

Quad 4-Wire AC Signalling Card Operating Information

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STATUTORY NOTICES

APPROVALS

The approval number is: NS/3660/2/N/603494

WARNING. Inter-connection, directly, or by way of other apparatus, of ports marked:

"SAFETY WARNING, See instructions for use."

with ports not so marked may produce hazardous conditions on the network. Advice should be obtained from a competent engineer before such a connection is made.

The safety warnings on the equipment apply to the backplane connector and the analogue ports. These ports do not provide isolation sufficient to satisfy the requirements of BS6301. Apparatus connected to these ports should either have been approved to BS6301 or have previously been evaluated against British Telecom plc (Post Office) Technical Guides 2 or 26 and permission given to attach. Other usage will invalidate any approval given to this equipment.

The voice ports are approved for connection to Branch systems. Approval was granted on the basis of testing to port types 5B and 6BX. Direct connection may only be made to barriered PABX ports or SELV circuits. Connection to unbarriered PABX ports and non SELV circuits may only be made via the barrier DT290.

This card is intended for operation in the 2000 and 3000 series chassis. Other usage will invalidate any approval given to this card, if as a result it ceases to comply with BS6301:1989.

The safety status of all ports on the card is SELV.



Case Technology Ltd declare that this product conforms with the protection requirements of Council Directive 89/336/EEC on the approximation of the laws of the member states relating to electromagnetic protection.

This equipment has been tested using shielded cables supplied by Case Technology Ltd. These cables, or equivalents, must be used to ensure compliance with this declaration.

All PCB assemblies contain Electrostatic Sensitive Devices (ESDs) which may be permanently damaged if incorrectly handled. This equipment must be handled in accordance with BS5783 code of practice for the handling of electrostatic sensitive devices.

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Quad 4-Wire AC Signalling Card

Quad 4-Wire AC Signalling Card - DTE66

The DTE66 card consists of the basic card DT515 fitted with signalling firmware DT951.

1. Description

The Quad AC Signalling Card provides an interface for four independent, 4-wire VF circuits with AC signalling using 2280Hz signalling protocols to four independent timeslots in a 30 channel 2048kbit/s PCM stream. The signalling information for the four channels is carried over timeslot 16 in the same PCM stream.

The signalling codes used by the card match those used by the Quad 2-/4-wire E&M and 8 Channel ADPCM (64k only) channel cards, such that the cards can be used in an end to end link between AC15A signalling equipment and E&M (DC5A) equipment. AC15A to AC15A operation is also possible.

2. Operation

AC15A is an AC, 4-wire, in-band inter-equipment signalling system, using 2280Hz tone bursts and absence of tone condition to identify the different stages in the set up and termination of telephone calls. Two balanced 600 ohm pairs are used, one for sending tone and voice signals and one for receiving tone and voice signals. Some AC systems transmit and receive on the same pair (2-wire systems) which is not supported by this card.

The circuit drops digital voice data from the selected timeslots and converts this to analogue VF signals for the output on the 4-wire receive pair. VF input signals on the 4-wire transmit pair are converted into digital voice data and inserted back into the selected timeslots.

Signalling data is dropped from timeslot 16. This controls the tone on/off condition of the circuits via the on board microprocessor which implements various tone persistence checks and other timing controls which are necessary to implement AC15A to E&M system conversion and vice-versa. The card detects 2280Hz tone on/off conditions on each analogue circuit. Using this information the microprocessor controls the inserted code in timeslot 16 of the PCM stream for each circuit.

This card will operate in a mains or DC powered chassis.

3. Specifications

Performance

Meets CCITT recommendations G711 A-Law and G714.

VF Levels

Software selectable in 1dB steps

Tx (input) +1dBr to -6dBr

Rx (output) +2dBr to -5dBr

Tolerance: ±0.4dB

(except when used with a DT290 isolation box)

VF Frequency Response

Transmit input to receive output via one PCM link:

300 Hz - 3000 Hz ±0.5dB

3000 Hz - 3400 Hz +0.5/-1.8dB

Idle Channel Noise: <64 dBm0 weighted

Signalling Frequency: 2280 Hz

Isolation: Complies with the requirements of BS6301: 1989 when used with a DT290 Isolation box connected to all used ports.

Analogue Characteristics

The VF input is encoded to CCITT recommendation G711 using the A-law characteristics. Any 2280Hz tone components are filtered out and are not passed on down the link. 4-wire performance characteristics conform to G714.

Terminating impedance and source impedance for transmission are both 600 ohms.

Gain

The gain of the transmit and receive voice paths can be adjusted by means of the TS control byte data. For normal 4-wire operation the TS control byte should be set to 15H. This gives the nominal transmit input level to the card of -4dBm and receive output level of 0dBm.

Delay

The delay from an analogue input to the multiplexer backplane is 270 μ s @1004Hz.

The delay from the multiplexer backplane to the VF output is 210 μ s @ 1004Hz.

Quantisation Distortion

The quantisation distortion contributed by the card is 1 qdu for each direction of transmission.

Return Loss

The return loss and balance about earth (longitudinal power level) comply with BS6328 Part 1 sections 5.1.4 and 5.3.2 respectively.

DT290 Isolation Box

The DT290 isolation box is a barrier which, if used, inserts 0.8dB loss per channel at 1020Hz.

4. VF Level setting.

The analogue VF levels are set by software control using the TS Control byte forming part of the configuration set up for the multiplexer.

D7	D6	D5	D4	D3	D2	D1	D0		
								Transmit Level (A/D)	
					0	0	0	+1dBr	
					0	0	1	0dBr	
					0	1	0	-1dBr	
					0	1	1	-2dBr	
					1	0	0	-3dBr	
					1	0	1	-4dBr	
					1	1	0	-5dBr	
					1	1	1	-6dBr	
								Receive Level (D/A)	
		0	0	0				+2dBr	
		0	0	1				+1dBr	
		0	1	0				0dBr	
		0	1	1				-1dBr	
		1	0	0				-2dBr	
		1	0	1				-3dBr	
		1	1	0				-4dBr	
		1	1	1				-5dBr	
0	0	Normal operation							

TS Control byte values

5. Signalling Characteristics

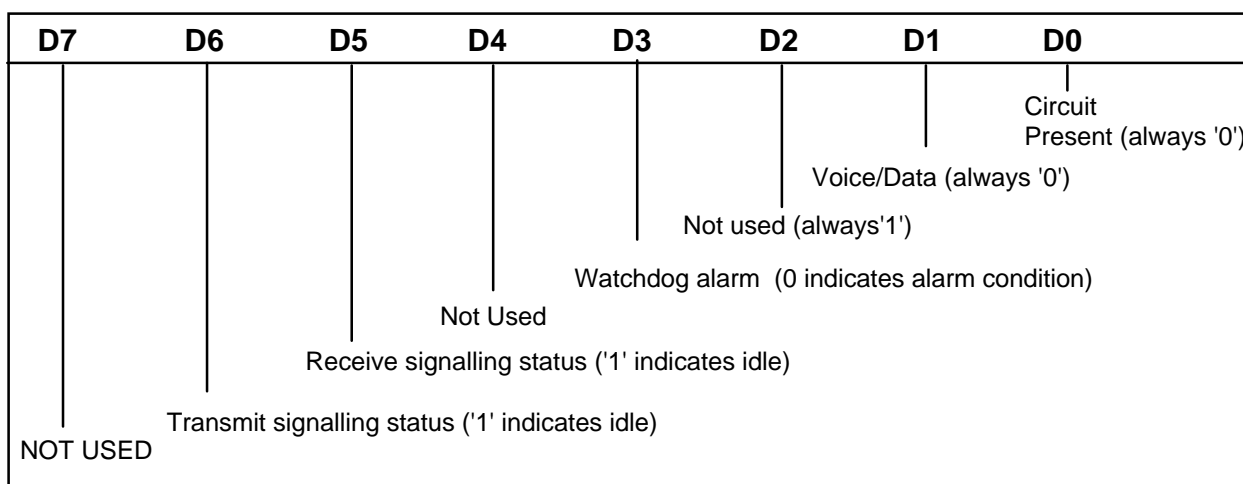
The multiplexer must be in channel associated signalling (CAS) mode, selectable through the control software, to enable signalling data to be carried over timeslot 16. The codes transmitted and received in timeslot 16 are:

Idle: 1101
 Busy: 0101

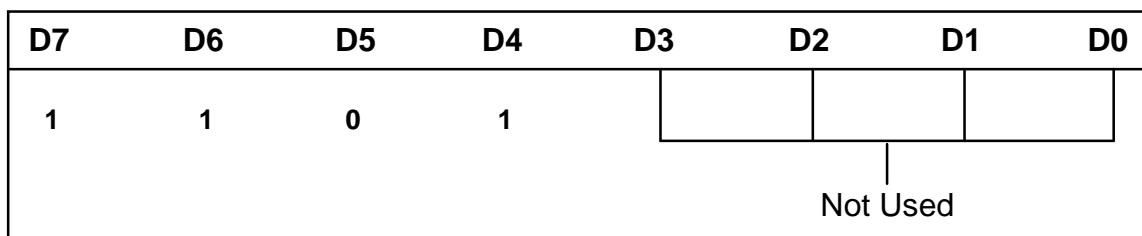
In the AC15A system idle/busy line status is represented by in-band tones for transmit and receive connections. AC15A operation is in accordance with BTNR181 except when used with the DT290 Isolation Box which inserts 0.8dB loss per channel at 1020Hz.

6. Status Ports

Two status ports are used by each of the four circuits. The data bits on status port 1 are allocated as shown below:



Status port 2 provides the identity code for the card:



Control Ports

No control ports are used.

Protection

On board circuitry is protected by transformer isolation and clamping diodes at the analogue interfaces. No additional protection is incorporated. Should any lightning protection be required it must be provided by the operator.

7. Link and Switch Options

One link, TL1, is provided for test purposes to disable the watchdog alarm. This should be left in the 1 to 2 position.

All other links should be set in the 1 to 2 position.

Four DIP switches (S2) are used to set up the card mode as follows:

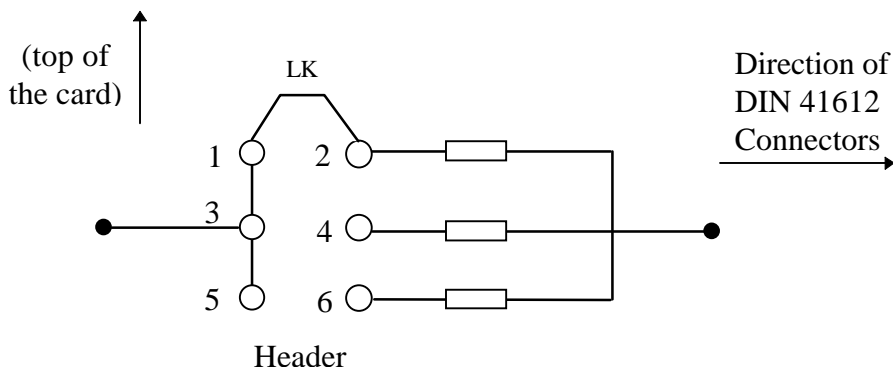
SW4	SW3	SW2	SW1	MODE
OFF	OFF	OFF	OFF	AC15A

All other combinations are invalid and are for future use.

Switches should be set before inserting the card into a chassis. If the switches are changed whilst the card is plugged into a powered system the change will have no effect.

Fixed Rx (output) Gain Adjustment PADS Modification

In addition to software programmable gain settings, a fixed gain PAD can be set in output channel via a header modification fitted in positions R168, R172, R176 and R179 for circuits 4 to 1 respectively. See the diagram below.



Gain	Link Position
-4dBr	1-2
0dBr	3-4
+1dBr	5-6

Note that in order to have -20dBr AC15 tone output, you should set 0dBr for fixed Rx gain setting and 0dB for timeslot control setting.

8. Connections

Note: When viewed from the rear of the chassis pin 1a is the bottom left hand pin of the connector.

Numbers in brackets refer to connections using the universal I/O adapter DT280 or on the 2100 multiplexer.

Circuit	Title	Pin No.
Cct 1	4WTxA	4a (28)
	4WTxB	5a (29)
	4WRxA	7a (31)
	4WRxB	8a (32)
Cct 2	4WTxA	12a (34)
	4WTxB	13a (35)
	4WRxA	15a (37)
	4WRxB	16a (38)
Cct 3	4WTxA	20a (40)
	4WTxB	21a (41)
	4WRxA	23a (43)
	4WRxB	24a (44)
Cct 4	4WTxA	28a (46)
	4WTxB	29a (47)
	4WRxA	31a (49)
	4WRxB	32a (50)

