Manual

Starlogger Field Termination Strip & Input/Output Modules

Models 6103E, 6104A-K, 6107B 6114A, 6141A, 6144A

Revision History

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1.0 INTRODUCTION

This supplement explains how to use the Starlogger Field Termination Strip (model 6103E). A FTS extends a data logger's (model 6004D Starloggers) input signal connections to rows of numbered screw terminals, simplifying on-site installation of a data logging system (particularly for complex applications).

This supplement also includes a detailed description of how to install the model 6103M-L Mounting Frame, and instructions for using signal conditioning modules (I/O Modules) which can be attached to the FTS. These modules are:

- Model 6107B Isolated Input Amplifier & Relay Output
- Model 6114A Single Channel Relay Control Module
- Model 6141A Isolated Input Module
- Model 6144A 4-20mA Current Loop Isolator

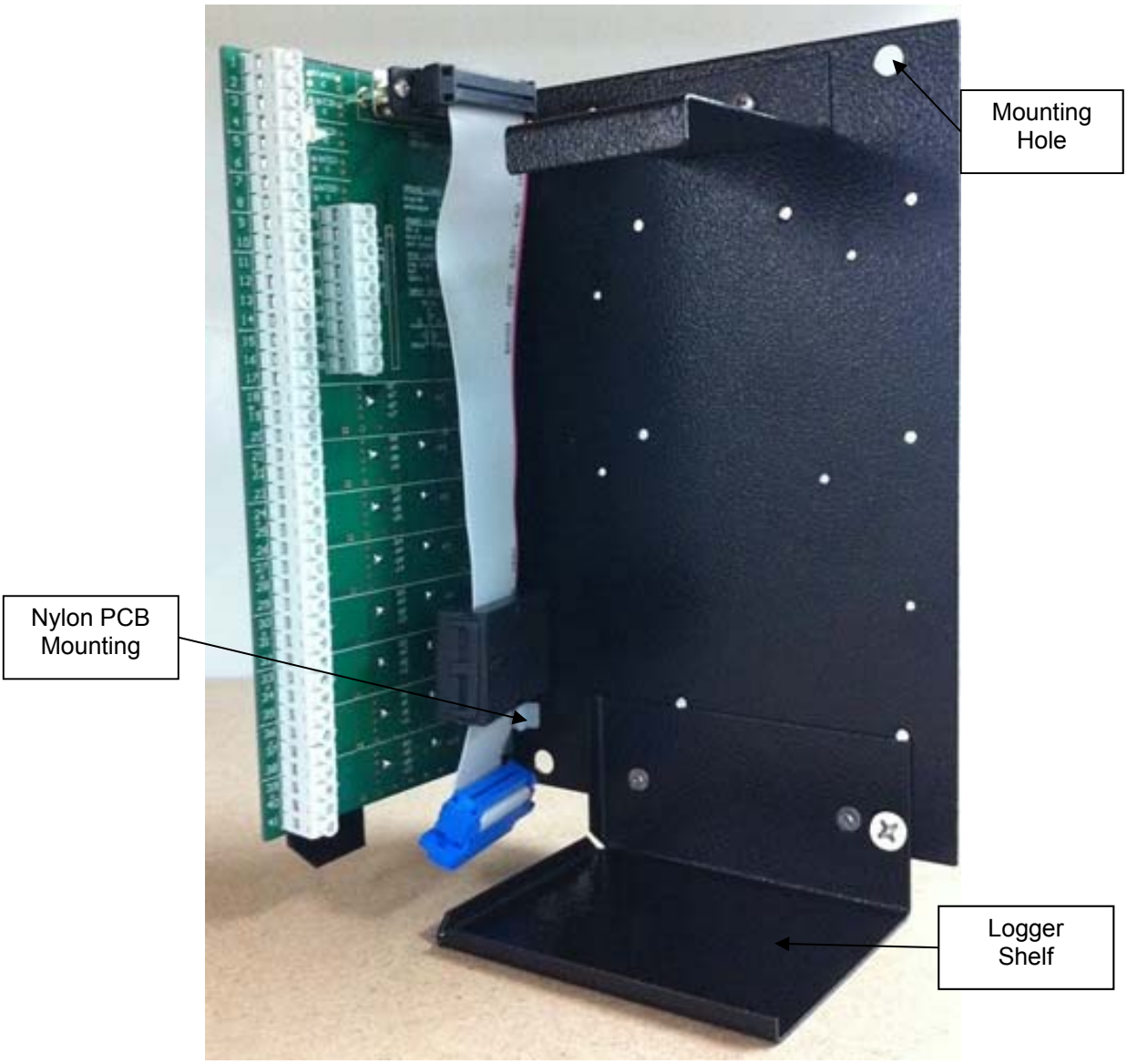
1.1 Introducing the Starlogger Field Termination Strip

The Starlogger Field Termination Strip (Model 6103E) was developed to take advantage of the technical advancements offered by the Model 6004 Starlogger. Its features are:

- More links for signal conditioning and custom configuration.
- More terminals for scan synchronised power, continuous Micro power and continuous external power.
- Built-in facility to add special purpose modules.
- An extra three terminals for custom use.
- An Analog Ground is provided for all channels

2.0 INSTALLATION OF FRAME AND STRIP

This frame is designed to be mounted inside a Model 6701 Weatherproof Enclosure.



Model 6103E FTS and 6103M-L Mounting Frame

The frame provides:

- a shelf on which the Data Logger is held in place
- Holes for nylon PCB mountings for the Termination Strip
- 4 x 6 mm mounting holes (at each corner) for the frame to be mounted In 6701 waterproof enclosure

3.0 TERMINATIONS

This section provides brief descriptions of terminations and links and two diagrams of the Model 6103E Field Termination Strip. The table below lists each termination. It includes a brief description, the corresponding channel used in Starlog Software and the corresponding pin in the Starlogger Input Signals connector.

Terminal	Description	Channel	Pin
1	Power input for recharging battery and/or operating logger	Battery	16
2	Digital Ground		23
3	16 bit counter input (3kHz)	C3	25
4	Data Logger power and logic ground		23
5	16 bit counter input (20kHz)	C2	12
6	Data Logger power and logic ground		23
7	16 bit counter input (3kHz)	C1	24
8	Data Logger power and logic ground		23
9	16 bit counter input (20kHz)	C0	11
10	Data Logger power and logic ground		23
11	High Speed Synchronous Serial Port Data 0 TTL level Input / Output	s0 to s7	21
12	High Speed Synchronous Serial Port Clock 0 Buffered output signal		9
13	High Speed Synchronous Serial Port Clock 1 TTL level Output		22
14	Data Logger power and logic ground		23
15	+5V, 250mA Scan Synchronised User Power Source	+5V sync signal	13
16			
17			
18	ANALOG 7 +ve signal Input	A7	8
19	ANALOG 7 –ve signal Input or Power		

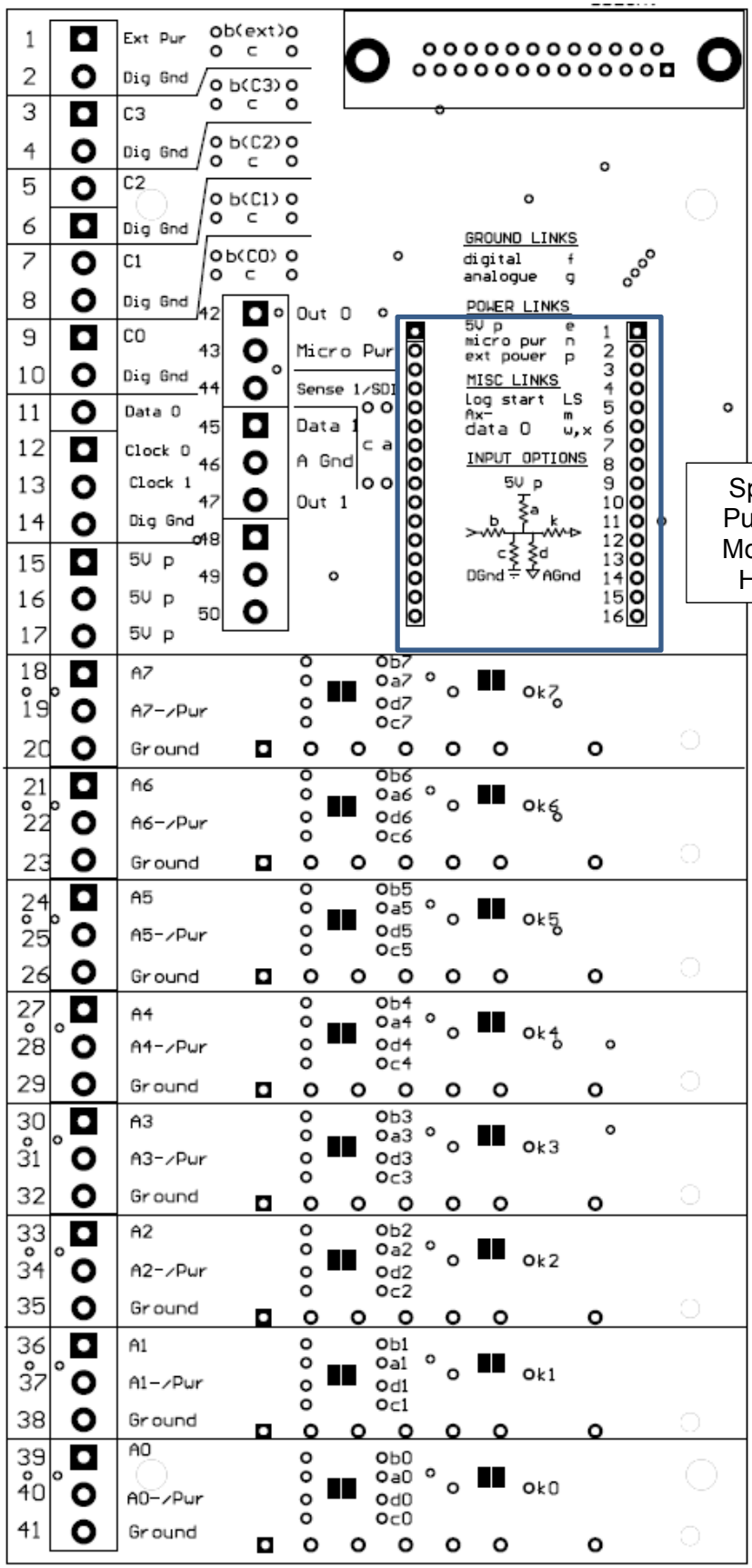
Terminal	Description	Channel	Pin
20	Ground		23, 14
21	ANALOG 6 +ve	A6	7
22	ANALOG 6 –ve or Power		
23	Ground		23, 14
24	ANALOG 5 +ve	A5	6
25	ANALOG 5 –ve or Power		
26	Ground		23, 14
27	ANALOG 4 +ve	A4	5
28	ANALOG 4 –ve or Power		
29	Ground		23,14
30	ANALOG 3 +ve, A3	A3	4
31	ANALOG 3 –ve or Power		
32	Ground		23, 14
33	ANALOG 2 +ve	A2	3
34	ANALOG 2 –ve or Power		
35	Ground		23, 14
36	ANALOG 1 +ve	A1	2
37	ANALOG 1 –ve or Power		
38	Ground		23, 14
39	ANALOG 0 +ve	A0	1
40	ANALOG 0 –ve or Power	A0	
41	Ground		23, 14
42	Open Collector output 30V max., 100mA drive 5ms – 250ms pulse width	Out 0	17
43	+6V continuous power for external instruments 1mA	Micropwr	18
44	Sense 1/SDI-12 (CMOS) input	Sense1 /SDI	20
45	High Speed Synchronous Serial Bus Data 1 (TTL level input and output)	s8–s14	10
46	Analog Ground		14
47	CMOS output, HSIO Sync/5ms–250ms pulse	Out 1	15
48	Available		
49			
50			

3.1 Special Purpose Modules

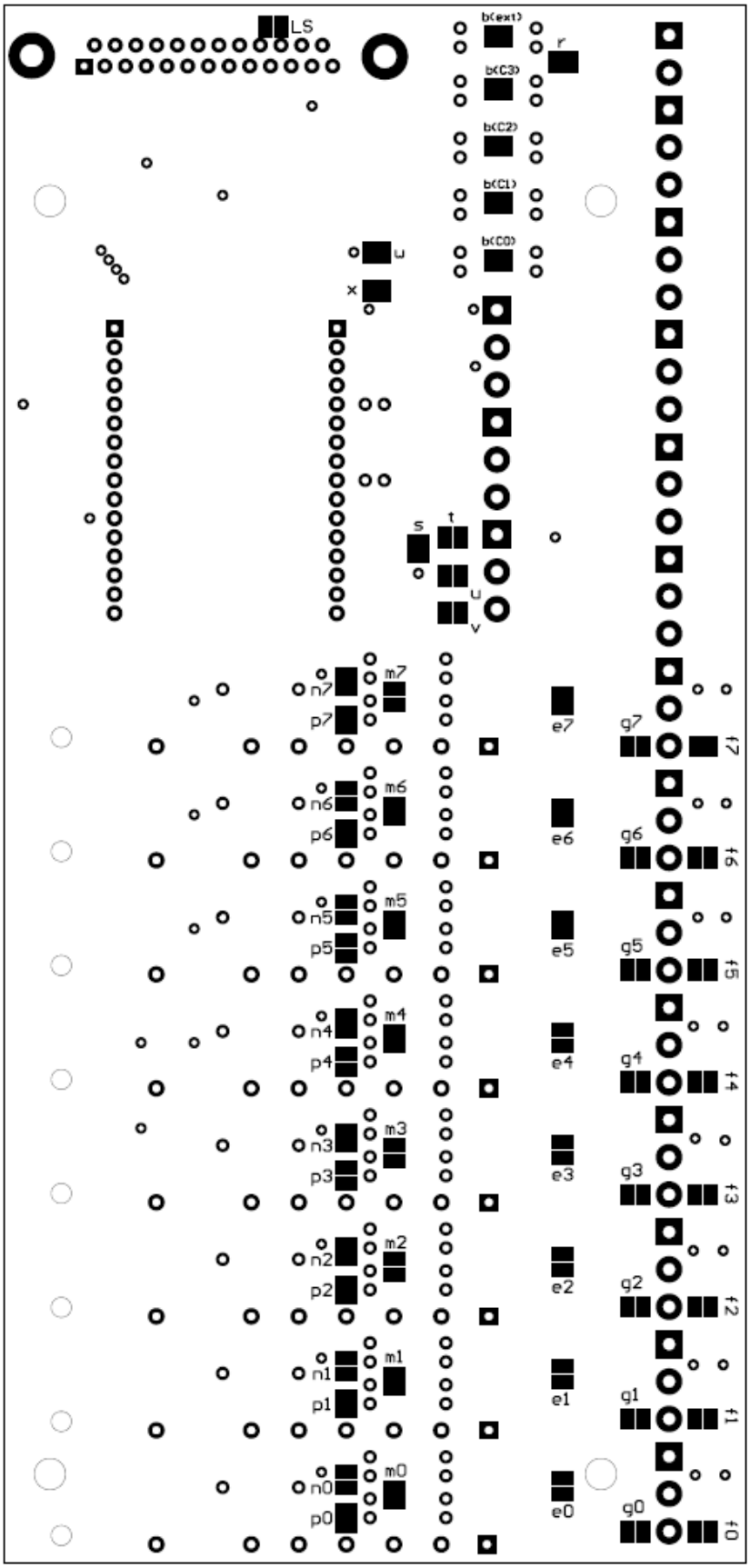
Hole	Description
1	Clock 0
2	Data 0
3	Sense 1/SDI-12
4	Data 0 (Terminal 11) via link X
5	Micropower
6	Out 0
7	External power (Terminal 1) via link B(ext)
8	Out 1/HSIO Sync
9	5Vp (scan synchronised 5V pulse from logger)
10	Digital Ground
11	Analog Ground
12	Counter 0 (C0) (Terminal 9)
13	Counter 0 (C0) via Link B(C0)
14	Terminal 48 via link t (see External Power)
15	Terminal 49 via link u
16	Terminal 50 via link v

3.2 Links

Link	Description
LS	Sense 0 (Log Start,, pin 19) connected to Ground
a	Pull up to +5vp
b	Divider Series Resistor
c	Pull down to Digital Ground
d	Pull down to Analog Ground
e	Ax–/Pwr to +5vp
F	Ax ground to Digital Ground
g	Ax ground to Analog Ground
k	Ax+ terminal to Ax input of Logger
m	Ax–/Pwr to -ve input of amplifier module
n	Ax–/Pwr to Micro power
p	Ax–/Pwr to External Power Circuit
r	Ext. Power Term. To amp. Modules & Ax–/Pwr Terms. Via Link P
s	S.P.M. Hole 14 to amp. Modules & Ax–/Pwr terminals via Link P
t	Terminal 48 to S.P.M. Hole 14 or Link S
u	Terminal 49 to S.P.M. Hole 15 or Link S
v	Terminal 50 to S.P.M. Hole 16 or Link S
w	Data 0 Terminal to Data 0 pin of Logger
x	Data 0 Terminal to S.P.M. Hole 4



Model 6103E Field Termination Strip (front side)



Model 6103E Field Termination Strip (links on back)

4.0 SIGNAL DESCRIPTION

The Starlogger accepts many different kinds of signal. The Field Termination Strip offers terminals for each input and output. In addition, using links on the FTS, most terminals can be customised offering an even wider range of possible inputs and outputs. This section describes each signal possible using the FTS, its links and terminals.

4.1 Input Signal Connections

The amplifier accepts single-ended and differential input signals which may be unipolar or bipolar. Signal inputs are connected into two of three terminals available for the chosen analog channel:

Input Signal	Description	Analog Terminals
Differential Unipolar or Bipolar	+ve signal –ve signal	A A–/Pwr
Single Ended Unipolar or Bipolar	+ve signal –ve signal	A Ground
Inverting Single Ended Unipolar or Bipolar	+ve signal –ve signal	A–/Pwr Ground

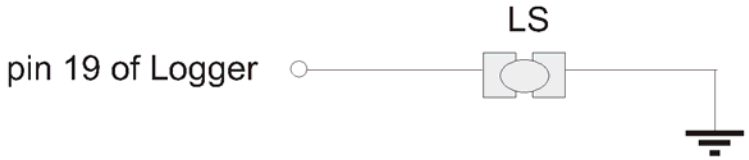
Unipolar Signals - The amplifier is factory set to accept unipolar signals and no further adjustment is necessary.

Bipolar Signals - The amplifier Offset Adjust Trimmer must be set to read zero volts output for the most negative input signal to be used. To adjust the bipolar offset:

1. Select desired Gain setting
2. Apply the most –ve input signal and adjust Offset Trimmer anti-clockwise until you have a reading on that channel (using **Test Mode**.)
3. Carefully adjust (clockwise) until reading just changes to zero.

4.2 Log Start Sense (Link LS)

Normally, the data Logger only begins to record when an instrument is connected to the input signals. To sense this condition, there is a Link (LS) on the back of the FTS which connects Pin 19 (Log Start Sense 0) Input Signals; Log Start Sense to ground. It is normally connected so that when the FTS is plugged into the Logger, Sense 0 is connected to ground. This causes the Logger to begin operating.

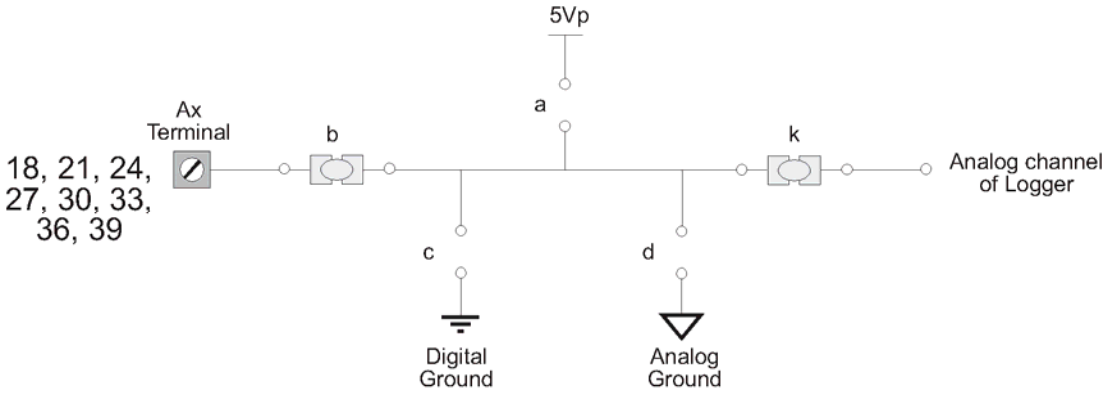


4.3 Analog Inputs

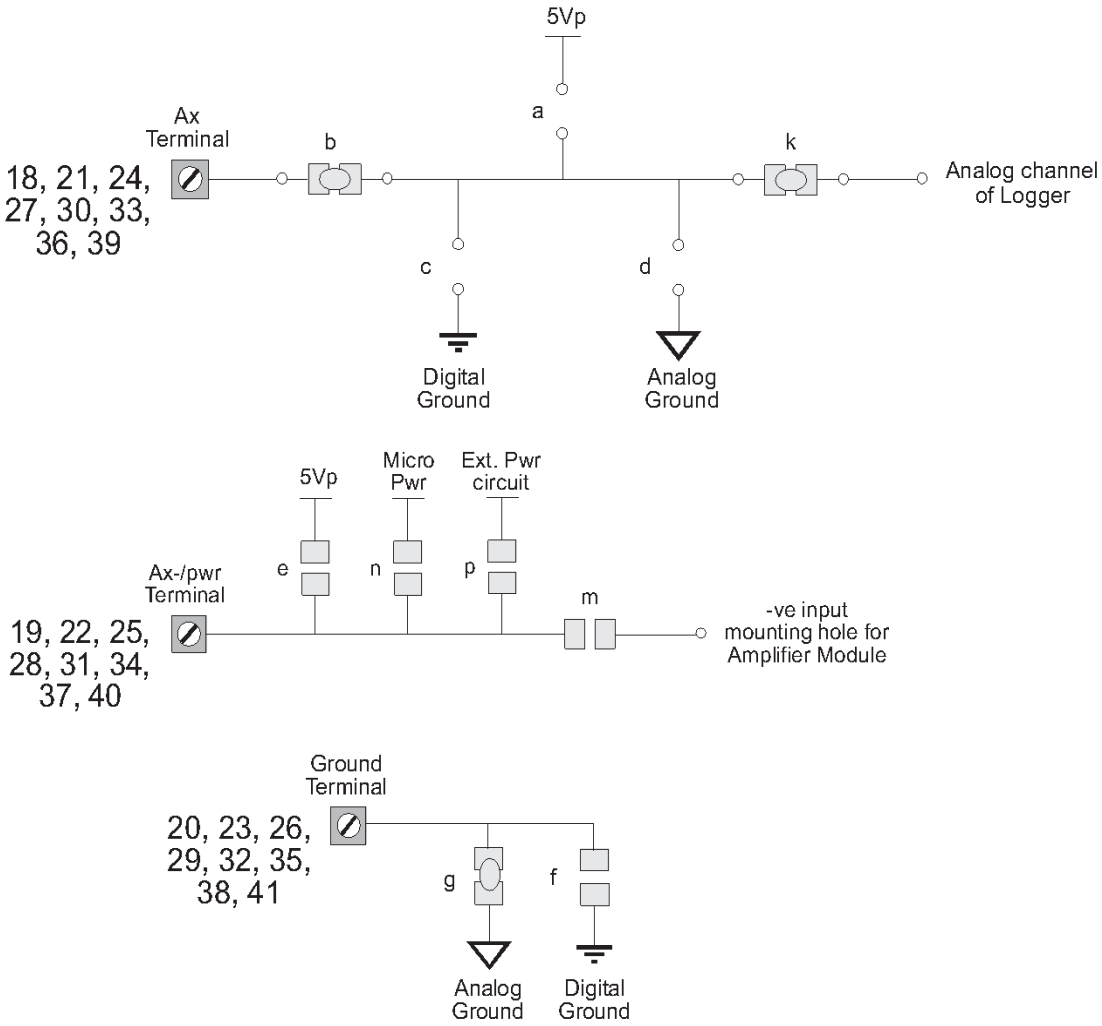
Terminals labelled A0 – A7 can be logged as low resolution values (8 bit data) or high resolution values (10 bit data). Their usage depends on how you refer to the input using Starlog V4 software. The software interprets analog inputs as low resolution channels when you refer to them as a0 – a7 and high resolution channels when you refer to them as A0 – A7

The Ax-/Pwr Terminal can be used as a negative input (via Link m) if a module is installed on the FTS which requires this. Please see the diagram in section 4.10

All Analog channels are programmable to carry a signal in one of two ranges analog ranges: 0 to 2.550 V (2.5 mV per bit) and 0 to 255 mV (250 µV per bit). Input impedance (when the logger is active) is greater than 1 MΩ. Load impedance (when the Logger is inactive) for signals less than 500 mV is greater than 1 MΩ, while for signals greater than 500 mV, it is 10 kΩ. The recommended source drive impedance is <10 kΩ.



Analog signals can be conditioned using the following links on the FTS.


5Vp
a
Ax
Terminal
b
k
18, 21, 24,
27, 30, 33,
36, 39
Analog channel
of Logger
c
d
Digital
Ground
Analog
Ground
5Vp
Micro
Pwr
Ext. Pwr
circuit
Ax-/pwr
Terminal
e
n
p
m
19, 22, 25,
28, 31, 34,
37, 40
-ve input
mounting hole for
Amplifier Module
Ground
Terminal
20, 23, 26,
29, 32, 35,
38, 41
g
f
Analog
Ground
Digital
Ground

Link a - Pull-up to +5V

This location is used to install thermistor reference resistors or to convert an analog channel for ON/OFF sensing.

Link b - Divider Series Resistor or Protection Series Resistor

This location is used as part of a voltage divider network (for example, with Model 6104A/B/C/D Voltage Resistors.) This can also be used for a series resistor or a filter resistor on counter channels.

Or can be used to install a resistor in series with the input signal to prevent excessive external power being applied to the logger. Used for externally powered signals (e.g. voltages, active pulses).

Link c – Pull-down to Digital Ground

This location is used to install a filter capacitor (for pulse inputs) or voltage divider resistor (for voltage attenuation).

Link d - Pull-down to Analog Ground

Link k - Protection Series Resistor or Direct Input

This location is used to install a resistor in series with the input signal to prevent excessive external power being applied to the logger. Used for externally powered signals (e.g. voltages, active pulses).
By default this link is installed to connect the datalogger channels to their associated terminals when an amplifier module is not being used to pre-condition the input signal.
The 'k' link is removed when an Amplifier Module is fitted.

Link m - Isolated Input

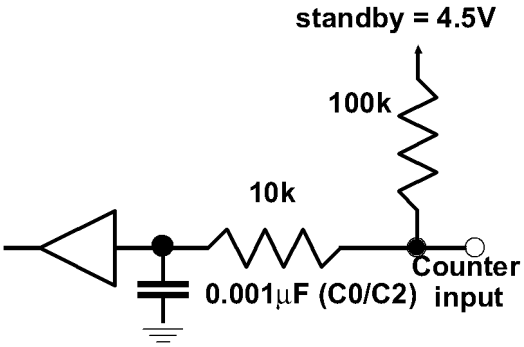
This location is installed to connect the Analog -ve signal input to the associated amplifier module. The link is installed for Differential or Isolated input signals being connected to differential or isolated amplifier modules. The link is otherwise not installed.

WARNING: Ensure that Links e, n and p are not installed. Do not use Link m if these links are installed. Damage may occur to the amplifier module or an instrument connected to an Ax–/Pwr terminal.

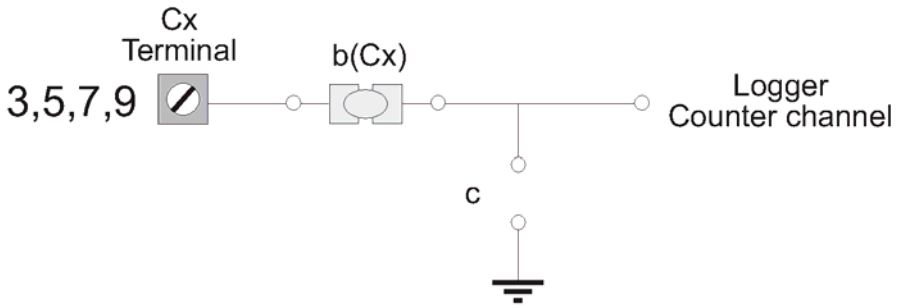
4.4 Counters and Sense Inputs

Counters are CMOS inputs, suitable for 3kHZ or 20kHz potential free contacts, open collector outputs or 0–5V to 0–12V DC digital signals.

Maximum pulse rate to C0 & C2 is 20 kHz, and to C1 & C3 is 3kHz. Pulse rates must also be related to scan rate, to ensure counters do not overflow before being scanned by the Logger.



Links b and **c** can be used if attenuation or extra filtering is required.



4.5 Outputs

There are two outputs:

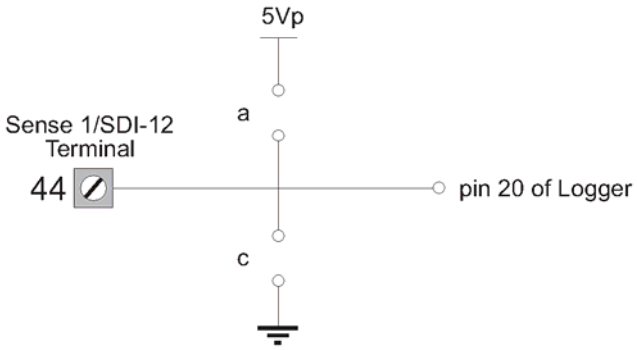
Out 0	Open Collector Output	Terminal 42
Out 1	CMOS Output	Terminal 47

The Open Collector Output (Out 0) is rated at 100mA and can be used to switch on/off relays controlling experiments.

4.6 SDI-12 Serial Digital Interface

The Starlogger support the SDI-12 standard for serial data interchange between the logger and intelligent instruments.

SDI-12 is implemented as an alternate use of Sense 1 (Terminal 44). Up to ten SDI-12 compatible instruments may be connected onto this bus. Programming the SDI-12 interface is supported in Starlog Software V4.

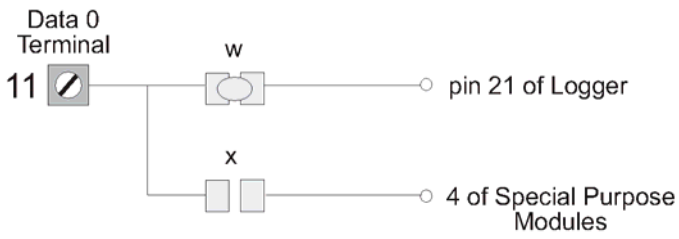


4.7 High Speed Serial Input / Output Ports

There are two serial ports:

Port 0	Terminal 11 (Data 0)	s0 - s7
	Terminal 12 (Clock 0)	
Port 1	Terminal 45 (Data 1)	s8 - s14
	Terminal 13 (Clock 1)	
	Terminal 15, 16 or 17	+5V sync signal

The Data 0 Terminal can also be linked (via **Link x**) to hole 4 of the Special Purpose Modules.



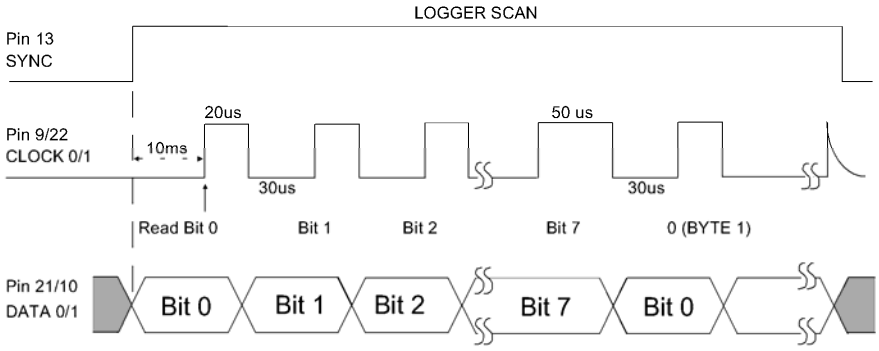
Each logger scan, the High Speed Serial Ports are read. Any of the +5V power supplies (Terminals 15, 16, 17) may be used as a “Sync signal” to indicate to remote equipment that a logger read scan is about to begin. This signal is usually used to load the serial shift register(s) in the remote equipment in preparation of being read.

Note: the first data bit LSB must be present on the Data (0/1) input within 7ms after the Sync signal.

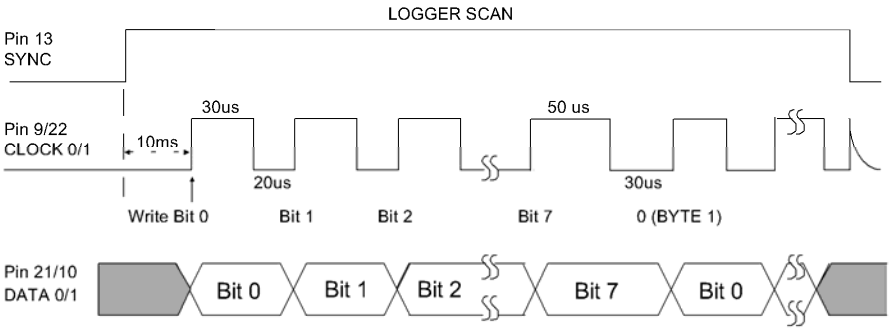
Serial transfer rate is 50 microseconds per bit with a 30 microsecond gap between each byte.

Note: every 1 millisecond a logger interrupt sequence adds a 50 microsecond delay to the serial transfer sequence. Transfer starts with the least significant bit of the least significant byte and each clock reads the next most significant bit.

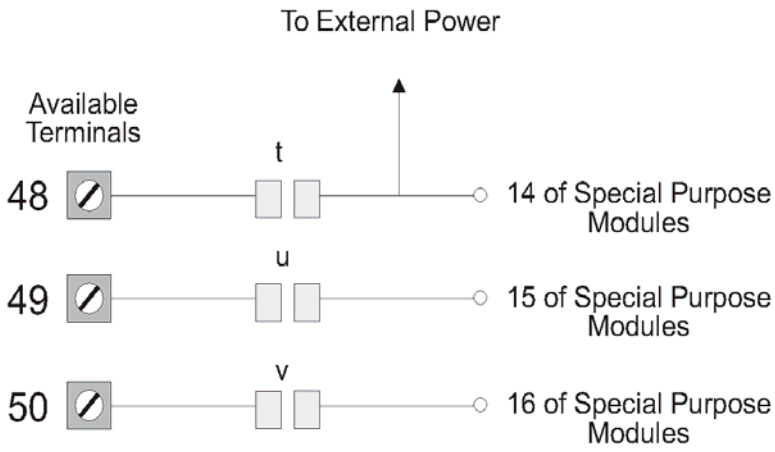
SERIAL IN



SERIAL OUT



4.8 Available Terminals (48, 49, 50)



Three terminals are available for use via the Special Purpose Modules.

4.9 External Power

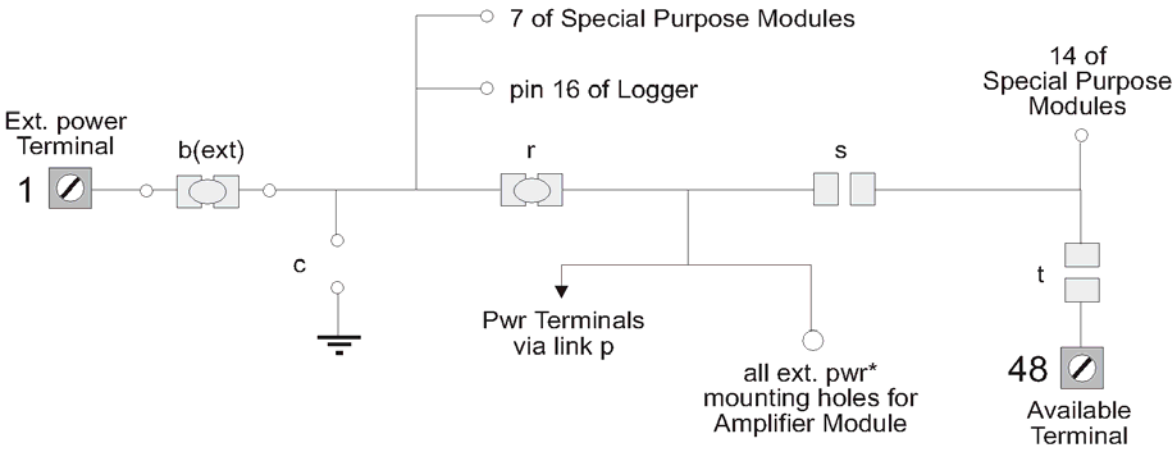
There are several ways to use External Power via the Field Termination Strip. The external power may be used with an alkaline battery pack as a backup power source or simply on its own. A mains power pack and a solar recharge module are available from Unidata.

The External Power circuit has been designed so that more than one external power source can be used at the same time. Power can be made available to the Logger, several Terminals (labelled Ax/Pwr), the amplifier modules, and special purpose modules. Uses of an External Power Source are:

- Back-up Power or Power Supply for a Logger
- Provide power to all ext pwr* amplifier mounting holes
- Provide power to Pwr Terminals
- Provide power to/from Special Purpose Modules (7 & 14)
- Provide power to Available Terminal 48

IMPORTANT - The supply voltage to the Data Logger must be maintained at all times to ensure correct logger operation and data integrity. Voltage to the logger must be in the range of 9V to 20V and able to supply a load of 100mA peak

The diagram below shows the External Power circuit



The following sections describe these different uses of External Power.

To install an External Power Supply:

1. Connect +ve to Ext. Power Terminal 1 or Available Terminal 48.
2. Connect -ve to Terminal 2 (or any other Digital Ground).
3. Check that Links are installed or removed depending on how the installation is using the power

4.9.1 Back-up Power or Power Supply for Data Logger

Power is supplied from Ext. Power Terminal 1 to Starlogger pin 16 when **Link b(ext)** is installed. **Link c** can be used with a zener diode to regulate the voltage.

4.9.2 Power to all Amplifier Modules

Power is supplied from Ext. Power Terminal 1 to the ext. pwr* hole of all amplifier modules when **Link b(ext)** and **Link r** are installed. **Link c** can be used to regulate the power source. Alternatively, power is supplied from Terminal 48 when **Link t** and **Link s** are installed.

Special Purpose Modules can also be used to provide power to the ext. pwr* hole of **all** amplifier modules from 14 (via **Link s**).

4.9.3 Power to the Special Purpose Modules

External power can be supplied to the hole 7 of the Special Purpose Modules. Power is supplied from Ext. Power Terminal 1 to hole 7 when **Link b(ext)** is installed.

4.9.4 Power to Pwr Terminals

Power is supplied to the Pwr Terminals from Ext. Power Terminal 1 when **Links b(ext)**, **r** and **p** are installed. Alternatively, power is supplied from Available Terminal 48 to the Pwr Terminals when **Links t** and **s** and **p** are installed or from Special Purpose Module hole 14 via **Links s** and **p**.

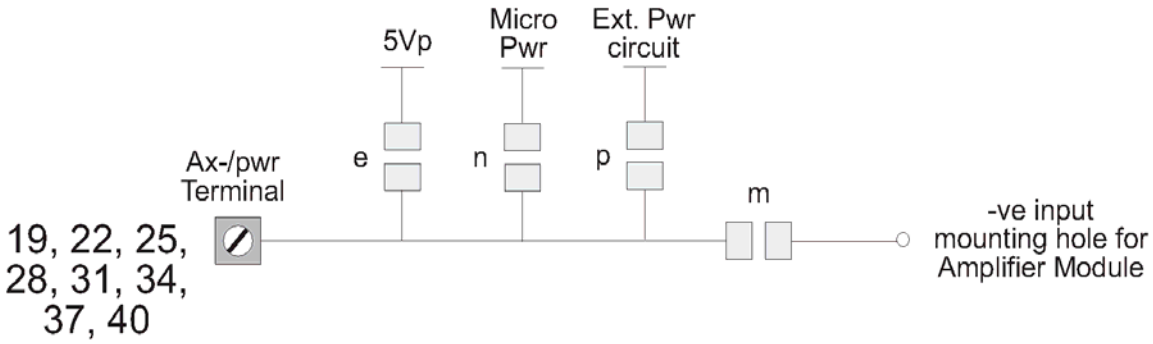
4.10 Instrument Power Sources

There are several options for providing power via the Field Termination Strip to instruments in a data logging system. The following connections can be used to provide power:

Instrument Power Sources	Connections
Pwr Terminals	19, 22, 25, 28, 31, 34, 37, 40
User Power Source (UPS) +5V regulated, scan synchronised	15, 16, 17
Micropower +6V unregulated, continuous	43

Each type of power source is available from an Ax-/Pwr Terminal using links.

WARNING - Only one link (e, n, p or m) can be safely installed for each channel, otherwise damage may result. Unidata recommends that you remove any unused links.



4.10.1 FTS External Power Circuit

External power is available to instruments through the Ax-/Pwr Terminals via **Link p** and via hole 14 of the Special Purpose Modules (using **Link b(ext)** as shown in section 4.9 External Power).

4.10.2 User Power Source

The User Power Source (UPS +5V regulated, scan synchronised) is intended to power instruments associated with the Data Logger. The full load output capability is 250mA in pulsed mode.

The UPS switches on and off (synchronised with the logger scan). Any loads connected to these outputs will contribute to the drain on the Data Logger battery (and reduce battery life).

The UPS may be programmed to switch on prior to the logger scan by setting the Prescan in the Starlogger Configuration Table.

The UPS is immediately available through Terminals 15, 16 and 17 and via hole 9 of the Special Purpose Modules. It is also available through the Ax-/Pwr Terminals via **Link e**.

+6V Unregulated, Continuous Micropower

The Micropower source provides +6V unregulated, continuous power for external instruments. The full load output capability is 1mA.

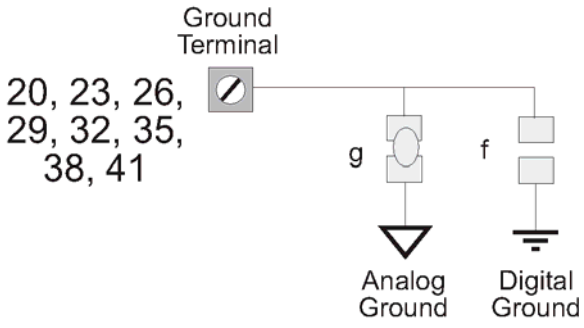
Micropower is immediately available through Terminal 43 and via hole 5 of the Special Purpose Modules. It is also available through the Ax-/Pwr Terminals via **Link n**.

4.11 Analog and Digital Ground

Terminals labelled Ground can be used as Analog or Digital Grounds depending on which links are installed (see diagram).

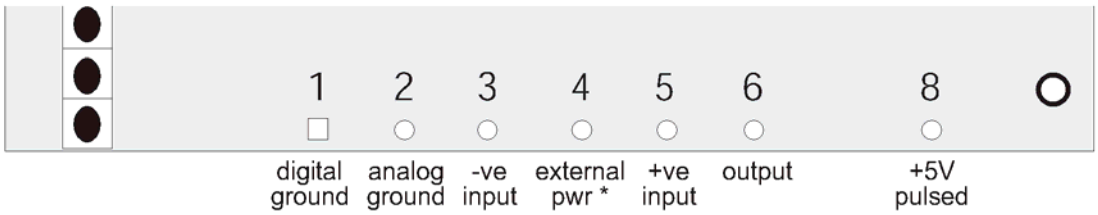
Digital Grounds are also available through six Terminals labelled Digital Gnd, the square Amplifier Module mounting holes (hole 1) and hole 10 of the Special Purpose Modules.

Analog Ground is also available through Terminal (46), the second Amplifier Module mounting holes (hole 2) and hole 11 of the Special Purpose Modules.



5.0 INPUT / OUTPUT MODULES

The FTS offers convenient facilities to mount signal conditioning and amplifier modules. The mounting holes designations are shown below

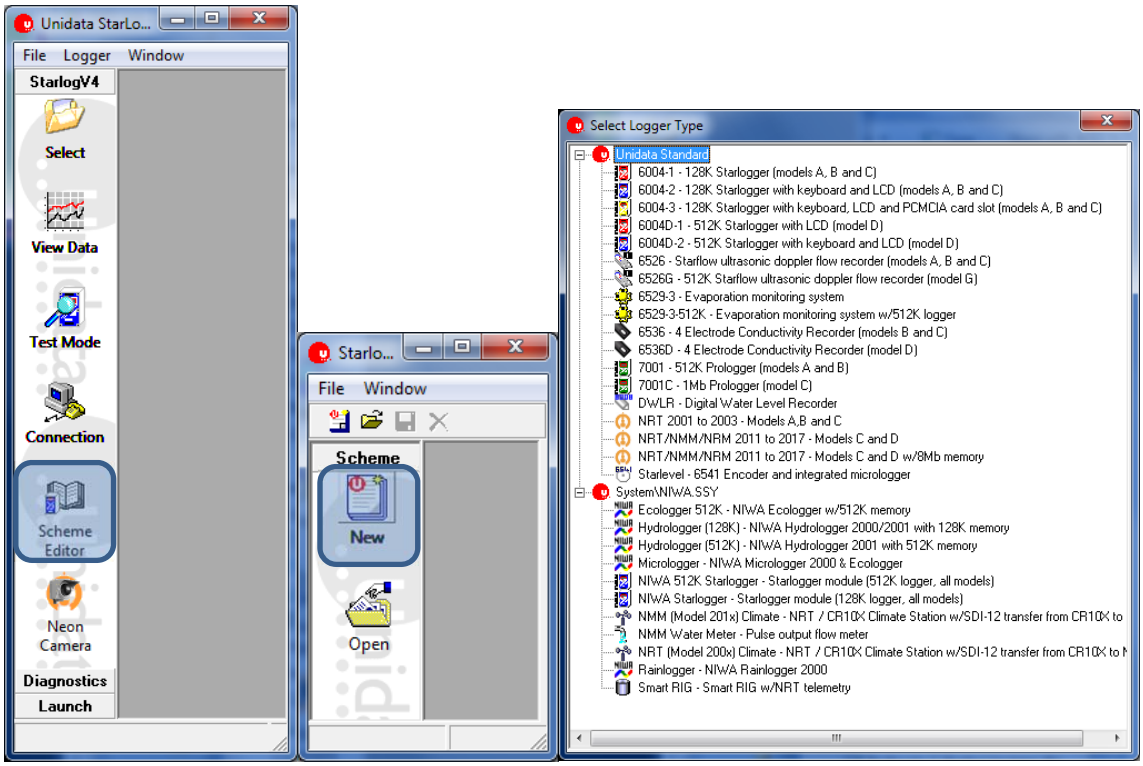


In addition to the links described in the previous section, the following input signal conditioning modules are available for all Analog channels.
When you use one of these options in a Starlog Data Logging Scheme you will want to ensure that the I/O module is wired in properly on the FTS and that you have added it to the Scheme using Starlog Software.

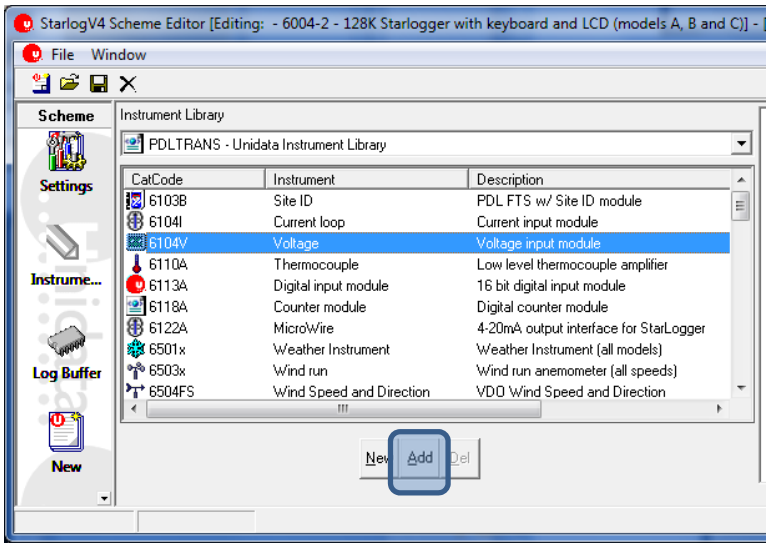
General info on how to add the option to a Scheme, using Starlog V4 software:

Please note that scheme settings will be determined primarily buy the characteristics of the instrument that it is attached to the FTS. Some instruments examples are described At the end of this section

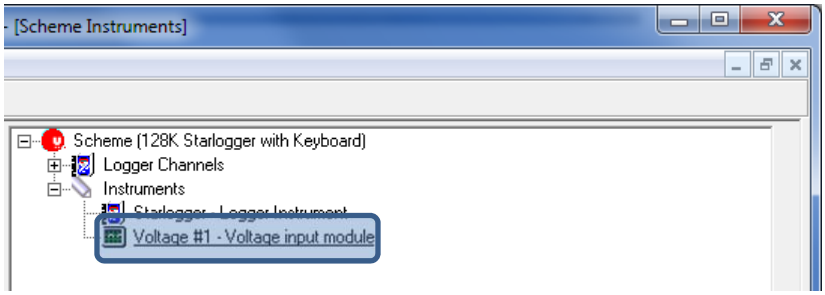
1. Open the **Scheme Editor**, **New** and **Select Logger Type** (6004 range)



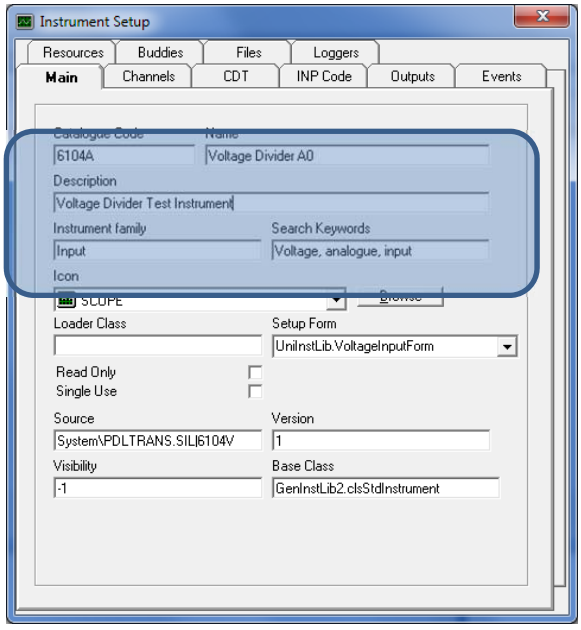
2. Select the **Instruments** menu, then Instrument (e.g. **6104V)** and **Add** Instrument



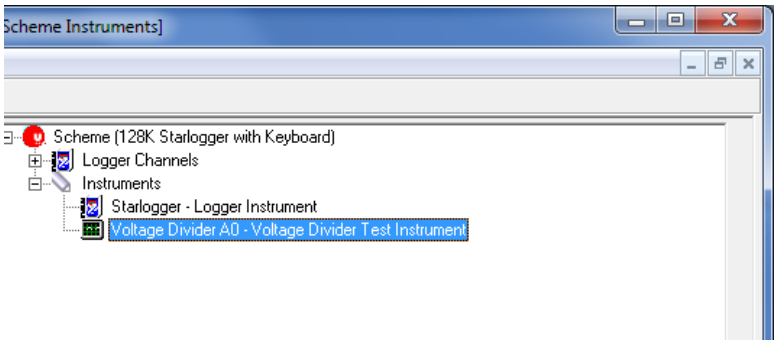
3. Mouse right click on the added scheme (Voltage #1)
Select **Advanced**



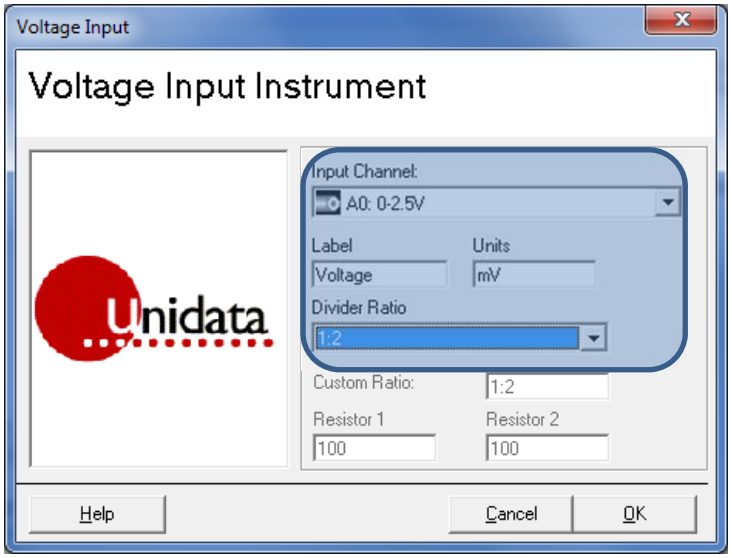
4. Edit Name and Description info if required



5. Double click on the scheme



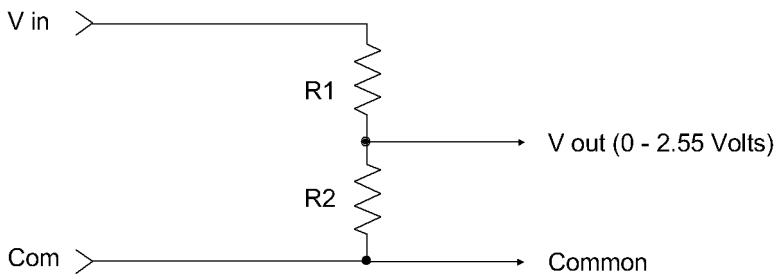
6. Edit instrument info and OK



5.1 Voltage Dividers and Current Loop References

5.1.1 Model 6104A/B/C/D – Voltage Divider

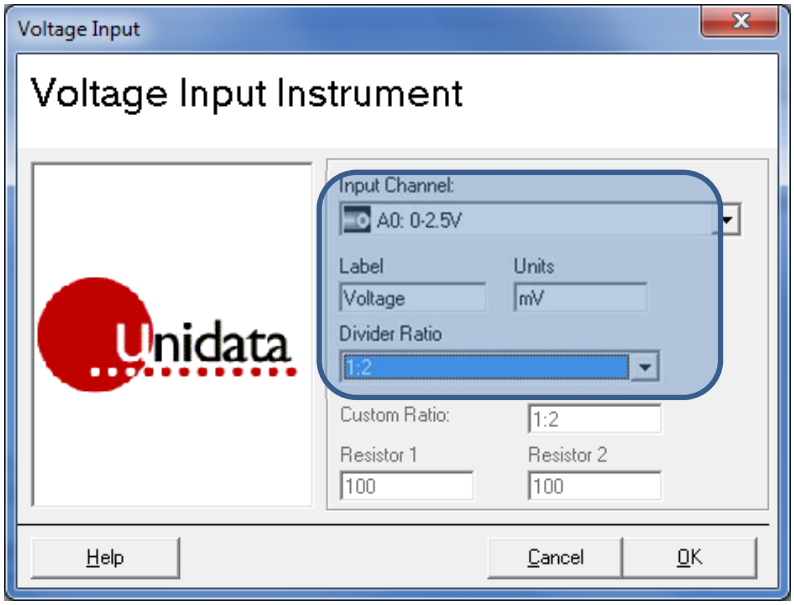
1. Remove solder blob connection from **Link b**
2. Insert 100kΩ resistor in **Link b**
3. Insert a second resistor in **Link c**
4. Do not remove **Link k**



The formula for calculating voltage divider resistors is:
(V in) / (V out) = (R1+R2) / R2
Note: Resistor R1 should be larger than 47kΩ (100kΩ suggested).

To add the option to a Scheme, using Starlog V4 software:
(see general info on page 21)

7. Select the **Instruments** menu, then **6104V** Instrument and **Add Instrument**
8. Mouse right click on the added scheme - Select **Advanced**
9. Edit Name and Description info if required
10. Double click on the scheme to edit instrument



5.1.2 Model 6104I/IE and J – Current Loops

1. Fit one of the following loop reference resistors to **Link c**.

Model 6104I	100Ω for 4–20mA
Model 6104I-E	120Ω for 4–20mA
Model 6104J	250Ω for 0–10mA

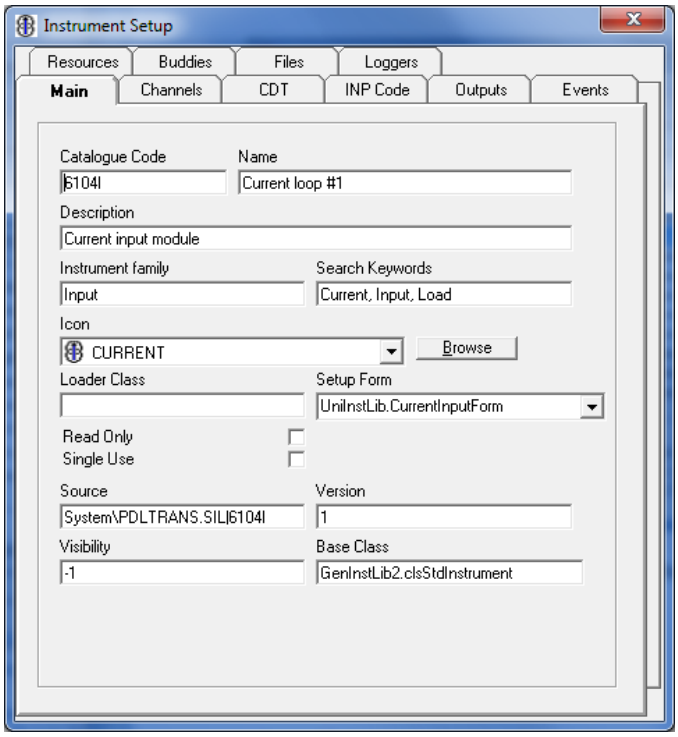
2. Leave **Links b** and **k** connected.
3. Use Analog +ve and Common as signal inputs. (eg A0 and Ground)

Using Model 6104I	Logger will read
	000 at 0mA
	40 at 4mA
	200 at 20mA
	255 at 25.5mA
Using Model 6104I -E	Logger will read
	000 at 0mA
	48 at 4mA
	240 at 20mA
Using Model 6104J	Logger will read
	100 at 4mA
	250 at 10mA

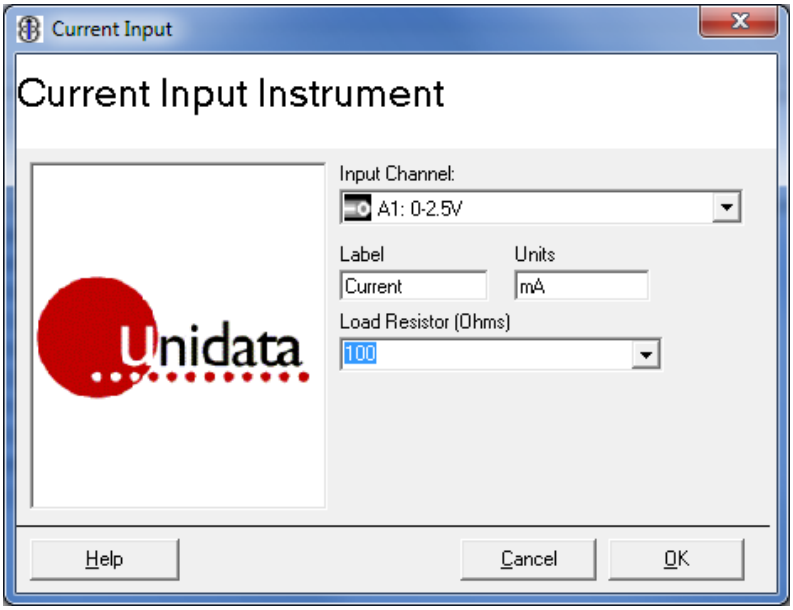
To add the option to a Scheme, using Starlog V4 software:

1. Select the **Instruments** menu, then **6104I** Instrument and **Add Instrument**

2. Mouse right click on the added scheme - Select **Advanced**
3. Edit Name and Description info if required



4. Double click on the scheme to edit instrument (Current loop #1)

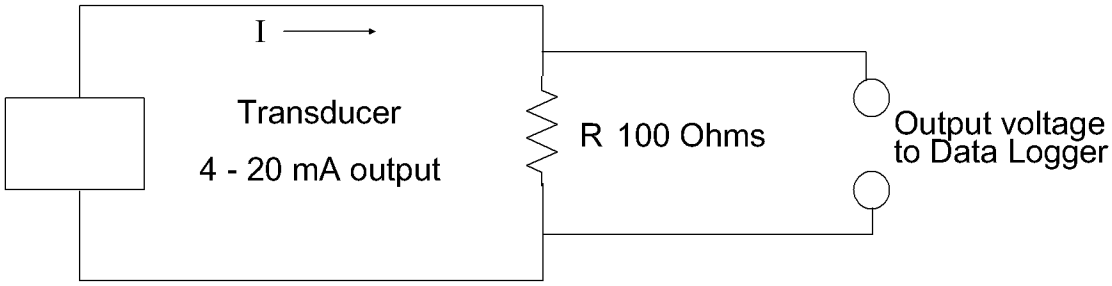


Example using depth instrument

1. Using Starlog Software and the Current Loop Isolator

Connecting 100m depth probe with 4-20mA output to 6103E FTS using 6144A Current Loop Isolator and 6104I Current loop Reference to 6004D Logger

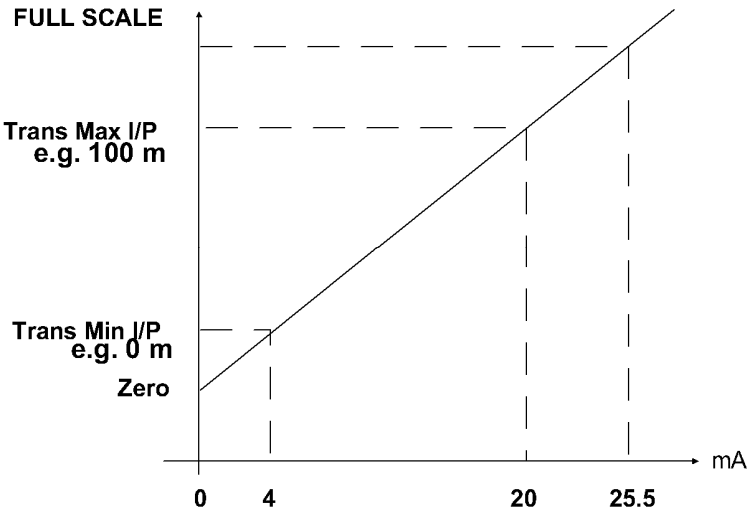
To record information from a current loop device you need to determine the equivalent zero and full scale values of the transducer.



Model 6104I Current Loop Reference

Determine the input signal range corresponding to the 4 – 20 mA output range. This will be found in the specifications of the device.

eg, level 4 – 20 mA corresponds to 0 – 100 metres
the 0 is the **transducer min input**
the 100 is the **transducer max input**
the difference between the two is the **transducer input range**



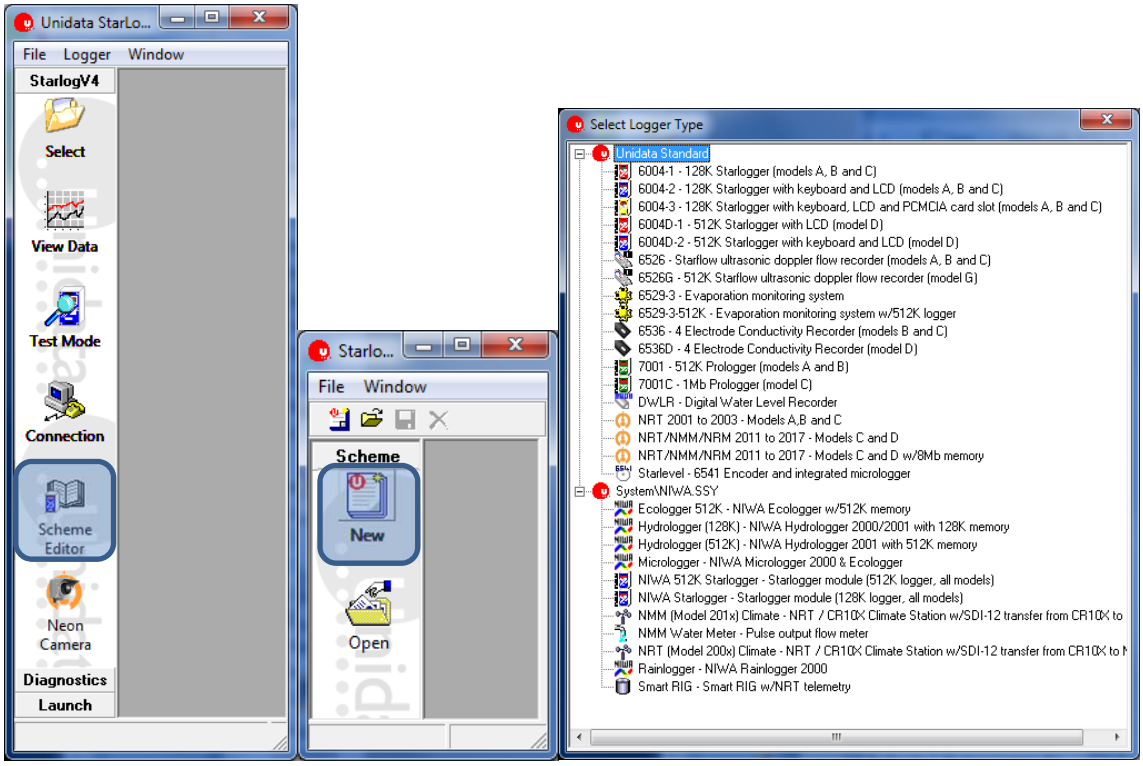
1. Calculate corresponding logger readings. i.e., multiply the reference resistor value by the current loop reading. E.g.

   4 (mA) x 100 (Ω) = 400mV

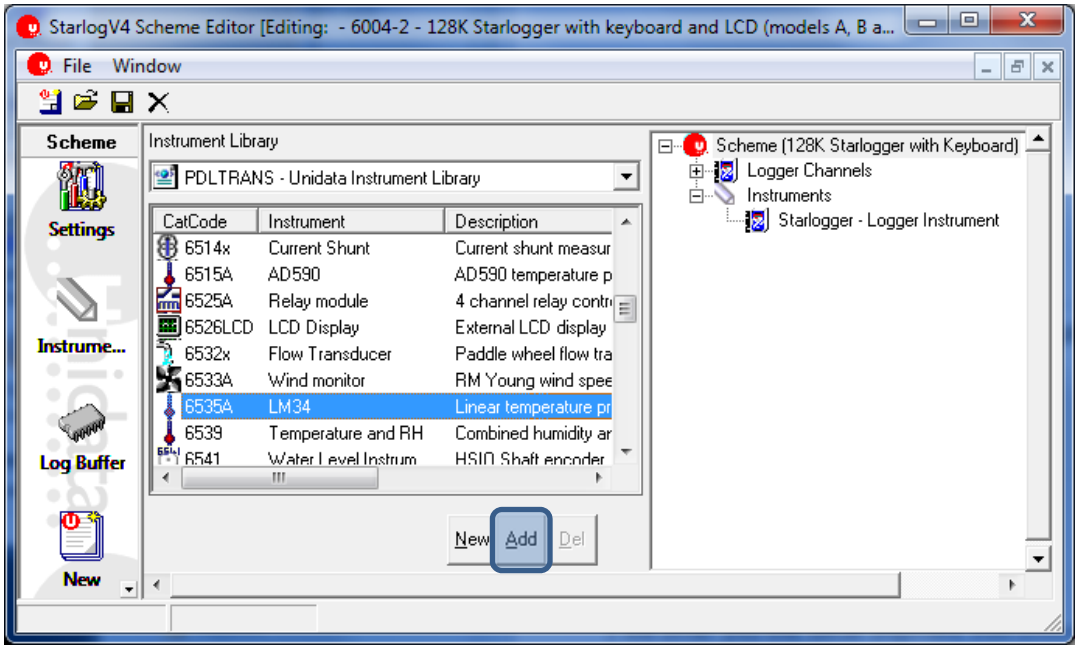
   20 (mA) x 100 (Ω) = 2000mV

   Your transducer range is 400 to 2000. Scaling formula is 0 to 100.

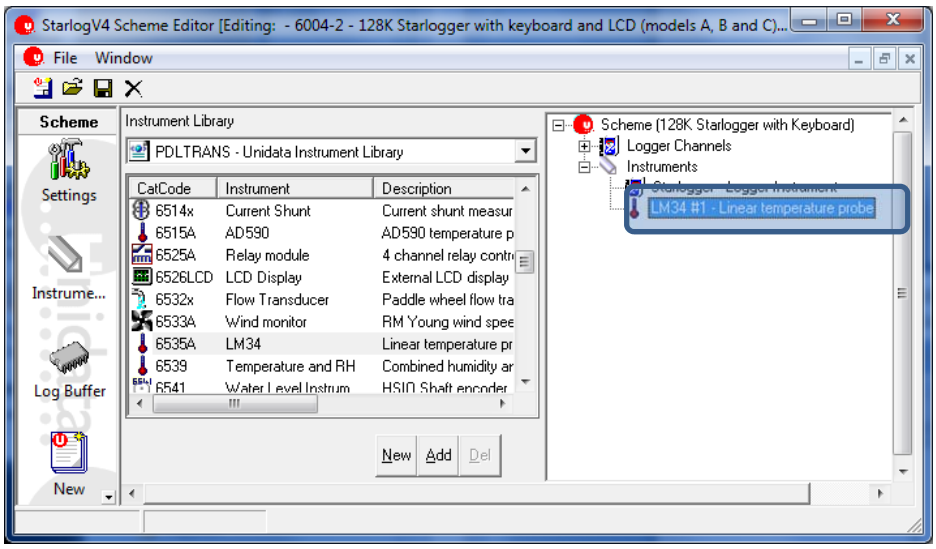
1. Open the **Scheme Editor**, **New** and **Select Logger Type** (6004 range)



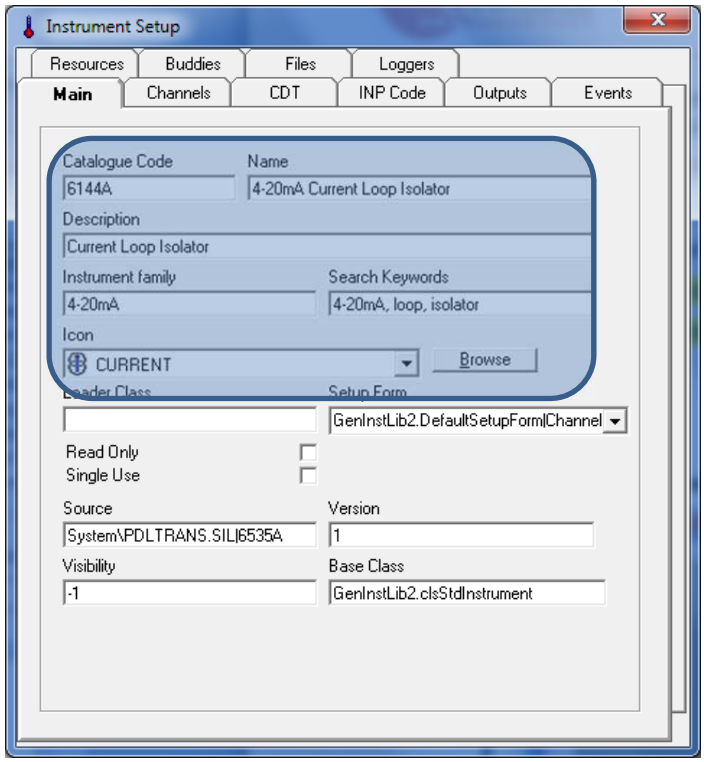
2. Select the **Instruments** menu, then Instrument **6535A** and **Add** Instrument



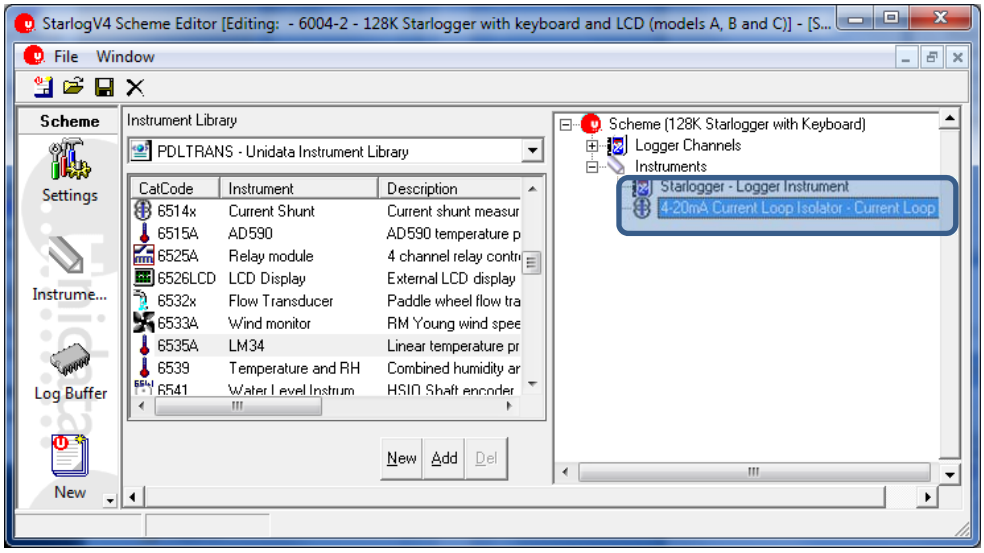
3. Mouse right click on the added scheme (LM34#1)
   Select **Advanced**



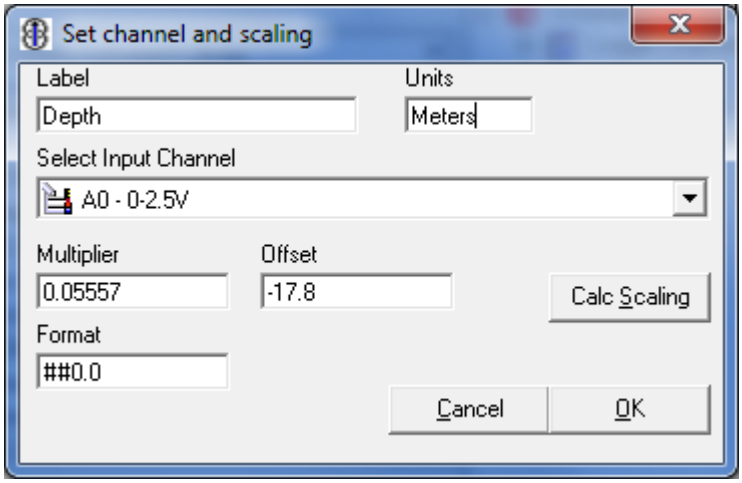
4. **Edit info** Type Code: 6144A Type the Description: 4-20mA Current Loop Isolator.



5. Double click on the scheme

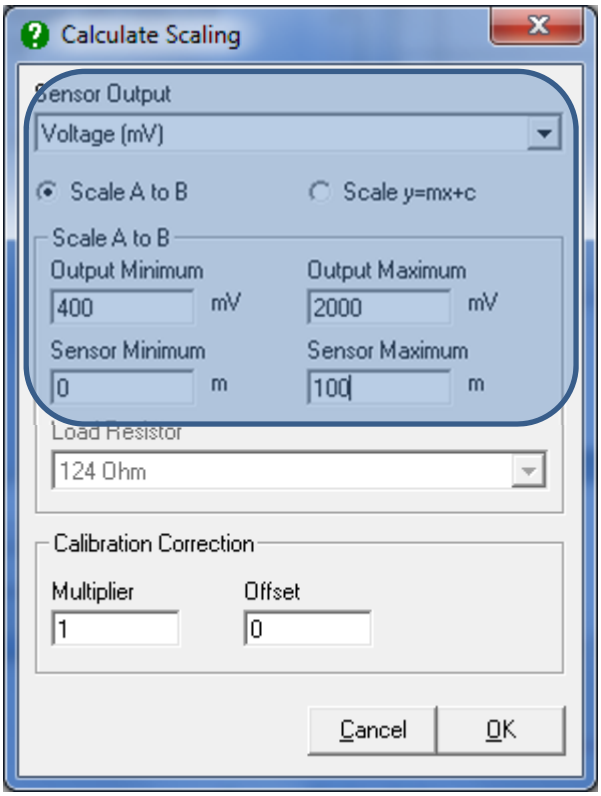


6. Edit instrument info and



Select **Calc Scaling** and enter previously calculated data:

(note: ignore load resistor value)


Calculate Scaling
Sensor Output
Voltage (mV)
Scale A to B
Scale y=mx+c
Scale A to B
Output Minimum
400
mV
Output Maximum
2000
mV
Sensor Minimum
0
m
Sensor Maximum
100
m
Load Resistor
124 Ohm
Calibration Correction
Multiplier
1
Offset
0
Cancel
OK

5.2 Input / Output Modules

Small signals may be measured by the Data Logger by using suitable I/O modules. I/O modules are small circuit boards which mounts perpendicular to the FTS adjacent to the eight Analog input terminations.

To install the I/O modules:

1. Remove the appropriate **Link k**.
2. Position module adjacent to the Analog channel to be conditioned with component side to the top of the FTS.
3. Feed the module leads through the corresponding holes in the Termination Strip.
4. Secure the module with an M2.5 x 6mm screw & nut to the FTS (if module is fitted with bracket).
5. Solder the module pins to the strip (from the back) and trim off excess leads.

Zero & gain adjustments (general notes)

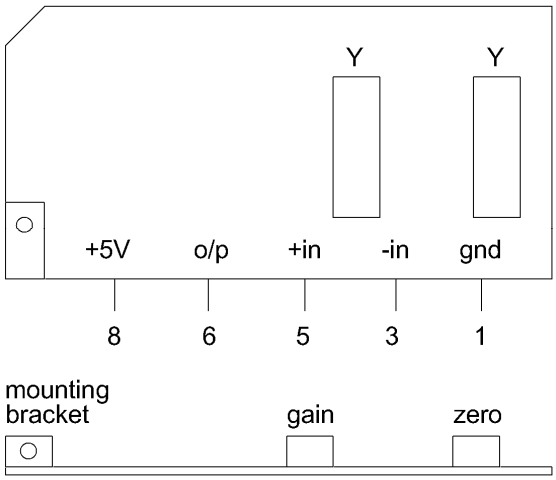
1. Zero will adjust to a reading of 0, 1 or 2 bits.
2. For bipolar inputs (+ and - voltage/current) set the zero adjustment to read half scale (127). Input values will then be either side of this
3. Gain will adjust from unity (*1) to (*100). Zero adjust will become more sensitive as gain is increased. Recommended input voltage is around 100 millivolts full-scale.
4. Power consumption of logging system will increase by approx. 10% for each isolation module fitted.
5. Set gain to maximum.
6. Then set zero. Zero is normally set with the minimum (lowest) signal to be measured. Data Logger should read 0 or 1.
7. Then set full scale. Full scale is set with the maximum (highest) signal to be measured. The logger should read 254 or 255.

   Note: Calibration is done using **Scheme Test Mode** of Starlog Software to read the Data Logger's memory locations.

5.2.1 Model 6107B - Isolated Input Amplifier

Isolated input amplifier extends the signal range for Starlogger allowing devices with low level input signals to connected

1. Remove **Link k**.
2. Install **Link m**.
   WARNING: Ensure that Links e, n and p are not installed.
   Damage may result if they are.
3. Install module

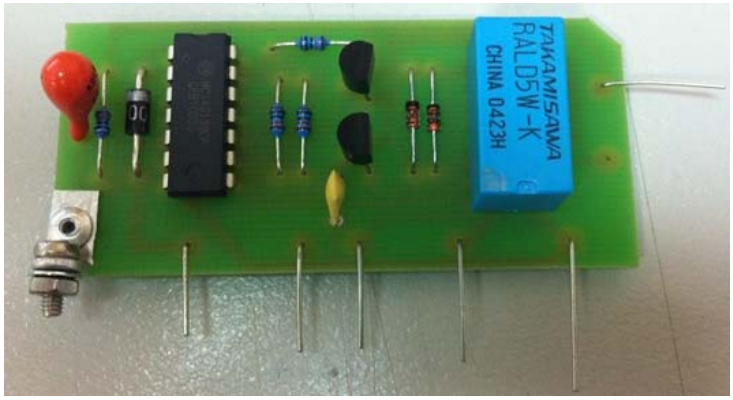


4. Use any Analog +ve and Analog -ve as signal inputs (eg A0 and A0-/Pwr)
5. Connect Data Logger and set zero & gain adjustments for desired signal range.

Specifications

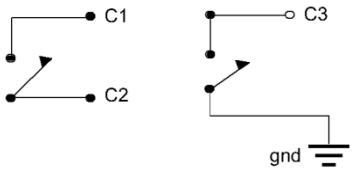
Input Signal:	single-ended or differential unipolar (0-50mV factory calibrated)
Output Signal:	0.1V to 2.5V (factory calibrated)
Isolation:	flying capacitor, relay isolated
Power:	5V DC, 25mA from Logger
Gain:	1 to 250

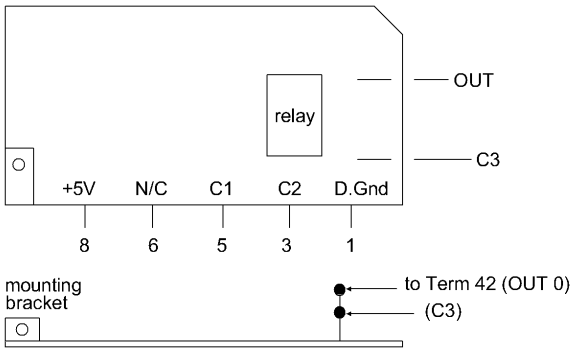
5.2.2 Model 6114A - Single Channel Relay Control Module



Single channel relay control module is used to switch on/off an external instrument from The logger (e.g. switch on a pump, lamp or set off alarm).
This module uses pulse output from the logger t latch the relay.
To use this module you will want to define a Scheme which uses an event to send a Pulse Output to Output 1

1. Remove **Link k**
2. Install **Link m**
   WARNING: Ensure that Links e, n and p are not installed.
   Damage may result if they are.
3. Mount the module.
4. Connect the top (upper) lead (OUT 0) to Terminal 42 (open collector output).





Single Channel Relay Control Module (Model 6114A)

5. The C1/C2 relay contacts are now connected to the Ax+ and Ax-/pwr terminals. To monitor the status of the C1/C2 relay contacts, you should use the channel to monitor C3. The analog channel will now read close to zero when C1 and C2 are shorted and will read full scale when C1 and C2 are open.

The relay will be “toggled” with each pulse sent to it by the Logger. This is done by a PULSE #x instruction.

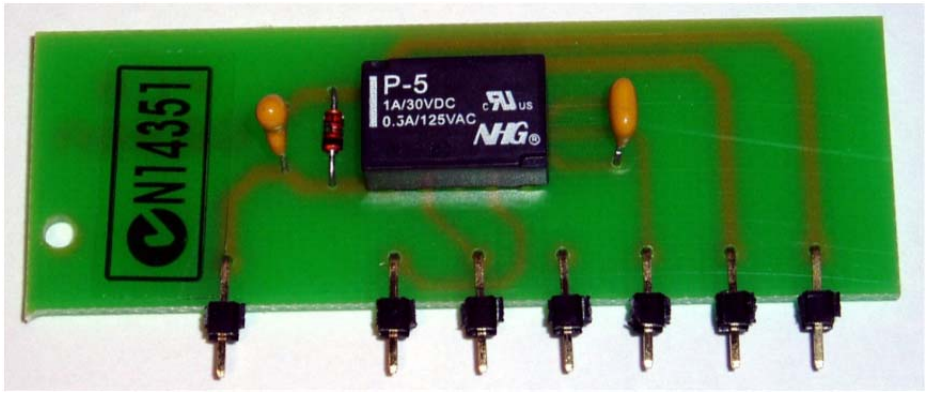
It is possible to have signal conditioning (voltage divider) and the Analog +ve and Analog -ve screw terminals free (for the channel which would be occupied by the 6114A Module)

by connecting the 5V and GND wire but not connecting the C1 and C2 relay wires. These can be replaced with wire, or better, with terminals. **Link k** should not be removed and **Link m** not installed in this case.

Specifications

Input Signal:	programmable output control from data logger
Output Signal:	potential free latch relay contacts, DPDT
Power:	5V DC, 10mA from Logger

5.2.3 Model 6141A – Isolated Input Module



8	6	5	4	3	2	1
+5v	OUT	+IN		-IN	SIG GND	PWR GND

Up to eight current loops can be measured by the Starlogger. To use more than one current loop device, we recommend that you use an Isolated Input Module (Model 6141A) fitted with a Model 6104I, J or I/E to isolate the device from the logger and to avoid errors caused by ground loops. If you do not use this module please ensure that it is permissible to common all current loop grounds at the Data Logger end.

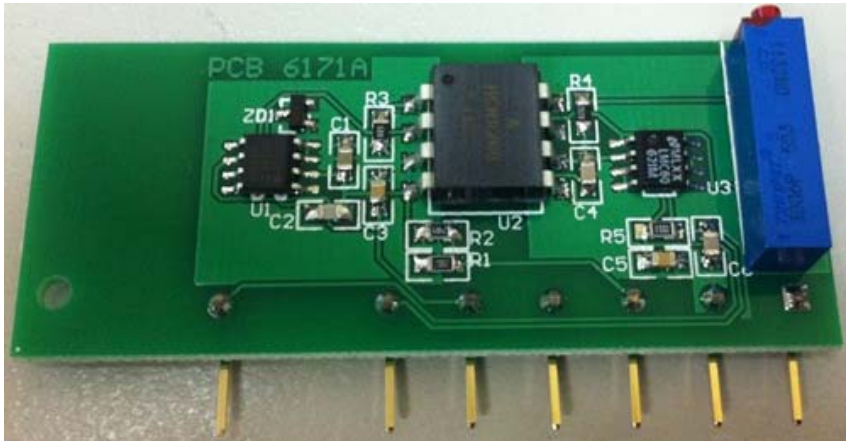
The Isolated Input Module provides isolation for transducers which cannot be directly connected to the Logger, e.g., current loop transducers powered from separate supplies. Eight modules can be fitted onto the FTS.

1. Remove **Link k**
2. Install **Link m**
   WARNING: Ensure that Links e, n and p are not installed.
   Damage may result if they are.
3. Solder Module to FTS on desired analog channel – it will only fit one way
4. Connect input signal to A and A-/Pwr terminals on the FTS.

Specifications

Input Signal:	single-ended or differential, 0 to ±2.55V DC
Output Signal:	isolated input signal, not amplified
Isolation:	flying capacitor, relay isolated
Power:	5V DC, 25mA from Logger

5.2.4 Model 6144A – 4-20mA Current Loop Isolator



The 4-20mA Current Loop Isolator isolates a Starlogger from the current loop and converts the signal to a voltage compatible with the logger. The isolator is designed for very low power consumption, provided by the logger and the current loop.

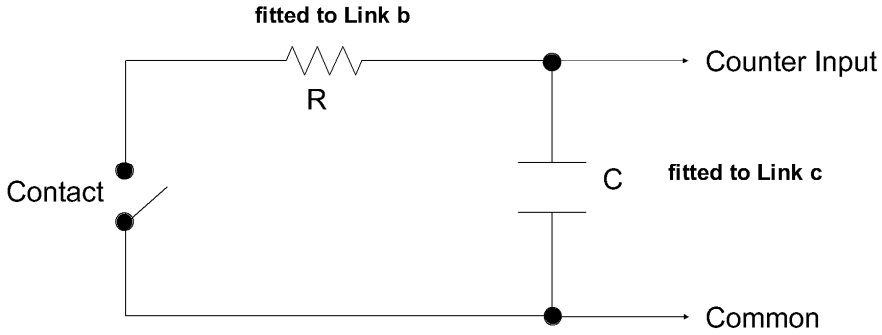
1. Remove **Link k**
2. Install **Link m**
   WARNING: Ensure that Links e, n and p are not installed.
   Damage may result if they are.
3. Solder Module to FTS on desired analog channel – it will only fit one way.
4. Connect input signal to A and A-/Pwr terminals on the FTS.
5. Define the Scheme using Starlog Software V4

Specifications

Input Signal:	4 to 20mA
Output Signal:	0.5 to 2.5V (factory calibrated)
Non Linearity:	0.25% maximum
Isolation:	>300V
Operating Temp.:	-20°C to 60°C
Power:	<1mA from Logger's 5V User Power Source

5.3 Input Filtering for Counter Inputs

All counter inputs have filtering to remove noise and unwanted signals. For certain types of input (normally relay contacts) the internal filtering may not be sufficient. A slowly actuating relay contact may have sufficient "contact bounce" to produce large errors usually in the form of a much larger number of pulses recorded than were actually applied. This problem can be solved by using an external filter circuit. The form of external filter used will vary depending upon the maximum pulse rate to be recorded and the severity of the bounce problem but would typically take the form of a capacitor across the contacts with a series resistor as shown in the diagram.



The value of C would typically vary from 0.01µF to 1µF depending upon the application. The resistor R may not be required for small values of C and robust contact types but would typically be 100Ω to 1kΩ.