMinCoef>,<NegMinCoef>,<PosMaxCoef>,<NegMaxCoef>	set the coefficients for the profile stage {0 1 2 3 4 5}::= stage selection <digit 0 to 5> <PosMinCoef>::= 32 bit integer value type <unsigned> <NegMinCoef>::= 32 bit integer value type <unsigned> <PosMaxCoef>::= 32 bit integer value type <unsigned> <NegMaxCoef>::= 32 bit integer value type <unsigned>
CONFig:Coef? {0 1 2 3 4 5}	query, display the coefficients for the profile stage {0 1 2 3 4 5}::= stage selection <digit 0 to 5>
CONFig:Save	save the profile changes
CONFig:CALibrate:DISPlay	run touch screen calibration routine
SYSTem:TERSe	respond to commands with a minimum data set
SYSTem:VERBose	respond to commands with a minimum data set
SYSTem:VERSion?	query, display the installed software version
SYSTem:LOCAL	respond to local operation (unlock local)
SYSTem:REMOTE	respond to remote operation (lock out local)





## 6. CONTROL UNIT CALIBRATION

The model 66259 Extender Control Unit can be calibrated so that the current source of the Range Extender connected to it will meet current magnitude specifications. The Extender Control Unit is normally calibrated at the factory whenever it is shipped with a specific Range Extender and a Summary of Coefficients is provided with the unit. If the Control Unit is shipped separately it should be calibrated before being used.

### 6.1. CALIBRATION SETUP AND PROCEDURE

1. Set up the Control Unit with the Range Extender as per Section 2.4 or 2.5 and connect suitable calibrated current shunts of known accuracy to the different current ranges in sequence.
2. For each current range, determine first the positive and negative current offsets at the lowest current in the range using a DMM with an accuracy of at least 0.03% and calculating the error of the positive and negative currents.
3. Refer to Section 3.2.5 to modify the “+min Coef” and the “-min Coef” values for the lowest range by algebraically subtracting the measured errors for each polarity to the existing calibration values. Note that only the small error values are used and not the actual measured current values for the coefficients as these coefficients represent corrections to the drive signals to the range extender current sources.
4. Repeat the procedure for the highest positive and negative currents and modify the “+max Coef” and the “-max Coef” values accordingly.
5. Verify that the modified coefficient values provide current outputs within specifications.
6. Repeat the process for each higher range.



## Section 6

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### **7. CONTROL UNIT MAINTENANCE AND SERVICE**

#### **7.1. MAINTENANCE**

There are no routine maintenance requirements for the model 66259 Extender Control unit. It is recommended that the current calibration be verified as per Section 5 on an annual basis. There are no fans or air filters to be checked.

The unit should be inspected for proper functioning and the cables inspected for damage during the calibration.

#### **7.2. SERVICE**

There are no user serviceable parts in the Extender Control Unit. Contact Guildline Instruments for instructions should a fault be experienced.