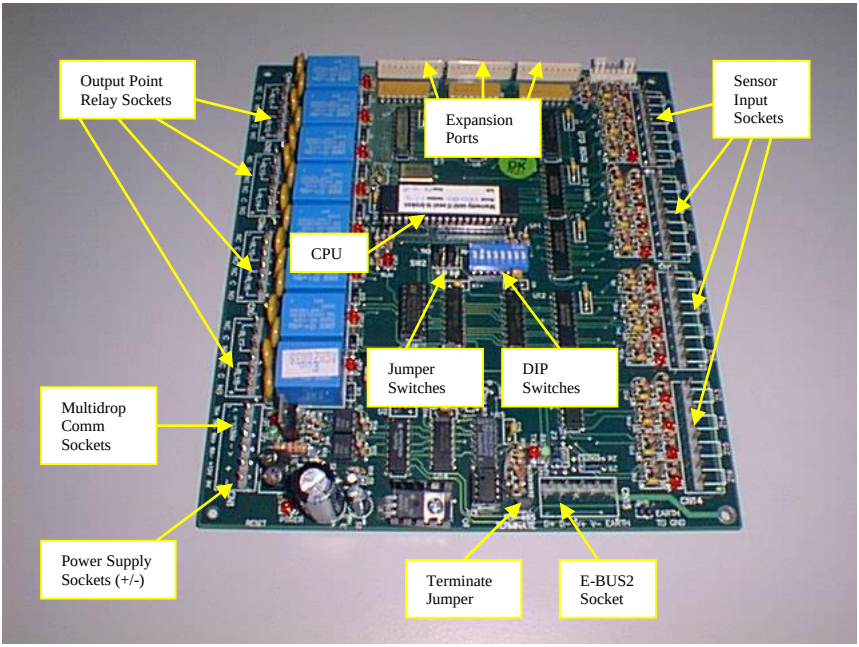
EFD80 ELECTRONIC FIELD DEVICE

This guide is intended to assist qualified technicians in installing the EFD80 Electronic Field Device.

Layout of the EFD80 Board

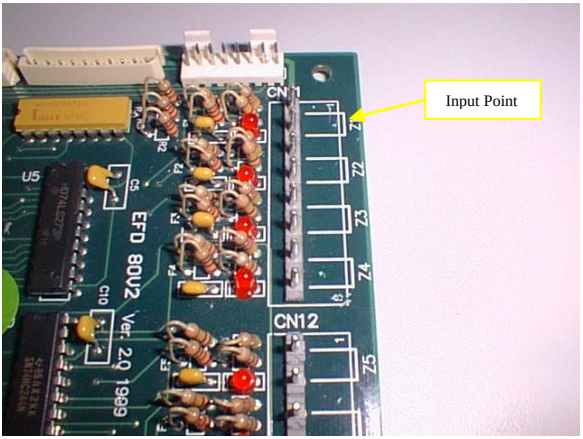


This guide is divided into the following sections:

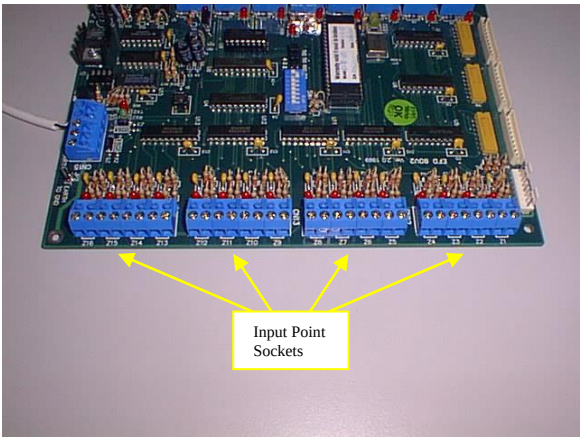
SECTION 1 - EFD80 BOARD PART DESCRIPTION

1.1 SENSOR INPUT SOCKETS

The EFD80 has the capacity to support up to sixteen sensor points.



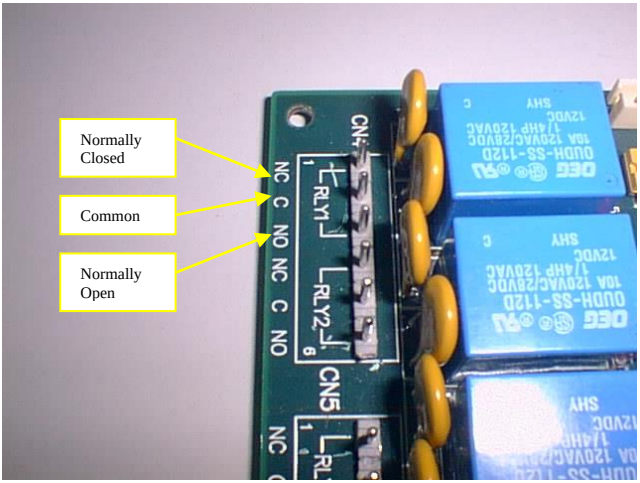
Four input points at CN11 - two socket pins per input point



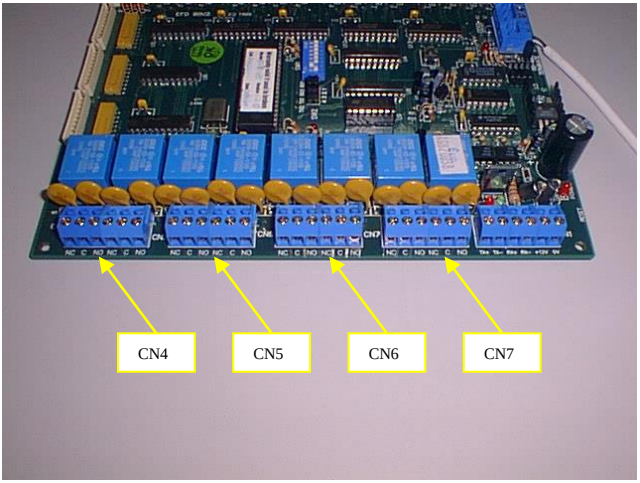
Sixteen input point sockets (Z1-Z16) grouped into socket groups CN11-CN14.

1.2 OUTPUT POINT RELAY SOCKETS

The EFD80 can support up to eight output points on the board itself, as well as up to twenty-four more with relay expansion boards.

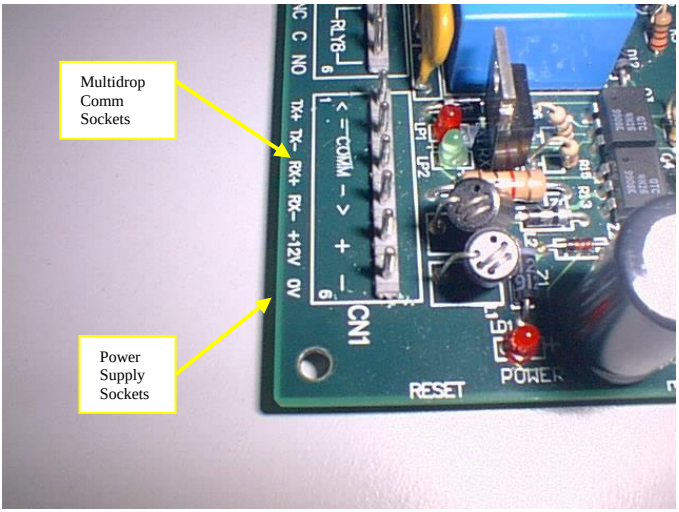


Each Output Point Relay has three socket pins: NC(Normally Closed), C(Common), NO(Normally Open)



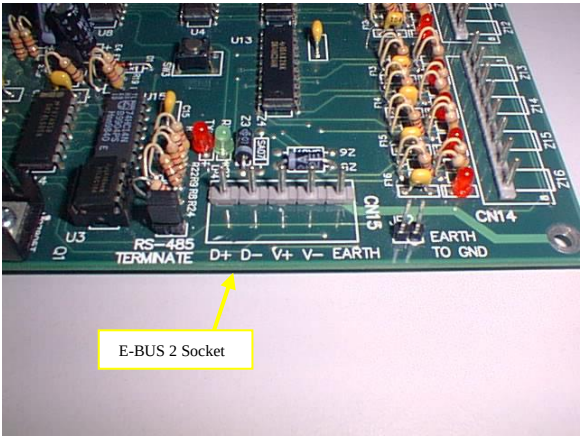
Eight output point relay sockets (CN4 to CN7)

1.3 MULTIDROP & POWER SUPPLY SOCKETS



Multidrop Comm Sockets (TX+/TX-/RX+/RX-) occupy CN1 Sockets 1-4
Power Supply Sockets (+12V/0V) occupy CN1 Sockets 5-6

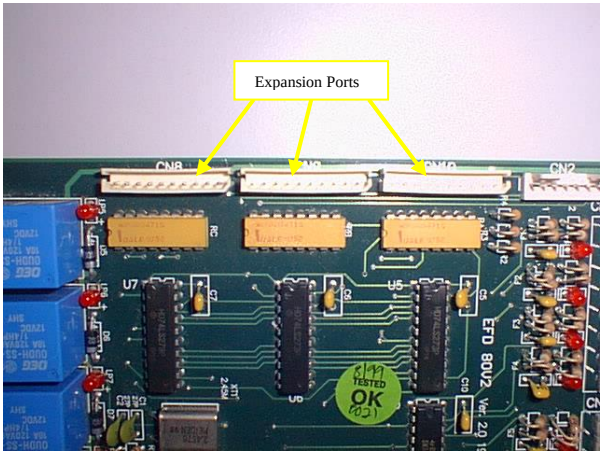
1.4 E-BUS-2 SOCKET



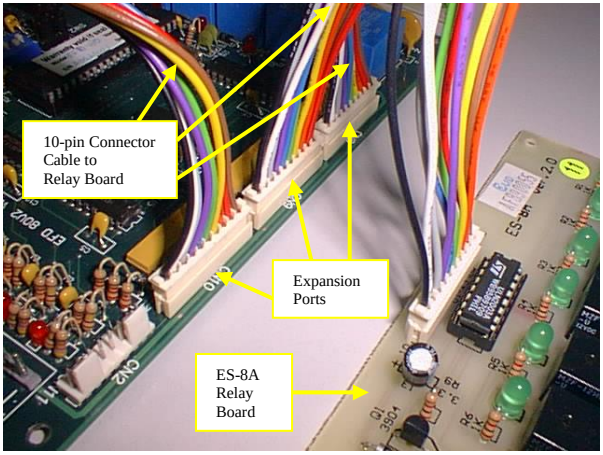
The E-BUS two-pin connector occupies the D+/D- sockets.

1.5 EXPANSION PORTS

These expansion ports (CN8, CN9, CN10) are for the ES-8A relay boards. Up to three relay boards may be attached to each EFD80. Each relay board expands the EFD80 board output point capacity by eight output points. A 10-pin Connector is required to connect a relay board to the EFD80 board.

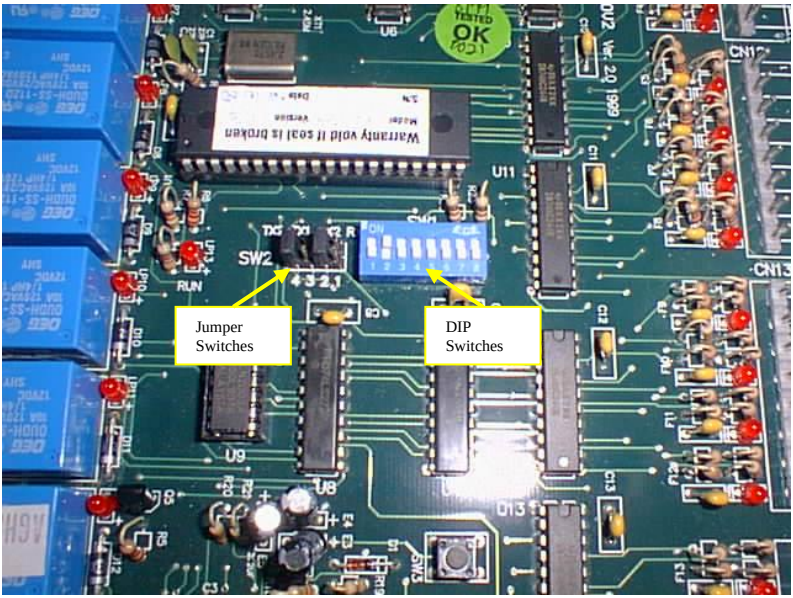


Expansion Ports on top edge of EFD80 board



Close up of wiring between EFD80 and ES-8A Relay Board

1.6 OTHERS:



This section covers the configuration of the EFD80's DIP Switches and Jumper Switches.

(1) DIP Switches
(2) Communication Jumper Switches
(3) RS485 Terminate Jumper

1.6.1 DIP Switches

The EFD80 DIP Switches control four different options:
i) Test Mode (switch 1) - Default: Off
ii) EL5000 Mode (switch 2) - Default: On
iii) Comm Baud Rate (switches 3-4) - Data Communication setting
iv) Unit No (switches 5-8) - Identity number that differentiates different EFD80s from one another.*

*Note: For EL5000 Controller configurations: Although the EFD80 has enough Unit No DIP Switch settings for sixteen EFD80 boards on a single daisy chain, an EL5000 Controller can only support up to eight EFD80 boards at one time.

Example: DIP Switches set to EL5000 Mode, 9600 Baud Rate, Unit no 1.

DIP SWITCH (Group A)		BAUD RATE
3	4	
OFF	OFF	9600
OFF	ON	4800
ON	OFF	2400
ON	ON	1200

Notes:
i) DIP Switch No.1 SET TO `ON' FOR TEST MODE.
ii) DIP Switch No 2 SET TO `ON' FOR EL5000 MODE.
iii) DIP Switch settings on Group A: 3-4 affects BAUD RATE while group B: 5-8 affects UNIT NO
Note: Settings on one group do not affect the other.

DIP SWITCH (Group B)				UNIT NO
5	6	7	8	
OFF	OFF	OFF	OFF	1
OFF	OFF	OFF	ON	2
OFF	OFF	ON	OFF	3
OFF	OFF	ON	ON	4
OFF	ON	OFF	OFF	5
OFF	ON	OFF	ON	6
OFF	ON	ON	OFF	7
OFF	ON	ON	ON	8
ON	OFF	OFF	OFF	9
ON	OFF	OFF	ON	10
ON	OFF	ON	OFF	11
ON	OFF	ON	ON	12
ON	ON	OFF	OFF	13
ON	ON	OFF	ON	14
ON	ON	ON	OFF	15
ON	ON	ON	ON	16

1.6.2 Communication Jumper Switches

Example: Comm Jumper set to RS-485 E-BUS mode

The Jumper Switches allow the EFD80 to be set to communicate via either E-BUS or MULTIDROP communication lines. The following Jumper Switch configurations select the communication mode for the EFD80:

RS-485 E-BUS - for use with EL5000 Controller

TX2	TX1	RX2	RX1
X		X	
X		X	

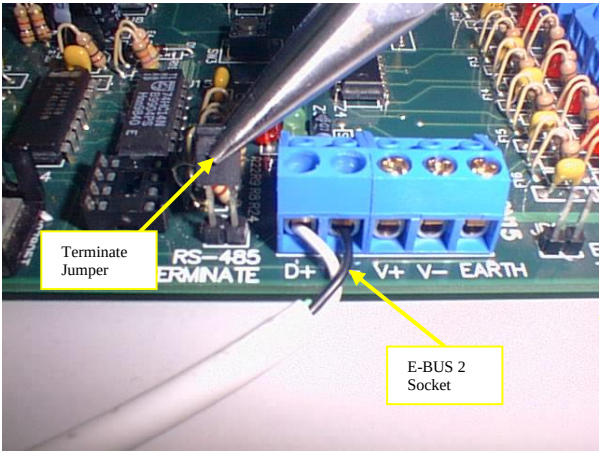
MULTIDROP - for use with EL70T Communicator

TX2	TX1	RX2	RX1
	X		X
	X		X

(Areas marked with an X represent switches filled with a jumper)

1.6.3 RS485 Terminate Jumper

The RS-485 Terminate Jumper is used to identify the last physical EFD80 in a daisy chain of EFD80 units interconnected along an E-BUS line.



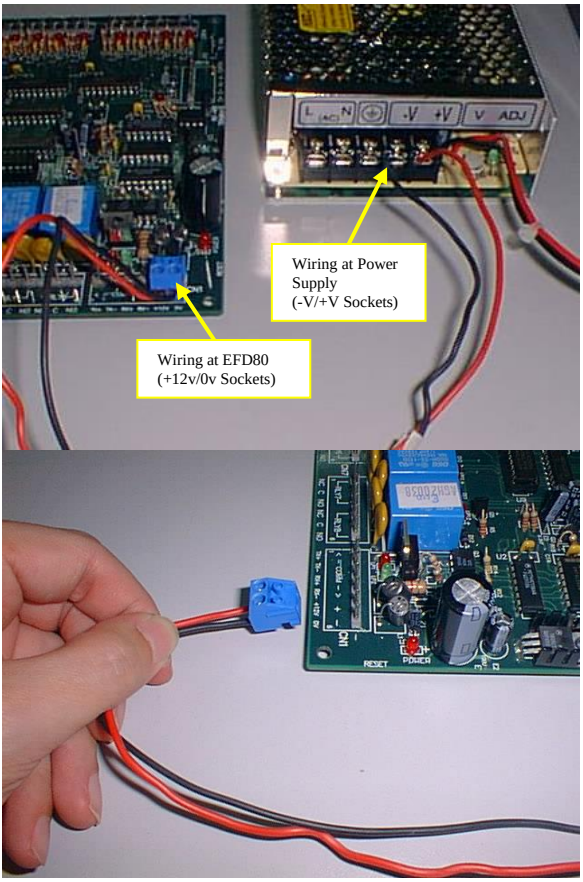
Close up of Terminate Jumper being installed in the ON position

Attach the Terminate Jumper Plug to the switch to the last physical EFD80 on a daisy chain. Be sure the Terminate Jumper Plug covers both pins of the Terminate Switch.

Note: When adding new EFD80 boards to a daisy chain, the Terminate Jumper settings on the new EFD80 boards and the EFD80 board directly preceding it have to be changed to take into account the new last physical device in the daisy chain.

SECTION 2 - WIRING PROCEDURES

2.1 POWER SUPPLY WIRING

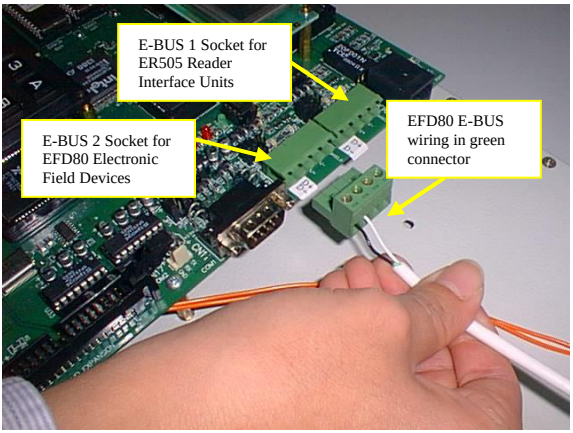


Wiring from EP36 Power Supply (-V/+V sockets) to EFD80 (+12v/0v sockets) at CN1.

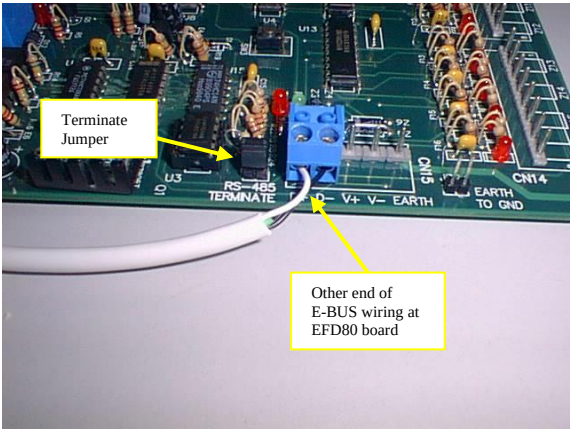
The -V wire (black) goes into the 0v(-) socket on the EFD80. The +V wire (red) goes into the 12v(+) socket on the EFD80.

2.2 E-BUS 2 WIRING

2.2.1 E-BUS wiring to EL5000 Controller



E-BUS 2 connection to EL5000 Controller (D+/D-) sockets



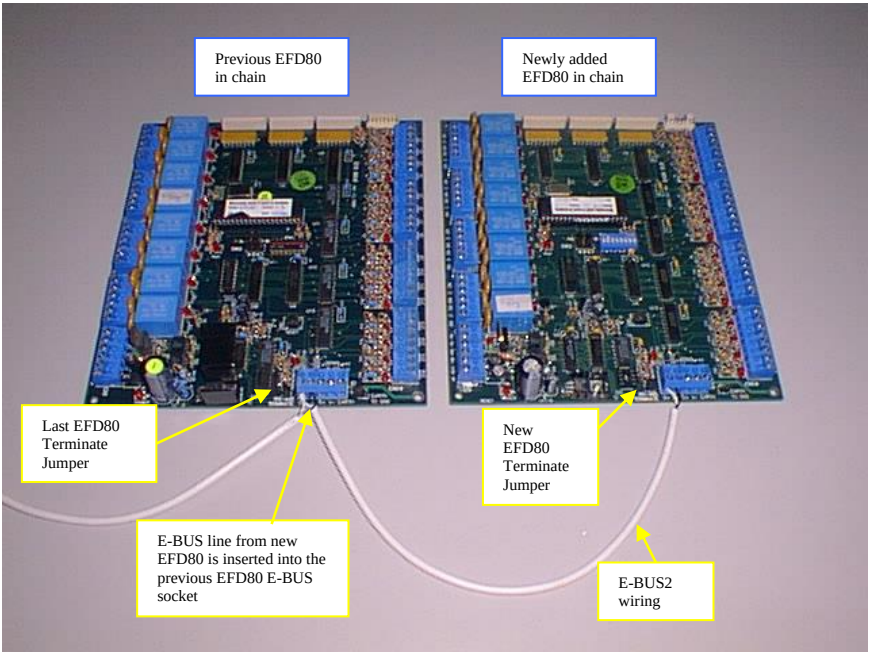
E-BUS 2 connection to EFD80 (D+/D-) sockets

Insert two 0v wires: D+ wire into D+ socket and D- wire into D- sockets at both ends of the wire. One end of the wire goes to the EL5000 Controller while the other end goes into CN15 (Socket 1-2) of the EFD80 board. Ensure that the Terminate Jumper is set to the ON position.

2.2.2 E-BUS 2 wiring to Multiple EFD80 boards

Adding a new EFD80 to a daisy chain:

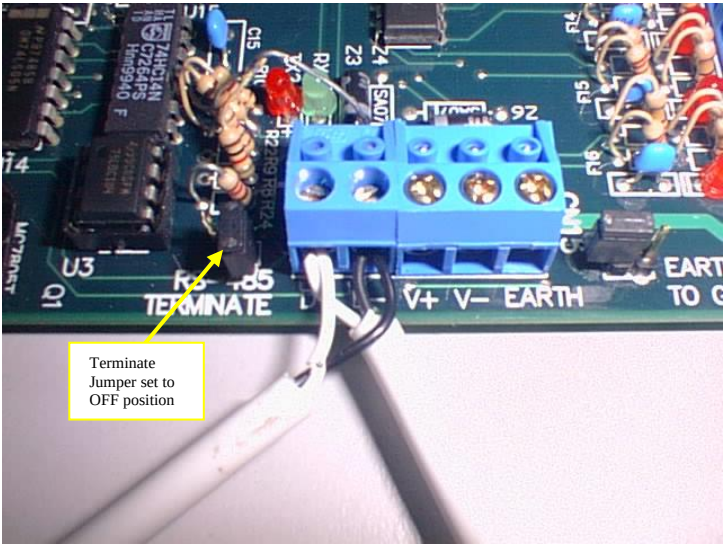
1. Install the *E-BUS wiring* from the new EFD80 into the Blue Connector Plug of the previous EFD80 in the chain.
2. Then, remove the *Terminate Jumper* from the last EFD80 and insert it into the new EFD80 Terminate Jumper Switch to identify the new last physical EFD80 in the daisy chain.



Example of two EFD80 boards connected on a daisy chain

Note: The EL5000 Controller can manage up to eight EFD80 boards interconnected along a daisy chain.

Wiring for Daisy Chain Configuration



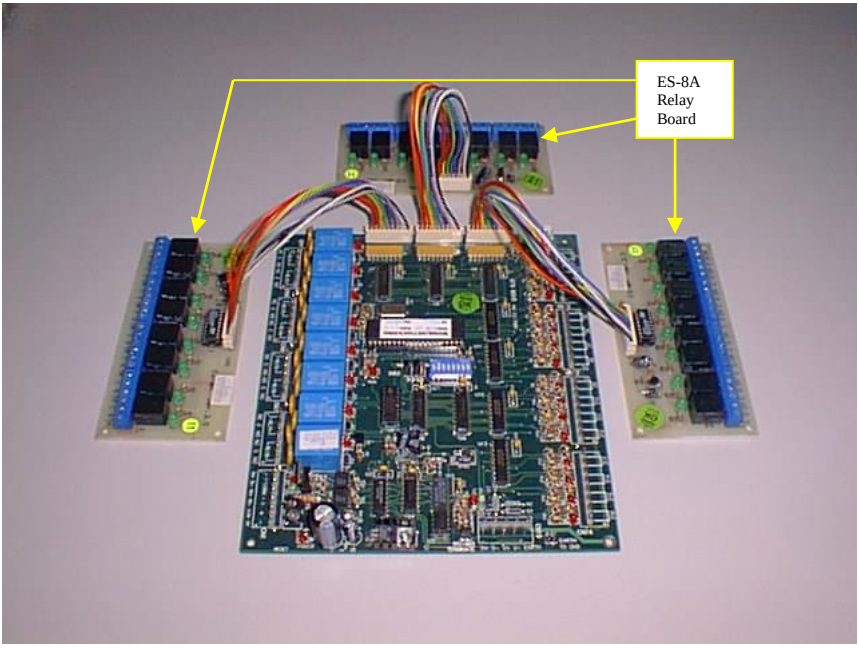
E-BUS wiring at the EFD80 board to two other devices (Either a Controller and another EFD80 board OR two other EFD80 boards)

The E-BUS wiring from the other devices on either side of the Daisy Chain are combined at the E-BUS sockets. It is important to remember the D+/D- line connection locations. The D+ wire (white) socket is on the left and the D- wire (black) socket is on the right.

Note that the Terminate Jumper is in the OFF position (vertical rather than horizontal and only covering one pin) to represent an EFD80 unit that is NOT the last unit (physically) on the RS-485 E-BUS Daisy Chain.

2.3 ES-8A RELAY BOARD WIRING

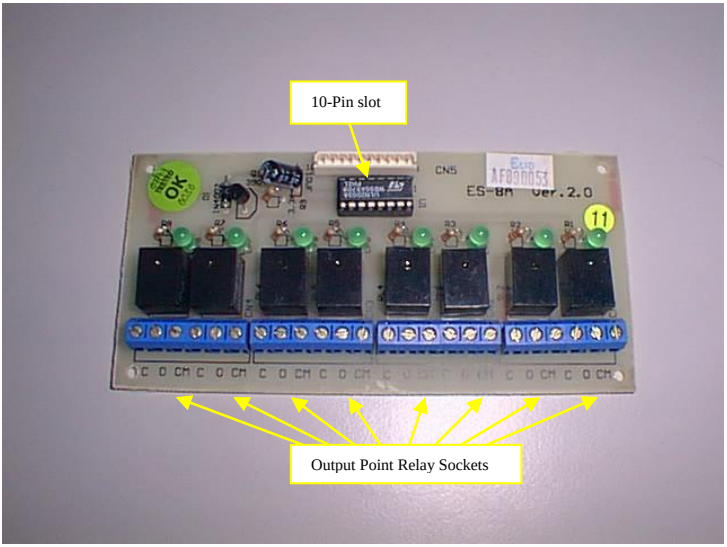
Up to three ES-8A Relay Boards may be attached to a single EFD80 board, expanding it's capacity to thirty-two output points. (Eight points per relay board plus the eight points on the EFD80 itself.)



EFD80 Board with three ES-8A Relay boards attached

Simply attach a 10-Pin connector at the 10-pin port at the ES-8A Relay Board and connect the other end to one of the three unused EFD80 Expansion ports.

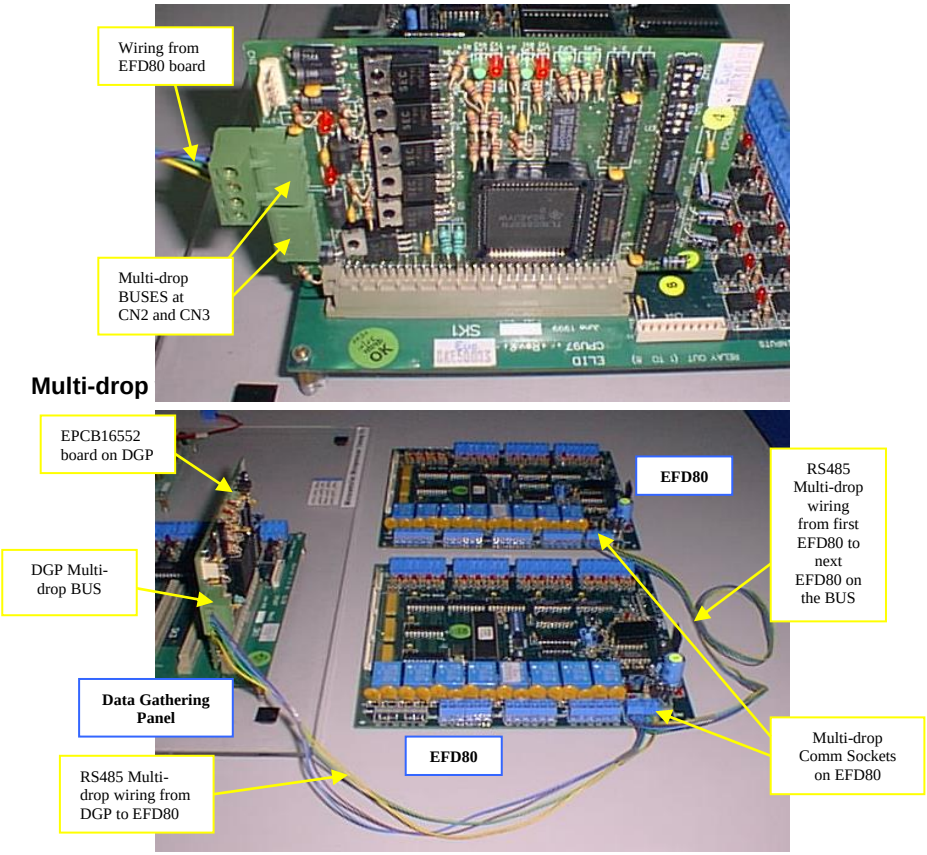
ES-8A Relay Board Layout



On the ES-8A Relay Board, each Output Point Relay has three wire sockets: C(Closed), O(Open), CM(Common). Each Relay Board has sufficient sockets for eight output points.

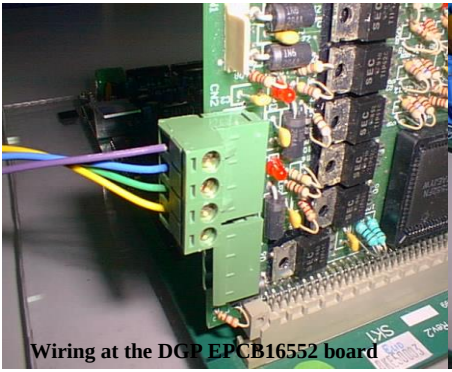
2.4 DATA GATHERING PANEL MULTI-DROP WIRING

The EFD80 board can be connected to the Data Gathering Panel (DGP) via the EPCB16552 board, which is an extension of the Data Gathering Panel. Four wires from the EFD80 Multi-drop Comm Socket (CN1) are sent to one of the EPCB16552 board's two Multi-drop BUS Socket (either CN2 or CN3) via green connectors. Consult the EPCB/DGP Wiring Diagram for more information.

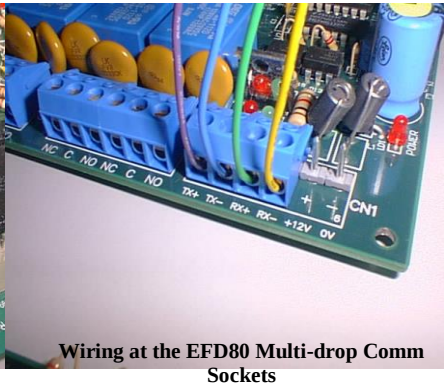


Multi-drop wiring from Data Gathering Panel (DGP) to EFD80 board

DGP to EFD80 Wiring Configuration



Wiring at the DGP EPCB16552 board



Wiring at the EFD80 Multi-drop Comm Sockets

The wiring configuration is as follows:

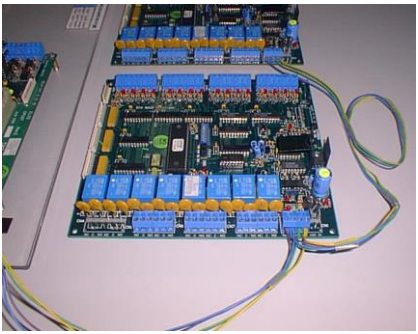
CN2/CN3 Sockets 1-4 on DGP	Wire Color	CN1 Sockets 1-4 on EFD80
RX+	Purple	TX+
RX-	Blue	TX-
TX+	Green	RX+
TX-	Yellow	RX-

RX+: Receive Positive
RX-: Receive Negative
TX+: Transmit Positive
TX-: Transmit Negative

Important: The Transmit Positive (TX+) wire from one board must go to the Receive Positive (RX+) socket on the other board. Similarly, the Transmit Negative (TX-) wire from one board must go to the Receive Negative (RX-) socket on the other board.

Wiring from EFD80 to another EFD80 (RS485 Multi-drop BUS configuration)

A single Data Gathering Panel can support up to 16 EFD80 boards on each of its two RS485 Multi-drop BUSES. Each subsequently added EFD80 is connected to the previous EFD80's through four wires connecting both boards' Multi-drop Comm Sockets (CN1).



The wiring configuration is as follows:

CN1 Sockets 1-4 on previous EFD80	**Wire Color**	**CN1 Sockets 1-4 on newly added EFD80**
TX+	Purple	TX+
TX-	Blue	TX-
RX+	Green	RX+
RX-	Yellow	RX-

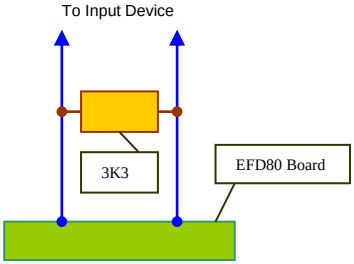
TX+: Transmit Positive
TX-: Transmit Negative
RX+: Receive Positive
RX-: Receive Negative

Important: When connecting two EFD80 boards on the same BUS together, all four wires from one board joins up with the same sockets on the other board (ie. TX+ on board one to TX+ on board two and so on.).

2.5 INPUT POINT WIRING

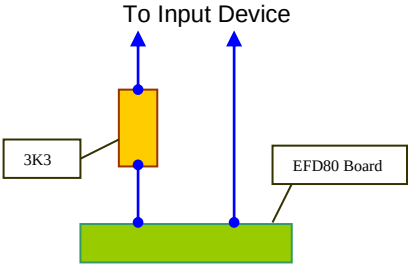
The EFD80 provides two wire sockets for every input point. 3K3 Resistors are required as part of the wiring process. There are two common wiring configurations for input points: *Normally Open* and *Normally Closed*.

Normally Open - Input device has a normal status and, when changed to an abnormal status by an event (eg. a motion detector sensing motion or a sensor detecting a tamper attempt), sends a signal to the EFD80 informing it of a change of status.



A simple example of a Normally Open Input Device may be a simple ON/OFF switch, which is meant to send a signal to the rest of the system if turned ON.

Normally Closed - Input device is normally activated and deactivates when triggered.



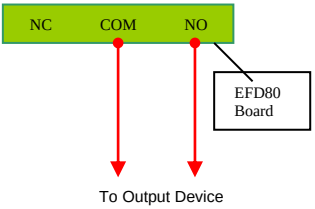
An example of a Normally Closed Input Device may be a door sensor, which remains connected to a closed door. When the door is opened, this connection is broken, breaking the input point line and sending a signal to the rest of the system.

2.6 OUTPUT POINT WIRING

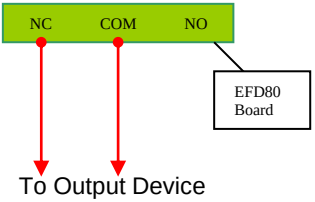
For the EFD80, output points exist on the board itself as well as on the ES-8A Relay boards. Although the layouts of the sockets are different, both layouts contain exactly three sockets: "Normally Closed" (NC/C), "Common" (C/CO) and "Normally Open" (NO/O).

The Output Relay Points may be set up in one of two configurations:
"Normally Open" and "Normally Closed".

Normally Open One wire in **COM**, One wire in **NO.**
In this configuration, the output device is normally deactivated. When the relay is triggered, power is fed to the device, activating it. (Eg. Buzzer)



Normally Closed - One wire in ***COM,*** One wire in **NC**
In this configuration, the output device is normally activated. When triggered, this device is deactivates. (Eg. An Electrified Fence being deactivated by a successful pass code entry.)



APPENDIX 1 - EFD80 TECHNICAL SPECIFICATIONS

Model	EFD80
Microprocessor	Motorola 68HC705 with bus speed of 1.2Mhz
Supervised Inputs	16 Input Points
Relay Outputs	32 Output Points
Power Supply	12VDC
Built-in tamper detection	YES
Operating Temperature	0C to 50C
Humidity	10% to 90% non-condensing
Casing Dimensions	410(H)x400(L)x120(W)