



Farnell Technical Data Service

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Assembly of Balanced Line Transceiver (BLT) Order Code 144-006

144-106

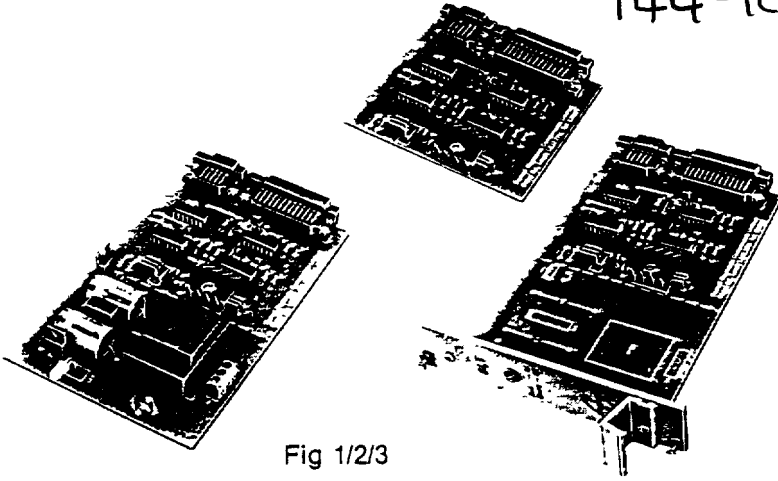


Fig 1/2/3

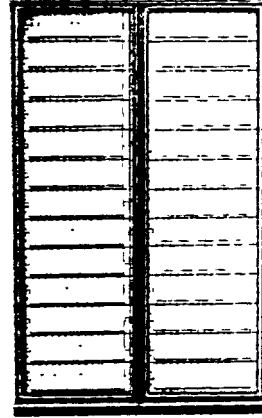


Fig 4

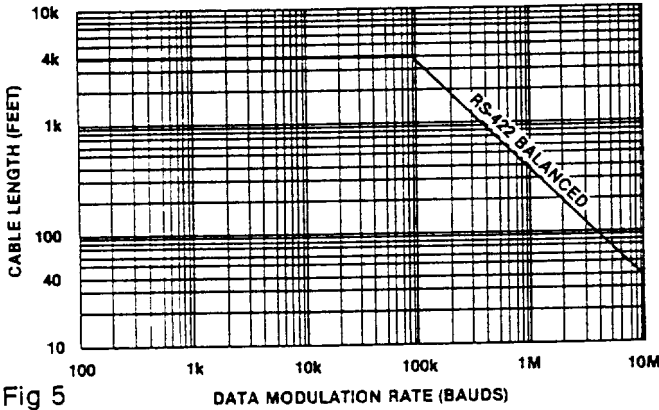


Fig 5

Balanced Line Transceiver

The 144-006 is a pre-prepared high quality Eurocard circuit board (160mm x 100mm) for the construction of a modern and reliable Balanced Line Transceiver (BLT). It has been designed for the purpose of extending the operating distance of computer peripheral equipment (eg VDU's, printers etc) that use the RS232/V24 system of communication. By using a pair of twin twisted or quad screened cable, a range of up to 4000 ft can be achieved with very good noise immunity. With quad screened cable the screen must only be earthed at one end, usually the computer end. The data rate can be up to 10 Megabaud depending on the length of the balanced line. see Fig 5. The graph is for twin twisted pair cable only. This type of balanced line communication system is known as RS422/V11.

Two BLT's are used together to form the balanced line link, one at the computer end, the other at the remote peripheral. This is shown in Fig 6. The BLT's have a unique data indicating system which incorporates a bi-coloured LED. A monostable circuit is used to stretch the data pulses so that they can easily be seen. When the BLT is transmitting data the red LED will flash, when receiving data the green LED will flash. If the transmitted and received data occur simultaneously the colours will be mixed and will be orange in colour.

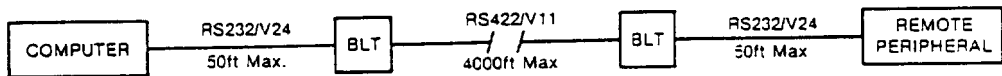


Fig 6

Important Note: The RS422/V11 balanced lines between two BLT's must cross over at some point in the wiring so that a BLT transmitter feeds the other BLT's receiver. See Fig 7.

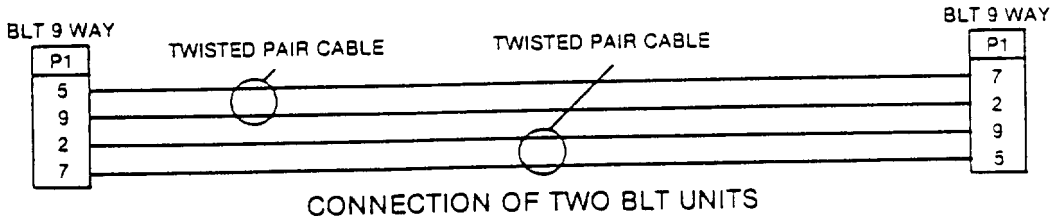


Fig 7

Configuration

The BLT can be constructed in three separate configurations.

- (a) Stand alone with its own on board mains power supply. See Fig 1
- (b) Stand alone with an external power supply. If required the board length can be cut down to the dotted line. If this is done the links L1, L2, L3 and L4 are omitted and the LED connected to X, Y and Z. The external power supply is connected through the 3 pin Molex connector P3. See Fig 2.
- (c) As a Eurocard rack mounted unit with a 1.2 inch x 3U high card panel (Order Code 141-605). In a standard 19 inch rack 10 BLT's plus a power supply can be accommodated. (Order Code 141-600). See Fig 3

A typical mainframe computer communication system using BLT's is shown in Fig 4.

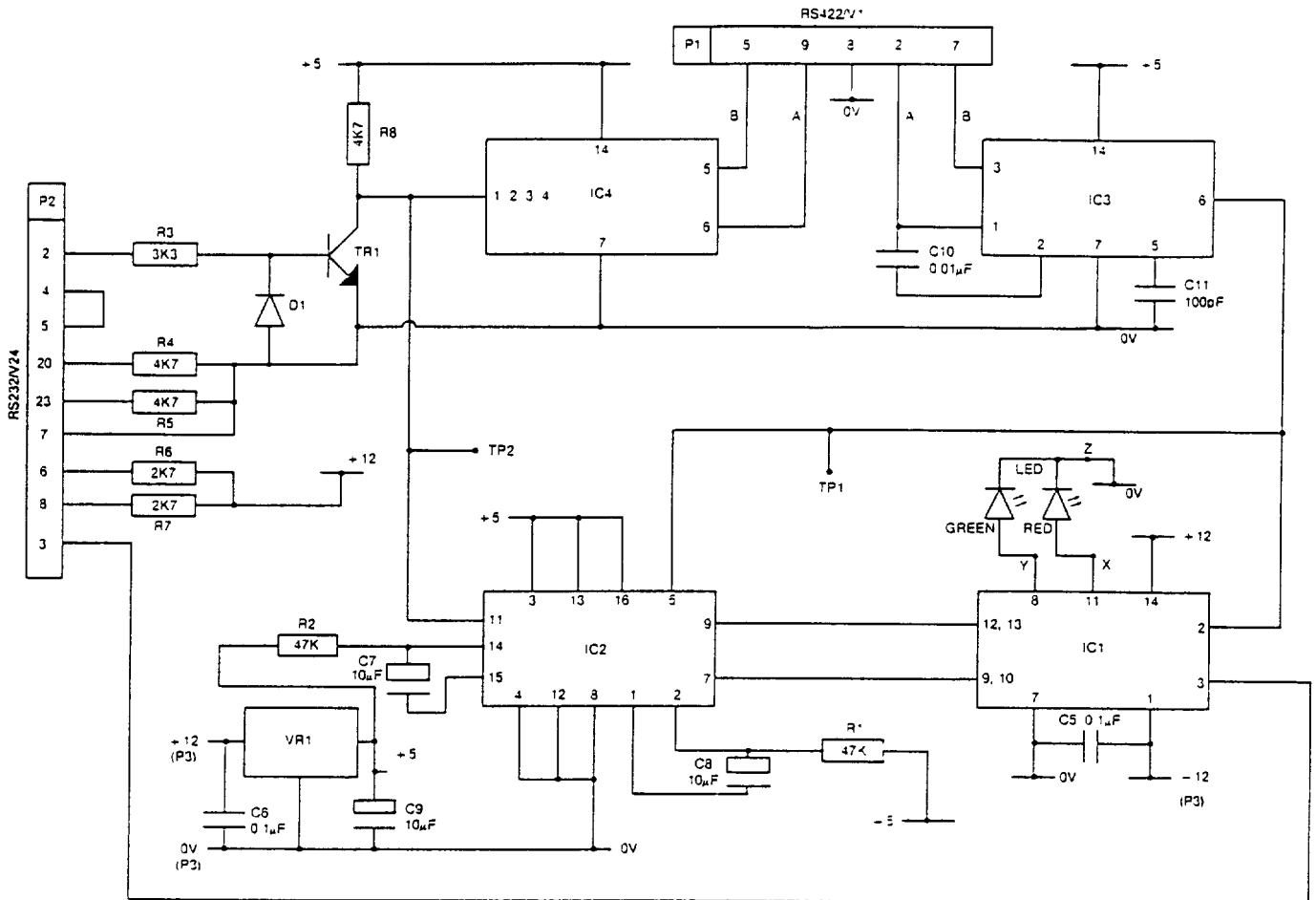
Circuit Description

By using modern integrated circuits, the component count is kept very low. The incoming data from the RS232/V24 system is first converted to TTL logic levels by TR1. This is then fed to IC4 which transmits the data down the RS422/V11 balanced line. It also feeds one half of IC2, a monostable to drive the red half of the LED via line driver IC1. The incoming data from the RS422/V11 balanced line is received by IC3 and converted to TTL logic levels. It is converted to RS232/V24 by line driver IC1. It also feeds the other monostable in IC2 to drive the green half of the LED via line driver IC1.

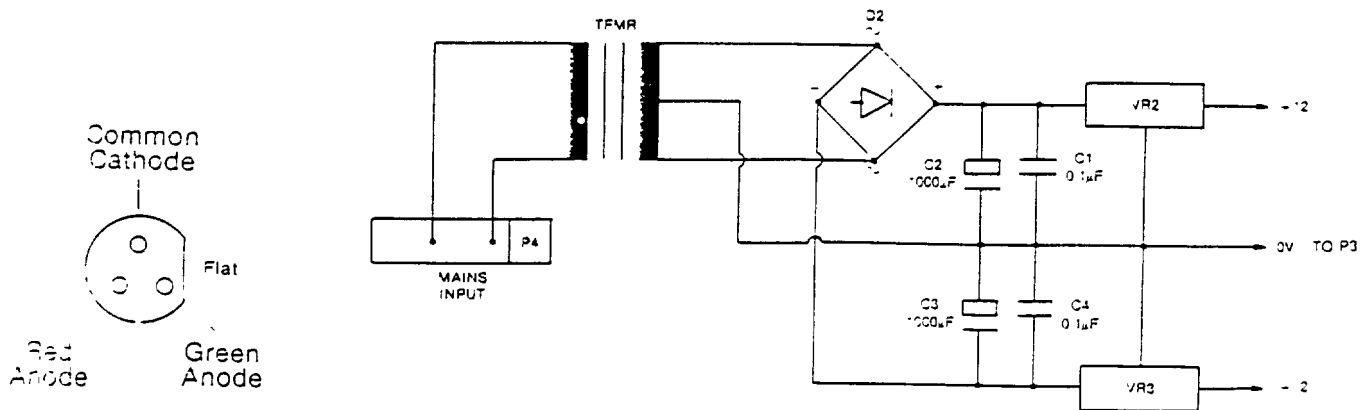
The power supply is a very simple regulated $\pm 12V$. The circuit diagram should be self explanatory.

Note: Two BLT's can be run from one on board power supply by connecting the two P3's together.

Circuit Diagrams



BALANCED LINE TRANSCEIVER



LED CONNECTIONS

ON BOARD POWER SUPPLY

Construction

Construction is straight forward, with care being taken that the polarity of the devices corresponds to that marked on the PCB component mask. The correct orientation of the VR2 and VR3 regulators are indicated by the thick band on the component mask corresponding to the metal tab of the regulator, if the stand alone power supply option is used

BLT Component List

R1	47K Resistor	MRS25 47K	TR1	Transistor	2N4401
R2	47K Resistor	MRS25 47K	LED	Bi-coloured LED	CQX95
R3	3K3 Resistor	MRS25 3K3	IC1	Line driver	MC1488F
R4	4K7 Resistor	MRS25 4K7	IC2	Dual monostable	CD4528BCN
R5	4K7 Resistor	MRS25 4K7	IC3	Receiver	DS8820N
R6	2K7 Resistor	MRS25 2K7	IC4	Transmitter	DS8830N
R7	2K7 Resistor	MRS25 2K7	P1	D type 9 way	146-271
R8	4K7 Resistor	MRS25 4K7	P2	D type 25 way	146-275
C5	0.1 μ F Capacitor	146-227	P3	Molex 3 way	143-111
C6	0.1 μ F Capacitor	146-227	1 off	PCB	144-006
C7	10 μ F Tantalum Capacitor	100-890	1 off	Heatsink	170-073
C9	10 μ F Tantalum Capacitor	100-890	2 off	Jackscrews (2 packs of 2)	140-880
C9	10 μ F Tantalum Capacitor	100-890	4 off	6BA x 1/4 Screws	
C10	0.01 μ F Capacitor	146-224	4 off	6BA Nuts	
C11	100pF Capacitor	427 41001	1 off	4BA x 1/4 Screws	
D1	Diode	1N4148	1 off	4BA Nuts	
VR1	Regulator +5V	LM2930T-5			

The above kit may be ordered under the Order Code 144-106.

Power Supply Component List

C1	0.1 μ F Capacitor	146-227	VR3	Regulator - 12V	LM320T-12
C2	1000 μ F Electrolytic Capacitor	143-655	D2	Bridge rectifier	2KBB40
C3	1000 μ F Electrolytic Capacitor	143-655	Tfmr	Transformer	141-472
C4	0.1 μ F Capacitor	146-227	P3	Connector	101-785
VR2	Regulator +12V	LM340T-12			

The above power supply option kit may be ordered under the Order Code 144-104.

Suitable Balanced Line Cable

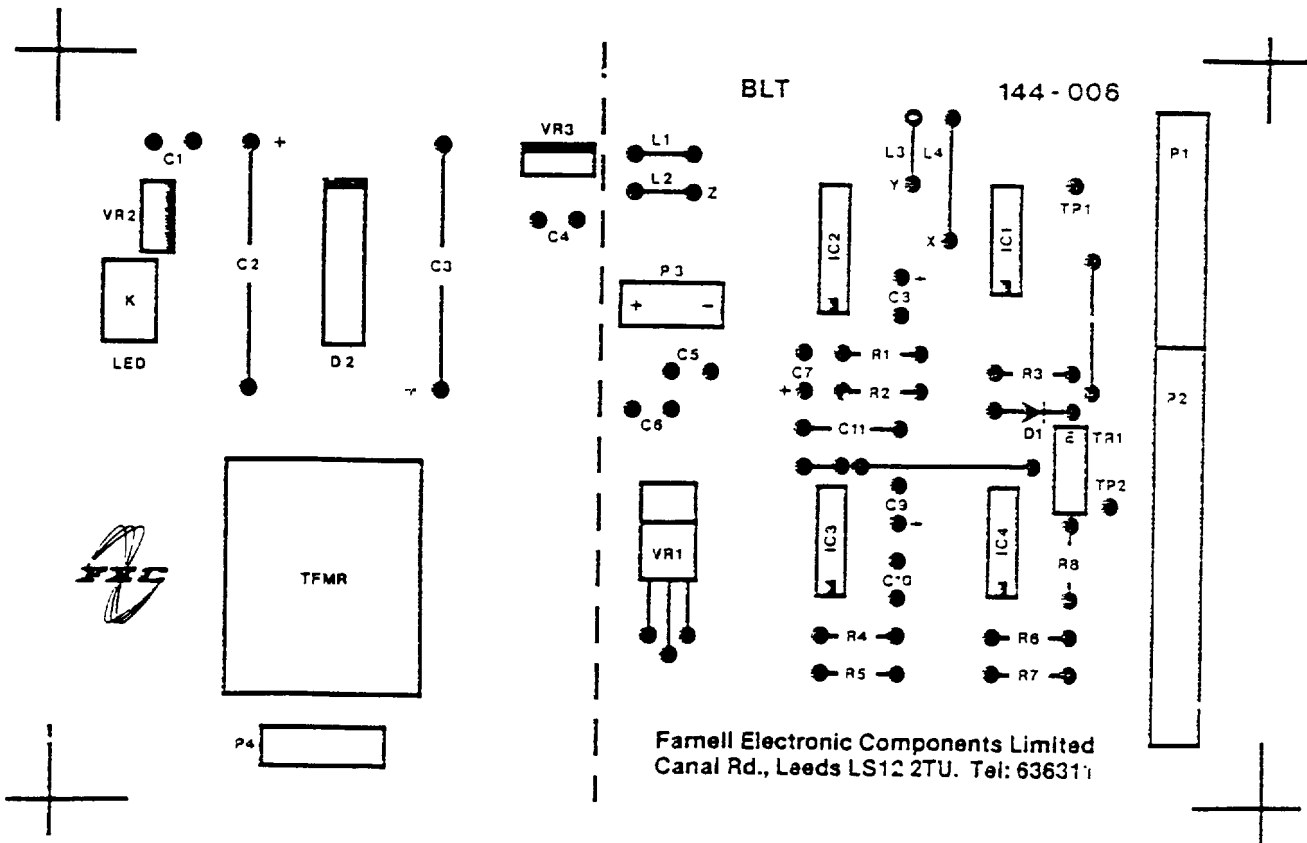
For extreme range and speed.

IBM spec. Order Code 143-072/100 metres. NCR spec. Order Code 143-073/100 metres.

For general purpose use.

Quad screened cable Order Code 140-481/100 metres.

Component Layout



144 104/106

144-006

AMENDMENTS TO PARTS LIST FOR
BALANCED LINE TRANSCEIVER KIT (144-006)

Please note, due to product obsolescence the following components have been replaced by direct equivalents:-

<u>Order Code</u>	<u>Direct Replacement Now Supplied</u>
CQX95	178-296
140-880	105-024
CD4528BCN	HEF4528P