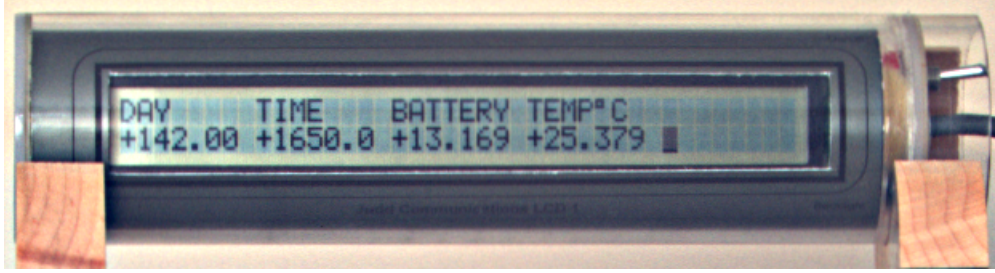


Judd Communications LCD1 Datalogger Display



The Datalogger Display connected to a CSI CR10X. The datalogger is running the first example program.

Introduction

The Judd Communications Datalogger Display is a 2 line by 40 character display that can be connected to any datalogger capable of outputting ASCII text. The Datalogger Display is a small terminal that monitors a 1200 baud data line and displays the output. The Datalogger Display is intended to be used as a local display, located within 250 feet of a datalogger. The Datalogger Display is housed in a water resistant clear acrylic tube. The case stands on two wooden holders that allow the display to be rotated for optimum viewing angle.

Operation

The Datalogger Display is powered by +12 Volts. Power can usually be taken directly from the datalogger power supply. Data to be displayed is received at 1200 baud(8-N-1). The display can be configured to decode either normal (RS-232) or inverted (TTL) serial data. The data input levels can be either RS-232 or 0 to 5 Volt. All ASCII characters can be displayed. The 01 ASCII character (Control A) can be used to clear the display. The 02 ASCII character (Control B) can be used to move the cursor to the beginning of the second line. Up to 80 characters can be displayed.

Options

- Backlighting, Electroluminescent (draws an additional 28 ma)
- Alternative display modules (1x16, 1x20 - large character .60 inch, 2x24, 2x32, etc.)
- Custom cable lengths, Custom cabling
- OEM version, display and interface circuitry without case for custom installations

Specifications

Power: +12 Volts, 4 ma

Data Input: 1200 baud, 8-N-1, RS-232 or TTL logic levels

Temp Range: -4 to 122 °F (-20 to 50 °C)

Size: 8.5 x 2 (216 x 51 mm)

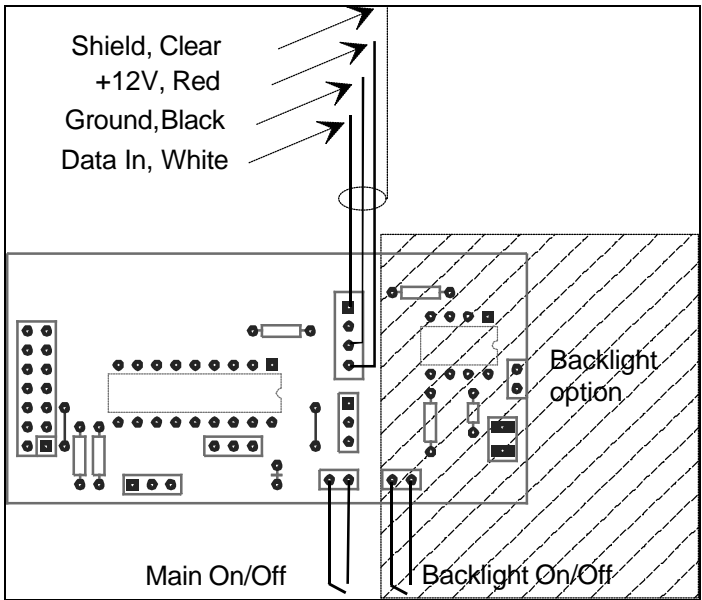
Weight: .5 lbs. (.23 kg)

Cable Length: 5 feet (1.52 meters)

Max. Cable Length: 250 feet (76 meters)

Character height: .23 inch (6.4 mm)

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LCD1 interface circuit board wiring diagram.

	32	48	64	80	96	112	160	176	192	208	224	240
0	0	1	2	3	4	5	6	7	8	9	0	1
1	!	1	A	Q	a	q	7	+	2	3	4	5
2	"	2	R	b	r	4	5	6	7	8	9	0
3	#	3	S	s	6	7	8	9	0	1	2	3
4	\$	4	T	t	8	9	0	1	2	3	4	5
5	%	5	U	u	9	0	1	2	3	4	5	6
6	&	6	V	v	0	1	2	3	4	5	6	7
7	'	7	W	w	1	2	3	4	5	6	7	8
8	(8	X	x	2	3	4	5	6	7	8	9
9)	9	Y	y	3	4	5	6	7	8	9	0
10	*	:	J	j	4	5	6	7	8	9	0	1
11	+	;	K	k	5	6	7	8	9	0	1	2
12	,	<	L	l	6	7	8	9	0	1	2	3
13	-	=	M	m	7	8	9	0	1	2	3	4
14	.	>	N	n	8	9	0	1	2	3	4	5
15	/	?	O	o	9	0	1	2	3	4	5	6

LCD1 Character Set. Add the column and row number together to determine a character number.

CR10 datalogger programming example

The following programming example shows how the Datalogger Display can be used with a Campbell Scientific CR10X datalogger, or a CR10 equipped with the optional P15 Control Port Serial command and the P65 Bulk Load command. The Datalogger Display wires should be connected as follows:

Color	CR10 Datalogger Connection
Red	+12V
Black	Ground
Clear	Ground
White	Control Port 2

Program Summary:

- The program will sample the Day, Time, Battery voltage, and Module temperature every 5 seconds.
- Once an hour, Date, Time, Average Battery Volts, and Average Module temperature are logged.
- Once every 5 seconds, labels and control characters will be output to Datalogger Display, followed by the values for Day, Time, Battery Volts, and Module Temp in degrees C.

Sample the Day, Time, Battery voltage, and datalogger Temp every 5 seconds

```

;-----
*Table 1 Program
01: 5.0      Execution Interval (seconds)

```

The next three steps get the Day and Time and store them in input locations 1 and 2.

```

1: Do (P86)
1: 10      Set Output Flag High

2: Set Active Storage Area (P80)
1: 3      Input Storage Area
2: 1      Array ID or Loc [ Day ]

3: Real Time (P77)
1: 220    Day,Hour/Minute

4: Batt Voltage (P10)
1: 3      Loc [ Battery ]

5: Internal Temperature (P17)
1: 4      Loc [ TempC ]

```

Input locations 6 and 7 are used to store the LCD1 cursor control codes

```

6: Z=F (P30)
1: 01     F
2: 0      Exponent of 10
3: 6      Z Loc [ CtrlA ]

7: Z=F (P30)
1: 02     F
2: 0      Exponent of 10
3: 7      Z Loc [ CtrlB ]

```

Load ASCII character values for the label "DAY "

```

8: Bulk Load (P65)

```

```

1: 68     F
2: 65     F
3: 89     F
4: 32     F
5: 32     F
6: 32     F
7: 32     F
8: 32     F
9: 10     Loc [ DayLabel ]

```

Load ASCII character values for the label "TIME "

```

9: Bulk Load (P65)
1: 84     F
2: 73     F
3: 77     F
4: 69     F
5: 32     F
6: 32     F
7: 32     F
8: 32     F
9: 18     Loc [ TimeLabel ]

```

Load ASCII character values for the label "BATTERY "

```

10: Bulk Load (P65)
1: 66     F
2: 65     F
3: 84     F
4: 84     F
5: 69     F
6: 82     F
7: 89     F
8: 32     F
9: 26     Loc [ BatLabel ]

```

Load ASCII character values for the label "TEMP°C "

```

11: Bulk Load (P65)
1: 84     F
2: 69     F
3: 77     F
4: 80     F
5: 223    F
6: 67     F
7: 32     F
8: 32     F
9: 34     Loc [ TempLabel ]

```

Output an ASCII 01 character (Control A) to clear the LCD1 display.

```

12: Port Serial I/O (Special) (P15)
1: 1      Reps
2: 01     ASCII/RS-232, 1200 Baud
3: 1      delay (0.01 seconds)
4: 1      First Control Port
5: 6      Output Loc [ CtrlA ]
6: 1      No. of Locs to Send
7: 0      Termination Character
8: 0      Maximum Characters
9: 1      CTS/Input Wait
10: 8     Loc [ Dummy ]
11: 1     Mult
12: 0     Offset

```

Output the labels to the first row of the LCD1 display.

```

13: Port Serial I/O (Special) (P15)
1: 1      Reps

```

```

2: 01     ASCII/RS-232, 1200 Baud
3: 1      delay (0.01 seconds)
4: 1      First Control Port
5: 10     Output Loc [ DayLabel ]
6: 32     No. of Locs to Send
7: 0      Termination Character
8: 0      Maximum Characters
9: 1      CTS/Input Wait
10: 8     Loc [ Dummy ]
11: 1     Mult
12: 0     Offset

```

Output an ASCII 02 character (Control B) to move the cursor to the beginning of the second line of the LCD1 display.

```

14: Port Serial I/O (Special) (P15)
1: 1      Reps
2: 01     ASCII/RS-232, 1200 Baud
3: 1      delay (0.01 seconds)
4: 1      First Control Port
5: 7      Output Loc [ CtrlB ]
6: 1      No. of Locs to Send
7: 0      Termination Character
8: 0      Maximum Characters
9: 1      CTS/Input Wait
10: 8     Loc [ Dummy ]
11: 1     Mult
12: 0     Offset

```

Output the values for Day, Time, Battery, & TempC to the LCD1 display. Note the two dash characters associated with parameter 6. They indicate that the values will be output in their ASCII decimal equivalents. To activate this mode, position the cursor on parameter 6 and either press the "F4" key or the "-" key for older versions of EDLOG.

```

15: Port Serial I/O (Special) (P15)
1: 1      Reps
2: 01     ASCII/RS-232, 1200 Baud
3: 1      delay (0.01 seconds)
4: 1      First Control Port
5: 1      Output Loc [ Day ]
6: 4      -- No. of Locs to Send
7: 0      Termination Character
8: 0      Maximum Characters
9: 1      CTS/Input Wait
10: 8     Loc [ Dummy ]
11: 1     Mult
12: 0     Offset

```

Log the battery voltage and module temperature once an hour

```

16: If time is (P92)
1: 0      Minutes (Seconds --) into a
2: 60     Interval (same units as above)
3: 10     Set Output Flag High

```

Set the array ID to 100

```

17: Set Active Storage Area (P80)
1: 1      Final Storage Area 1
2: 100    Array ID or Loc [ _____ ]

```

Output Array, Year, Day, Time, Battery, TempC

```

18: Real Time (P77)
1: 1110   Year,Day,Hour/Minute

```

19: Average (P71)
1: 1 Repts
2: 3 Loc [Battery]

20: Average (P71)
1: 1 Repts
2: 4 Loc [TempC]

;-----

*Table 2 Program
02: 0.0 Execution Interval

*Table 3 Subroutines

End Program

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Alternate CR10 datalogger programming example

The following programming example shows how the Datalogger Display can be used with a Campbell Scientific CR10 datalogger, using the P98 and P96 commands instead of the P15 command used in the previous example. This method can be used when the P15 command is not available. The Datalogger Display wires should be connected as follows:

Color	CR10 Datalogger Connection
Red	+12V
Black	Ground
Clear	Ground
White	Pin 9, Serial I/O connector *

*Pin 9 of the 9 pin D connector on the datalogger. See section 6 of the Data Retrieval chapter in the CR10 operators manual for a diagram of the 9 pin connector.

Program Summary:

- The program will sample the battery voltage and module temperature every 5 seconds.
- Once an hour, Date, Time, Average Battery Volts, and Average Module temperature are logged.
- Once every 5 seconds, the following data will be logged to final storage area 2 and then output to the display: Array ID, Year, Day, Time, Battery Volts, Module Temp in degrees C, Module Temp in degrees F.

Please note that this program uses Final Storage Area 2 as a small buffer for the display. This program will not work properly unless space is allocated for Final Storage Area 2. In older versions of Edlog this is done with the "Mode 10 Memory Allocation" section in a CR10 datalogger program. In Versions of Edlog version 6.2 and greater, memory is allocated by using the "CR10 Final Storage Area 2" choice from the "Options" menu. A value of 100 should be adequate.

Sample the battery voltage and module temperature every five seconds.

```

;-----
*Table 1 Program
  01: 5.0   Execution Interval (seconds)

1:  Batt Voltage (P10)
  1: 1      Loc [ Battery   ]

2:  Internal Temperature (P17)
  1: 2      Loc [ Mod_TempC ]

3:  Z=X*F (P37)
  1: 2      X Loc [ Mod_TempC ]
  2: 1.8    F
  3: 3      Z Loc [ Mod_TempF ]

4:  Z=X+F (P34)
  1: 3      X Loc [ Mod_TempF ]
  2: 32     F
  3: 3      Z Loc [ Mod_TempF ]

```

Log battery voltage and module temperature once an hour

```

;-----
5:  If time is (P92)
  1: 0      Minutes (Seconds --) into a
  2: 60     Interval (same units as above)
  3: 10     Set Output Flag High

```

Set array ID to 100 for data being logged hourly

```

6:  Set Active Storage Area (P80)
  1: 1      Final Storage Area 1
  2: 100    Array ID or Loc [ _____ ]

```

Output Array, Year, Day, Time, Battery, Temp C, Temp F

```

7:  Real Time (P77)
  1: 1110   Year,Day,Hour/Minute

8:  Average (P71)
  1: 1      Reps
  2: 1      Loc [ Battery   ]

9:  Average (P71)
  1: 1      Reps
  2: 2      Loc [ Mod_TempC ]

10: Average (P71)
  1: 1      Reps
  2: 3      Loc [ Mod_TempF ]

```

Log battery and module temperature every 5 seconds and then send the logged array to the Datalogger display

```

;-----
11: Do (P86)
  1: 10     Set Output Flag High

Set array ID to 200 for data being sent to display
12: Set Active Storage Area (P80)
  1: 2      Final Storage Area 2
  2: 200    Array ID or Loc [ _____ ]

```

Output Array, Year, Day, Time, Battery, Temp C Temp F

```

13: Real Time (P77)
  1: 1110   Year,Day,Hour/Minute

14: Sample (P70)
  1: 1      Reps
  2: 1      Loc [ Battery   ]

15: Sample (P70)
  1: 1      Reps
  2: 2      Loc [ Mod_TempC ]

16: Sample (P70)
  1: 1      Reps
  2: 3      Loc [ Mod_TempF ]

```

Send an ASCII 01 (control A) to the display to clear it

```

17: Send Printer Character (P98)
  1: 41     Printer/1200 Baud

18: Extended Parameters (P63)
  1: 01     Option
  2: 0      Option
  3: 00     Option
  4: 00     Option
  5: 00     Option
  6: 00     Option
  7: 00     Option
  8: 00     Option

```

Send a copy of all the data in Array 200 that was just sent to Final Storage Area 2 to the display

```

19: Serial Out (P96)
  1: 41     Printer ASCII/1200 Baud
;-----

*Table 2 Program
  02: 0.0   Execution Interval (seconds)

```

*Table 3 Subroutines

End Program

**In order for program to work, space for Final
Storage Area 2 MUST be allocated!**

*A Mode 10 Memory Allocation
1: 28 Input Locations
2: 64 Intermediate Locations
3: 100 **Final Storage Area 2**

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