VIEWDATA LINE TERMINATING UNIT MODULE (LTU)

DESCRIPTION

The LTU module provides an interface between the telephone network and the viewdata decoder ciruits which form the latest generation of viewdata modules based on the SAA5070 (LUCY) microprocessor peripheral I.C. The LTU module may be connected directly to a standard telephone line. A range of viewdata terminal facilities are provided by this module. The module may also be used to interface other SAA5070 (LUCY) based systems to the telephone line.

Features

- Complies with Prestel Terminal Specification Issue 1, (January 1981)
- Telephone line isolation
- Reed relays for dialling and line holding
- Carrier detection
- Telephone line audio signal a.g.c. amplifier
- Selectable 75/1200 baud transmit filter
- Receive band pass filter and level detector
- Post demodulation filter
- Provision to route MF dialling signals
- Power supply filtering
- P.S.U. 'daisy chain' plug
- Will stack with VM6520 and VM6530 modules

QUICK REFERENCE DATA

Power supplies		+5 ± 5%	V
		+12 ± 5%	V
Supply current (typ.)	+5 V supply	15	mA
	+12 V supply	90 (note 1)	mA
		60 (note 2)	mA
Storage temperature range		−20 to +80	°C
Operating ambient temperature range		0 to +70	°C
Module dimensions		150 x 166 x 35	mm

Notes

1. All relays on
2. SZLN relay only on

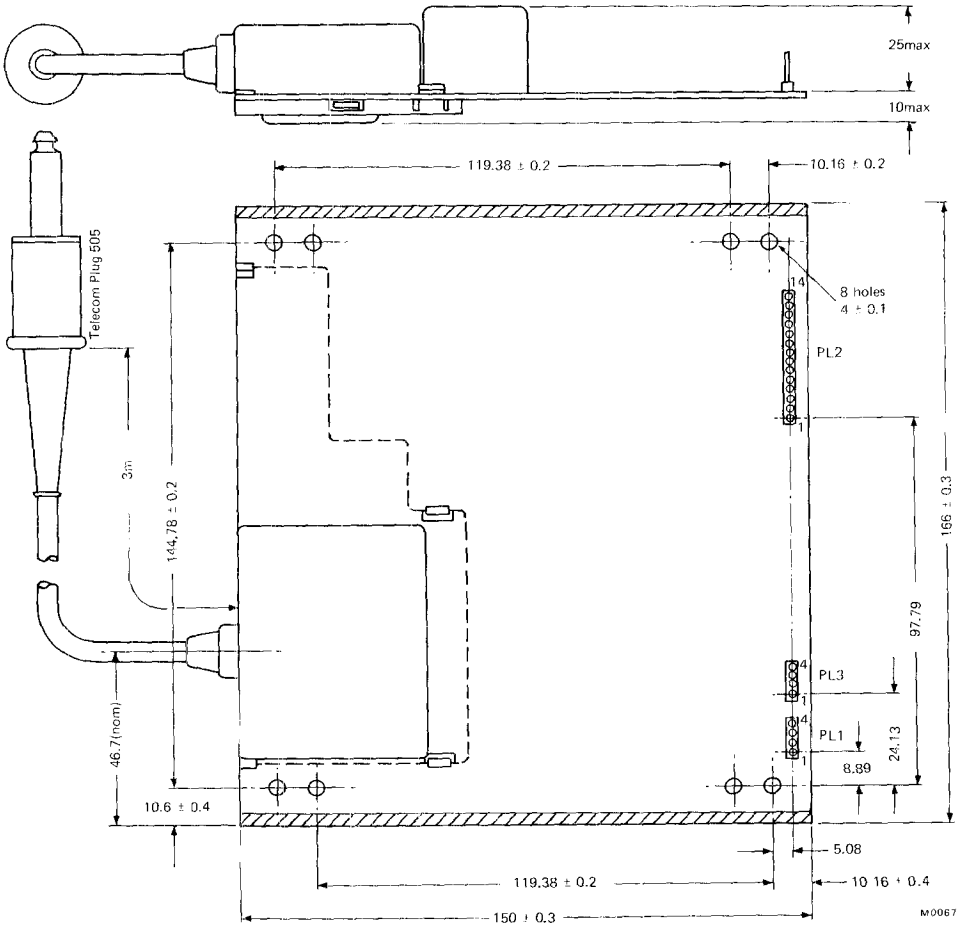

Fig. 1 Board layout

Shaded area = free area for rail mounting of module PCB

FACILITIES

Isolation

Isolation between the telephone line and the terminal chassis is achieved by the dialling relays and a specially constructed isolation transformer. This transformer conforms to BS415 and is approved by British Telecom.

Dialling

The LTU module provides reed relays and suitable drive circuits to enable dialling to be controlled by means of the module inputs 'IMP', 'DON', and 'SZLN'. Dialling must be controlled externally using a viewdata aquisition and control module (VAC), type VM6530, for example.

The 5-way telephone line interface is made by means of a Telecom type 505 jack-plug, connected as follows:

bell contact	:	plug points 1 to 5
line loop	:	plug points 2 to 3
not used	:	plug point 4

Carrier detection

The LTU module provides the filters and level detectors required to ensure that a TTL compatible 1300 Hz signal is present on the 'carrier detect' output if a 1300 Hz signal exceeding −45 ± 4 dBm, but less than −13 dBm is present on the Post Office line (see Prestel Specification). Until this level is reached the 'carrier detect' output will be inhibited. Thereafter, this output will be enabled until the received level of the carrier falls to a level 2 dBm or more below the minimum detect level. The 'carrier detect' output will always be inhibited with signals below −53 dBm.

Line audio a.g.c. amplifier

Signals on the Post Office line are monitored by means of an a.g.c. amplifier. Volume control is provided by means of a preset potentiometer. The line signal can be muted by means of an input at the mute pin (plug 2, pin 2).

The amplifier specification is summarised as follows:–

input signal range	–	up to 0 dBm
a.g.c. functional range	–	inputs from 0 dBm down to −20 dBm
open circuit output level (with volume control set to maximum gain)	–	700 ± 50% mV (rms)
frequency response (relative to gain at 1 kHz)	–	gain is −20 dB at 10 kHz and −3 dB at 100 Hz

75/1200 baud transmit filter (note 3)

The module contains a low-pass filter which filters the delta-modulated digital FSK signal from the VM6530 module. The corner frequency may be switched by means of the module input $75/\overline{1200}$ (plug 2, pin 1)

For transmission of SSMF4 (multi-frequency) dialling signals the filter should be set to 1200 baud if the MF signal is routed via this filter.

FACILITIES

Receive filter and level detector

The module contains a band-pass filter for received signals of 1300 Hz and 2100 Hz. The filter is followed by a limiting amplifier and squaring circuits.

The 'carrier detect' and 'receive FSK' outputs (plug 2, pins 3 and 9 respectively) are inhibited when the level of the input signal on the Post Office line is below the limit specified in the 'Carrier Detection' section.

Post demodulation filter

This function is performed by a low-pass filter which is followed by a comparator whose threshold is adjusted by means of a potentiometer, which is set during manufacture. For a '1' at the 'RXDATA OUT' pin (plug 2, pin 7) the input signal is a 2600 Hz squarewave with a mark:space ratio of approximately 1:1. For a '0' at the 'RXDATA OUT' pin the input signal is a 4200 Hz squarewave with a mark:space ratio of approximately 0.25:1.

SSMF4 signal connection

The input pin 'MF DIAL IN' (plug 2, pin 5) may be used to connect a suitably buffered MF dialling circuit to the telephone line (see note 4).

The buffer for the MF dialling must be a current source to avoid the reduction of the module's input impedance. To generate an output level of −9 dBm a nominal input current of 1.1 mA (r.m.s.) is required. When the module is connected to the telephone line the input impedance of the 'MF DIAL IN' pin is nominally 300 Ω. This input is not filtered.

Notes

3. Transmission at 1200 baud is intended for possible use on private networks. 1200 baud transmission by a Prestel approved terminal is not currently permitted by British Telecom.
4. When MF dialling signals are connected to the input, or when transmitting at 1200 baud, the outputs 'carrier detect' and 'receive FSK' become active. Some external means of avoiding false carrier detection is therefore necessary if the module is being used with modules other than the VM6530.

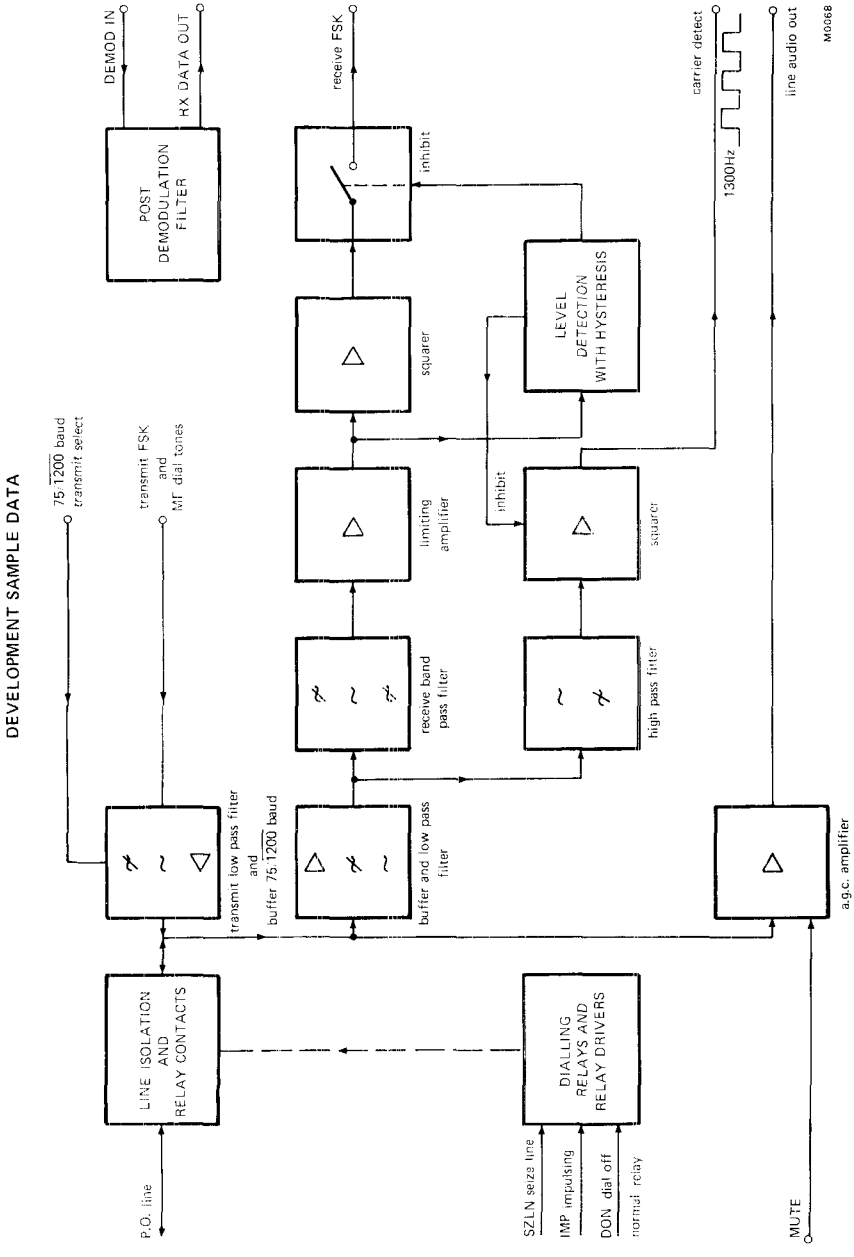

Fig. 2 Block diagram of the VM6500 viewdata line terminating unit module (LTU)

FUNCTIONAL PIN DESCRIPTION

Plug No 1 (4 pin) power supplies		Pin number
Supply voltage	GROUND	1
Supply voltage	+5 VOLT	2
Supply voltage	+12 VOLT	3
Connection to plug no 3 pin 4	–	4

Plug No 2 (14 pin) VAC (VM6530) connector		
Transmit baud rate selection input	75/$\overline{1200}$	1
AGC amplifier mute input (active HIGH)	MUTE	2
Carrier detect output	CARRIER DETECT	3
AGC amplifier output	LINE AUDIO OUT	4
MF dialling circuit input (buffered)	MF DIAL IN	5
Transmitted delta modulated data signal	TX FSK	6
Signal from post demodulation filter	RX DATA OUT	7
Input to post demodulation filter	DEMOD IN	8
1300 Hz/2100 Hz squarewave output	RX FSK	9
Supply voltage	+12 VOLT	10
Seize line relay control input (active HIGH, line looped)	SZLN	11
Impulsing relay control input	IMP	12
Dial off normal relay control input	DON	13
Spare	–	14

Plug No 3 (4 pin) power supplies		
Ground	GROUND	1
Supply voltage	+5 VOLT	2
Supply voltage	+12 VOLT	3
Connection to plug no 1 pin 4	–	4

ELECTRICAL CHARACTERISTICS

V_{DD} = 12 V ± 5%, V_{CC} = 5 V ± 5%, T_{amb} = 0 to +70 °C

Table 1

DC and operating electrical characteristics

	symbol	min.	typ.	max.		conditions
Inputs DON, IMP, SZLN, MUTE						
Input voltage HIGH	V_{IH1}	3.5	-	V_{CC}	V	
Input voltage LOW	V_{IL1}	0	-	0.8	V	
Input current HIGH	I_{IH1}	-	-	800	μA	V_{IH1} = 5.25 V
Input current LOW	I_{IL1}	-	-	75	μA	V_{IL1} = 0.8 V
Output power level	P_{OUT}	-	−12	−9	dBm	600 Ω termination
Input power level	P_{IN}	-	-	−13	dBm	into 600 Ω
carrier detect level		−39	-	-	dBm	1300 Hz
		−41	-	-	dBm	2100 Hz
carrier fail level		−53	-	-	dBm	
Input impedance (line holding)	Z_{IN}					
Magnitude		400	-	900	Ω	300 to 3400 Hz
phase angle		-	-	45	deg.	with line seized

DEVELOPMENT SAMPLE DATA

MECHANICAL DATA

Outline dimensions

The module is constructed on a rectangular printed wiring board 150 x 166 mm (see Fig.1). The maximum module height is 35 mm.
Four fixing holes are provided which permit the mounting of the module between the two compatible modules associated with it, that is the VM6520 viewdata compatible teletext module and the VM6530 viewdata acquisition and control module.

Connector system

A 0.1 in (2.54 mm) pitch connector system e.g. Molex KK (0.1 in), Pressac, AMP or similar brand is used. The power supply plugs have two groups of functionally identical pins to enable the power supplies of associated modules to be 'daisy chained' if required.

MOUNTING

The module may be mounted in any attitude. 5 mm rack mounting margins are provided (see Fig.1).

MARKING AND PACKING

The module is marked by means of a label or labels showing that it has been inspected to pass BS415 requirements and has the following details:

Module type number — VM6500; module status; Mullard logo.

The module is packed in units of five. The module can be ordered using the catalogue number 4313 130 51600.