DESIGN & EQUIPMENT DEPARTMENT

HANDBOOK A.1093(90)

CD2L/41 SIX-CHANNEL NICAM MK II CODER

.....
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for H.D.& E.D.

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1. INTRODUCTION

The CD2L/41 is the CODER for the next generation of NICAM equipment. The components that make up this unit are: UN26/101, UN26/102, CO9/14, CO8/19 (2 off) and a PS4/51. The CD2L/41 may be a sub-unit of two different 6U coded units - a PA1/144 which holds two complete CD2L/41's or a PA1/145 which holds a CD3L/58, 6 channel MK II NICAM DECODER, and a CD2L/41, 6 channel MK II NICAM CODER.

The CD2L/41 outputs a 2048 kbit/s HDB3 encoded bitstream from six channels of audio, with corresponding signalling bits. The audio inputs to the CODER can be either analogue or digital. There are audio monitor outputs provided which again are available in digital and analogue form. The digital inputs and outputs conform to the AES/EBU specification AES3-1985.

Along with the audio inputs there are eight signalling bits associated with each channel pair and one signalling bit at the 2048 kbit/s level in each 3 ms frame. There is a strobe associated with each set of eight bits and another for the 2048 bit which is output when data is expected to be input.

There are opto-isolated inputs to enable selection of either analogue or digital inputs for each channel pair.

In the event of a systematic fault the executive outputs are used to facilitate remote change-over of equipment. A continuous self-checking procedure runs as a background task and flags any system errors. The main fault outputs are open collector drivers.

2. SPECIFICATION

Performance Data:

Inputs:

(i) Mains power 240 V AC +10% - 15% on XLR LNE connector SKZ.

(ii) Reference AES clock input (32 kHz sampled) on XLR SKG.

(iii) 16.384 MHz ± 10 ppm external clock on BNC socket SKE.

Along with the audio inputs there are 8 signalling bit inputs associated with each channel pair and one signalling bit input at the 2048 kbit/s level.

(iv) 3 groups of signalling channel inputs (at the 676 kbit/s level) each comprising:

8 parallel bits data (opto-isolated) 1 strobe pulse (5-10 µs) (open collector).
1 common anode supply, current limited.

1 signal earth.

(v) 1 signalling channel (at the 2048 kbit/s level) comprising:

1 data bit (opto-isolated).
1 strobe pulse (5-10 µs) (open collector).
1 common anode supply (15 Ω resistor to +5 V).
fitted to 37 way D type socket (SKA)

Outputs: (i) 2048 kbit/s HDB3 into 75 Ω at nominally 4.7 V p-p bipolar ±10% on BNC socket SKC.

(ii) 2048 kHz buffered clock output (at TTL signal level) fitted to BNC socket SKD.

Power Outputs:

(i) The output from the PSU is available on a 15 way D type socket SKB. Maximum available current is 1 A at +5 volts and 200 mA at ±18 volts.

Fault-Monitoring outputs:

In the event of a systematic fault there is error flagging for the complete system to facilitate remote change-over. A continuous self-checking procedure runs as a background task and flags any systematic errors.

8 executive outputs:

6 channel fault indications (open collector).
1 'any channel fault' output (open collector).
1 'internal clock' output (open collector).

fitted to 25 way D type socket (SKB)

Audio Monitoring Outputs:

The audio outputs are available in digital and analogue form. The analogue versions are duplicated to provide monitor outputs. The digital versions conform to the AES/EBU specification AES3-1985 (sampling rate 32 kHz). The analogue outputs are link selectable for cosited/alternate sampling.

Analogue:

The 6 main analogue outputs are electronically balanced. The output impedance is 45 ±j5 Ω. There is short circuit protection on these outputs. They are link selectable for cosited/alternate sampling.

The 6 monitor analogue outputs are electronically balanced. The output impedance is 45 ±j5 Ω. There is short circuit protection on these outputs.

Above circuits fitted on 56 way varicon connector SKK

Digital:

3 digital audio outputs. 3 * 2048 kbit/s AES/EBU stereo channels Fitted to 3 XLR plugs PLA-PLF.

Displays:

All visual status indication on the CD21/41 is conveyed by means of 16 green LEDs on the edge of the UN26/101. A LED 'on' means that the monitored condition is functionally correct. However, an extinguished LED indicates that the monitored condition has failed.

(a) 1 Internal clock in use LED.
(b) 1 Any failure LED.
(c) 6 Channel fail LEDs.
(d) 1 AES clock fail LED.
(e) 2 External clock fail LEDs.
(f) 3 AES input selection LEDs.
(g) 1 HBD3 ok LED.
(h) 1 Digital fail LED.

Mechanical Data:

Chassis: 6U Eurocard Subframe (19 inch rackmount) 400 mm deep.

Weight: 15 kg (equipped with all plug ins).

Installation data:

Power requirements: 240 V AC @ less than 100 VA

Chassis extender: CH4/16

WARNING

(a) Mains voltages are present within this unit. The PS4/51 has an aluminium safety cover fitted which prevents access to live terminals. If this cover is removed extreme caution must be exercised.

(b) Some CMOS type signals appear on board edge connectors and devices may be damaged if signals are applied before power. To prevent any failures turn off the power and wait several seconds before inserting or removing sub-units.

3. OPERATION

3.1. Power Supplies

The unit is mains powered from socket Z via an LNE type mains XLR connector.

3.2. HDB3 Output

The 2048 kHz HDB3 output is present on BNC socket C which is isolated from the chassis earth. There is an internal test to determine whether or not the output is correctly terminated.

3.3. Sampling Scheme

Before operation the ADCs and DAC sampling schemes must be specified. There are two links on the UN26/102 for specifying the sampling scheme for the ADCs and DAC outputs. When the relevant link is in the upper position the scheme is cosited, when in the lower position the scheme is alternate. The sampling schemes of both ADC's and DAC's are independent of each other.

3.4. Input Source Selection

The audio inputs to the crate can be either analogue or digital. SKAA provides an analogue/digital selection port. This port has three opto isolated inputs which are used to select, in channel pairs, whether the input for the relevant channel pair is analogue or digital.

4. LINE-UP PROCEDURES

There are no operator accessible controls on NICAM 3 MK II, but before a CODER is commissioned, the clocking system used must be determined. For full system capabilities a '32 kHz' AES reference must be provided. Failing this a 16.384 MHz external feed must be present. Otherwise the CODER generates its clocks from an internal temperature compensated crystal oscillator (TCXO) source.

5. CIRCUIT DESCRIPTION

The hardware of the NICAM MK II CODER is described graphically on D63597A1 and can be broken down in blocks as follows:

- System Clock production and selection
- Sequencer
- System RAM
- Gate Array block
- CPU block
- Parity production system
- Signalling bits
- ADC block
- AES receivers
- Code-conversion blocks
- Monitor DAC block
- DAC serialisers
- DAC serialiser controller
- J17 de-emphasis and analogue filtering block
- Philips to AES format conversion
- Analogue outputs
- Digital outputs
- AES/EBU outputs
- NRZ Serialiser block
- HDB3 output stage
- HDB3 monitor
- Strobe routing
- Read pulse generation

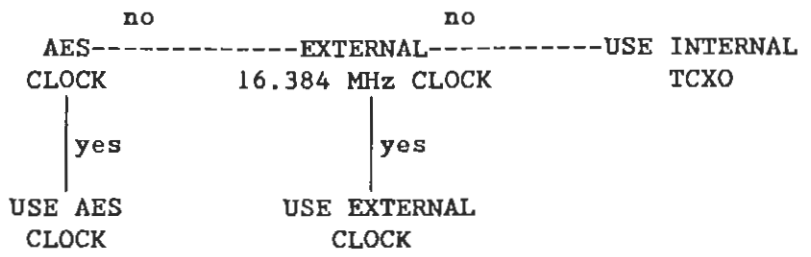
5.1. System Clock Production and Selection

The main clock frequency within the NICAM MK II CODER is 8192 kHz. The CODER can derive its system clock from one of 3 sources. The default clock source in the absence of any external clocks is the internal temperature compensated crystal oscillator (TCXO). The clock priority selection scheme is shown below.

Clock selection priority listing.

(1) AES reference clock input stage.
(2) External 16.384 MHz clock (sinewave).
(3) Internal.

The diagram below shows the clock selection arbitration used within the CODER.



5.2. AES/EBU REFERENCE Clock Input Stage (UN26/101)

The primary function of the AES reference input stage is to provide a system clock for the CODER when using any of the digital audio inputs.

An AES/EBU signal sampled at 32 kHz contains a relatively high component of the required system clock frequency, 8192 kHz. Thus by using some form of phase comparator/phase locked loop arrangement the clock frequency can be regenerated.

When using any of the digital audio inputs it is imperative to also provide a reference clock to eliminate the possibility of sample slipping. The CODER has been designed to work with 32 kHz sampled AES/EBU signals.

When using the AES/EBU reference as the clocking source for the CODER it is possible for two CODERS to be made frame synchronous, ie. two CODERS fed from the same AES reference clock will have their framing bits in the same place. In the event of a system error requiring the 'active' CODER to be switched, the DECODER at the far end of the line will not have to relock.

The AES/EBU reference input consists of the following component blocks.

(a) AES/EBU Input equalisation circuit.
(b) ADIC chip (Philips SAA7274 U6).
(c) Phase comparator (U2).

5.3. EXTERNAL 16.384 MHz Clock Input Circuit (UN26/101)

This is the clocking scheme used in MK I NICAM and is included for upward compatibility. The signal on this input is checked for frequency and amplitude accuracy.

This part of the system has been included so that the MK II NICAM CODER is compatible with existing MK I NICAM equipment. The following circuit blocks are associated with the 16.384 MHz external clock input stage.

(i) 16.384 MHz divide by 2.
(ii) 16.384 MHz band-pass amplifier.
(iii) Balanced mixer.
(iv) 160 Hz High pass filter.
(v) Amplitude and frequency error detectors.

5.4. 16.384 MHz Divide by 2 (UN26/101)

The divide by 2 circuit consists of an HC gate and a D type flip flop. The transformer coupled sinusoidal input is fed through a DC blocking capacitor, C22, to a CMOS inverter that has the input biased mid way between the +5 V supply rail and ground by resistors R76 and R77. The squarewave output of the inverter clocks a D type flip flop, U17 which divides the input frequency by 2, and provides a clock at the system operating frequency (8.192 MHz).

5.5. 16.384 MHz Bandpass Amplifier (UN26/101)

This grounded-gate amplifier U7 terminates the external frequency reference in 75 ohms and provides isolation from succeeding circuitry. U7 drain is connected to a band-pass filter, L2,C27 tuned to 16.384 MHz. An output from the amplifier is coupled via C24, L1 to rectifier D13. The DC level at TP4 represents the level of the incoming reference signal at PL1a 26 and PL1c 26. A second output at the centre-tapped secondary winding of L2 (pins 3 & 5) provides a switching signal for the diodes of the balanced mixer D14, D15.

5.6. Balanced Mixer (UN26/101)

The purpose of the balanced mixer is to generate a difference frequency which is the difference between the external reference and the internal reference oscillator (U53). When a suitable external reference is connected then the difference frequency will be less than 160 Hz, indicating an accuracy within ±10 ppm. If, however a wrong-frequency source is accidentally plugged in, then a higher difference frequency will accordingly be output from the mixer. This information is used in the monitoring system, so as to prevent the NICAM transmission being accidentally locked up to an unsatisfactory reference.

5.6.1. 160 Hz High Pass Filter (UN26/101)

The input to the 160 Hz high-pass filter is the difference frequency between the external and internal reference oscillator. The difference frequency is normally less than 160 Hz, somewhere down the skirt of the filter response, and so the output of this filter is normally a low amplitude sinewave. In the event that the external frequency reference is outside tolerance (not within 10 ppm) the difference frequency will be greater than 160 Hz, and within the passband of the fiiter, so the output of the filter will be at larger amplitude: tending towards 17 X the signal amplitude at TP6 at difference frequencies above 160 Hz. In this situation the output from rectifier D16 is correspondingly large (TP3), and this activates an error flag in the monitoring system.

5.7. 16.384 MHz Error Detector (UN26/101)

Section 5.6.1. above describes how frequency errors in the external reference source are converted into amplitude changes at the output of the high-pass filter, TP5. These are converted to dc level changes by rectifier D16, and form one input to a comparator U25 (b), whose other input is taken to an adjustable threshold-voltage reference, slider of R83. When the frequency-error voltage at TP3 exceeds the pre-set threshold voltage set by R83, the output of the comparator changes state, and outputs a frequency error flag to the monitoring system. The outputs of the "amplitude" and "frequency" comparators U25 are ORd together by U16, so that in the event of the external reference source being outside tolerance in either amplitude (eg double terminated) and/or frequency, pin 4 of U16 goes low to give an error indication. This will cause the internal crystal oscillator to be automatically selected.

5.8. INTERNAL 16.384 MHz TCXO (UN26/101)

This is the default clocking source in the event of neither the AES or external 16 MHz clock references being available. This clock source is accurate to within ±10 ppm.

The internal temperature compensated crystal oscillator U53, TCXO, operates at 16.384 MHz ±10 ppm i.e ±163.84 Hertz from the nominal operating frequency. The system clock frequency is 8.192 MHz which is produced by dividing the 16.384 MHz clock by 2.

The TCXO stage consists of the following circuit blocks.

(a) TCXO.
(b) TCXO output buffer.

The TCXO U53 is free running. Following the TCXO is a FET self biased source follower amplifier, Q1 and associated components.

5.9. AES/EBU Input Equalisation Circuits (UN26/101)

AES/EBU signals generally are difficult to decode over line lengths greater than 150 meters without equalisation in the receiver circuitry. This is due to bit width extension, which relates to problems in differentiating between 0's and 1's. The equalisation circuit will equalise the line satisfactorily between 0 and 200 metres.

5.9.1. AES/EBU Capture/Locking Range

The frequency of a signal source can vary due to temperature, ageing or tolerance problems. Therefore it is necessary that the AES/EBU input circuits can tolerate a degree of frequency variation.

The capture range measurement is the degree of 'in lock' input frequency deviation that can be tolerated when a signal is applied to the input at any instant in time.

The locking range of the AES input circuits is determined predominantly by the pulling range of the crystal.

5.10. Sequencer Controller (UN26/102 U87)

Control of the sequencer is taken care of by the HDB3 + SEQUENCER CONTROLLER PAL U87. Only the sequencer controller part of the PAL will be discussed in this section. The PAL will control the sequencer under reset conditions and in 'frame sync' mode.

5.10.1. Sequencer Counter Chain (UN26/102 U2 - U5)

The heart of the CODER is the sequencer. The sequencer acts like a hardware CPU executing 6144 instructions every 3 ms. The function of the sequencer counter chain is to supply the 5 sequencer PROMs with a linearly incrementing 13 bit address which resets to zero every 3 ms.

When using an AES/EBU clock source the sequencer counter chain receives frame synchronous reset pulses from the SEQUENCER CONTROLLER PAL U87. This enables 2 CODERS to be synchronous, thus allowing switching between CODERS without a break in the outgoing bitstream.

The sequencer counter chain consists of 4 synchronous counter chips U2-U5 and the SEQUENCER CONTROLLER + HDB3 MONITOR PAL.

5.10.2. Sequencer

The sequencer is the central control unit that controls the activity of the CODER signal processing hardware by driving system addresses and system control buses. It can be thought of as a 'hardware CPU' where the instructions it executes are the outputs of the five resident PROMs and the program counter is the output from the sequencer counter chain. This operation is fairly straightforward as the 'program' is linear code with no breaks or jumps. The sequencer issues instructions at the same rate as the outgoing 2048 kbit/s bitstream - i.e one instruction per 488 ns. The 488 ns intervals are called sequencer slots. The sequencer executes 6144 commands (one per slot) before the sequence starts repeating. The sequence is repeated at the same rate as the 676 level frame duration - 3 ms.

The sequencer is the main digital part of the system; it controls most of the digital components and resides on the UN26/102. The components of this circuit are counters U2, 3, 4, 5 and SEQUENCER CONTROLLER PAL U87. The SEQUENCER CONTROLLER PAL allows two CODERS to be made frame synchronous; this can only be achieved if both CODERS are using the reference AES/EBU clock input. The block start signal required to achieve frame synchronism is derived from the Philips SAA7274 'Digital Audio Input Chip' (U6). Since this signal is 1/49152 of the system clock frequency, it occurs at 6 ms intervals, which makes it very convenient to use this signal to reset the sequencer and thus enable frame synchronism.

The advantage of this is that if the outgoing bitstream is switched from one CODER to another synchronous one, the DECODERs at the other end of the line will not need to relock, thus avoiding any break or interruption in the program material.

The rest of the sequencer circuitry consists of: five 64k PROMs U6, 7, 8, 9, 10 and latches U16, 17, 18, 20, 21, 22. The counter chain addresses the five sequencer PROMs whose contents are latched. The outputs from these latches form the instructions that control the processing. Because these instructions follow a 3 ms pattern it is possible to use signature analysis where the start and stop signals are taken from the reset signal to the CPU and the clock is taken from the 2.048 MHz pin. The addresses and data can be checked this way.

The digital processing in the CODER is carried out by executing the instructions supplied by the sequencer. The sequencer can be viewed as an overall controller. It issues instructions at 488 ns intervals. The sequencer has no read/write memory; thus almost all instructions involve the use of the system RAM.

The Gate-Array compresses 14-bit audio samples into 10-bit samples and calculates a parity bit for each group of 3 10-bit samples. The CODER works on a pipeline principle, where each of the single channel frames (3 ms of audio) is taken through three processing stages. Each stage handles six channels at a time.

There are different types of sequencer outputs that make up the 40 bit value and these are summarised as follows:

(1) RAM(0-12)

This 13 bit bus is broken down as follows.

RAM0-RAM7	These bits carry the sample address, parity, range-code and house keeping bits.
RAM8-RAM10	Sample channel number.
RAM11-RAM12	RAM page area switching

(2) LCNGC(0-2)

This 3 bit address is used by the gate array and represents a channel number or a gate array command.

(3) LA0

LA0 is purely a latched version of the CPU address bus bit 0 used to allow access to the system RAM as 8 bit or 16 bit words.

(4) /LRD

/LRD is a latched version of the CPU's read pulse.

(5) /LCPURQ

This signal is active when the CPU needs to access the system RAM.

(6) /LCPURST

The CPU is reset every 3ms to avoid lock up. /LCPURST is a pulse 488 ns wide produced by the sequencer to reset the CPU.

(7) /LSRD

This signal is the latched sequencer system RAM read pulse.

(8) /LADC

The /LADC signal is used as a strobe pulse to gate data from either the ADC's or the AES input stages on to the system data bus.

(9) /GA

The /GA signal is basically the gate array chip select signal. This signal is asserted each time the sequencer makes accesses to the gate array.

(10) /RA0-1

The /RA0 and /RA1 signals are used by the gate array. They form the range code address.

(11) /LCB(0-3)

The /LCB(0-3) signals are used to address the output serialiser. They are effectively used to control which bits of the 'Q(0-11)' bus are to be output next.

(12) /LCN(0-2)

These three signals are used to address the 74F189 RAM chips in the output serialiser.

(13) /LSER

This signal is used to control writes to the 74F198s.

(14) /SCONA

The /SCONA signal is the start conversion pulse supplied to the left hand ADC card. The signal controls the point at which ADC conversions for channels 1, 3 and 5 are made.

(15) /SCONB

The /SCONB signal is a start conversion pulse which occurs half a sample period later than /SCONA. Depending on the setting of the co-sites/interleaved ADC sampling link, /SCONA or /SCONB will control the point at which ADC conversions for channels 2, 4 and 6 are made.

(16) /PCOLL

/PCOLL is the parity collector chip enable signal.

(17) /LSIG

The /LSIG signal is used to kick the 2048 signalling bit monostable.

(18) LDACOP

LDACOP is the sample load signal for the left and right audio samples destined for the DAC.

(19) /LWSAB

/LWSAB is the word clock generated by the sequencer and used by the interpolating filters.

(20) /INT

/INT is the CPU interrupt signal.

5.11. Parallel Processing

The CODER performs the processing of the audio samples in three "pipelined" stages. In the first stage the audio samples (14 bits wide) are loaded from the ADCs into the system RAM. In the second stage, the samples are read back from the RAM, processed by the Gate-Array to reduce them to 10 bits and put back into the system RAM again (but in a different place within the same 'page').

In the third and final stage, the compressed samples are output to the serialiser which makes up the HDB3 output bitstream. In one complete 3 ms frame, each of these processes is done to a block of 96 samples per channel. Each stage uses a different page in RAM. Because there is only one central control element (the sequencer), the pipelining is achieved not by parallel processing but by time multiplexing (or interleaving).

The sequencer has a page adjust counter. This is a 3 state counter that is clocked at the end of the 6144 sequence. The counter maps the logical page of the system RAM to the physical one. For example, CPU and Gate-array always address page 2, samples from the ADCs are read into page 0. The above page numbers refer to logical pages. The page adjust counter makes sure that the logical to physical page mapping is such that the 96 samples (one 338 frame) for each of the six channels progresses through the pipeline stages in the correct order. In addition, the CPU executes the instructions in its program PROM quite independently of the sequencer, unless they both require access to the system RAM simultaneously.

5.12. System RAM

The system RAM consists of two 8K*8 RAMs, U12 and U13 which give 16/8 bit wide word access capability. The RAM is split into four physical pages of 2K 16 bit words each. Physical pages 0 to 2 are allocated to pipeline stages 1-3 and the mapping is switched every 3 ms. Page 3 is a general purpose page and is not switched. The sequencer is responsible for changing the allocation of pages to pipeline stages every 3 ms in such a way that pages propagate through the pipeline.

	t	t+3ms	t+6ms
ADC read (logical page 0)	page 0	page 1	page 2
G-Array (logical page 2)	page 2	page 0	page 1
Output serialiser (logical page 1)	page 1	page 2	page 0

A PAL is used to map the logical page number according to the 3ms interval. The PAL (U19) has an internal 0 to 2 counter which is clocked at the end of every 3 ms frame. The logical to physical page mapping is changed every 3 ms (at the beginning of the 6144 sequence). Page 3 is not switched and is used as a scratch pad.

The system RAM address is 13 bits wide. Here is the breakdown:

bit:	12 11	10 9 8	7 6 5 4 3 2 1 0
	physical page no.	channel	channel workspace

(e.g. address 01 001 00000000 corresponds to page one and channel one.)

The RAM area corresponding to Channel 0 is used as general workspace. It is used by all the six channels to store the signalling bits as follows:

```
sample 0 space (ls byte)     :Signalling word for ch.1 and 2
sample 0 space (ms byte)     :Signalling word for ch.3 and 4
sample 1 space (ls byte)     :Signalling word for ch.5 and 6
```

The signalling word is 8 bits long. The four least significant bits are the signalling bits for the odd channel number in a pair and the four most significant bits are for the even channel number. Channel space for channels 1 to 6 is allocated to the six NICAM channels.

Channel workspace for channels 1 to 6 is divided into:

```
  0 -  95      :not processed samples
100 - 131      :32 parity bits, lsb of each word
140 - 142      :three range codes
145 - 149      :parity bits arranged in words
150 - 156      :housekeeping words
160 - 255      :processed samples
```

Channel space for channel 7 is not used.

5.13. Gate-Array Block

The Gate-Array block consists of a custom LSI chip (gate-array) and a PAL. The actual gate-array is used in both the CODER and DECODER and has an input pin to determine whether it is compressing (CODER) or expanding (DECODER) the input data. The gate-array compresses 14-bit samples into 10-bit and calculates the parity. The PARITY COLLECTOR PAL (U39), is used to convert parity words into the parallel format (the way they are stored in the system RAM) from serial (as output by the gate array). The sequencer loads a parity word (first parity word is p1-p7, then p8-p14 etc, see DSK21831A2) into the system RAM. The PARITY COLLECTOR PAL monitors the gate-array commands issued by the sequencer and clocks in the serial parity bits when produced by the gate-array. A sequencer command then loads the 8 bit parity word stored within the PAL into system RAM for later processing.

5.14. CPU Block

The CPU block is resident on UN26/101 with some I/O hardware on UN26/102. The main components are:

Z80 CPU (U1), 6116 RAM (U41), 27128 PROM (U2),

The CPU is responsible for the processing not done by the sequencer. The various roles it performs can be described:

- Providing system diagnostics with fault reporting.
- Extraction of signalling bits
- Setting of Justification bits
- 7 → 11 Hamming coding of range bits
- Housekeeping functions

A reset is forced by the sequencer every 3 ms to prevent lock-up, and as a further protection the CPU must reset a monostable (U5 on the UN26/101) every 3 ms otherwise it will 'time-out' forcing all fault outputs bad by clearing the open collector driver U47. The CPU running program is stored in U2. The private RAM for the CPU is U41, the system RAM U30, 35 (UN26/102) is shared by both the CPU and the sequencer and although the sequencer has priority if there is any contention, the CPU has certain slots where it can make use of this resource. The CPU has as part of its program an interrupt routine which the sequencer invokes at a specific time in the 3 ms frame. This interrupt routine is used to carry out the background self testing.

The CPU works independently of the rest of the hardware except when it accesses the system RAM. The sequencer allocates slots to the CPU and when the CPU wishes to access system RAM it is put into a 'wait' state by the sequencer until the next CPU slot. This process is transparent to the CPU program - e only drawback is that a system RAM access may have some wait states inserted by the sequencer. To minimise the time CPU wastes in the 'wait' state, all the data that does not need to be shared with the rest of the hardware resides in the private RAM. The CPU's memory map is as follows:

0000 - 3FFFH CPU PROM (27128 occupies 16K bytes)
4000H - 7FFFH CPU private RAM (6116 occupies only 2K)
8000H - FFFFH System RAM. (occupies 16Kbytes)

The system RAM as seen by the CPU is as follows:

bit:	13 12	11 10 9	8 7 6 5 4 3 2 1	0
	page	channel	channel workspace	switch

Bits 1 to 13 correspond to bits 0-12 of the actual system RAM chips.

The word size for the system RAM is 16 bits. Apart from the CPU all the functional blocks transfer a word at a time. The CPU transfers 8 bits at a time.

For the CPU to access system RAM bit 15 of the address must be set, bit 14 is "don't care". Bit 0 enables access to the RAM by 8-bit wide words: if bit 0 is zero the lower portion of the 16-bit RAM word is accessed if bit zero is 1 the high byte is accessed. This enables Z80's 16-bit load instructions to be executed on the system RAM.

5.14.1. Input/Output Configuration

The various external inputs to the processor are to enable the user to define parameters used by the error processing software. Some system status information is also passed to the Z80, eg. clock fails, AES input fails, HDB3 fail.

The outputs from the system are the various error displays and signalling data that are removed from the audio by the DECODER.

5.14.2. Executive Outputs

These eight outputs as defined in Section 2 above are the highest level error reports and will be used to change over to an identical set of equipment. These outputs are activated (ie, become open circuit) when a 'fault' occurs. A fault is defined as:

(a) Bitstream failure — If the HDB3 output has failed or is incorrectly terminated, all channel fault outputs are failed.

(b) AES failure — If a digital input is in use and the associated AES receiver is not locked, both the relevant channels will be failed.

(c) Clocking error

(i) If one or more AES channels are in use and the reference AES clock input is not being correctly driven, the relevant channel fault outputs are failed.

(ii) If the internal clock is in use, the 'internal clock' fault output will be failed.

(d) Digital error — If an error is discovered during system self-test, all channel fault outputs will be failed.

(e) Timeout — The central processor must issue a pulse every 3 ms to a re-triggerable monostable. A timeout error is reported if the monostable has time to reset. This error flags all channels.

5.14.3. Status Outputs

The various ports and where they are situated is given in the following table:

SYSTEM PORTS		Z80 port address (HEX)
UN26/102		
SIGX	SIGNALLING BITS OF CHAN. 1 AND 2	00
SIGY	SIGNALLING BITS OF CHAN. 3 AND 4	01
SIGZ	SIGNALLING BITS OF CHAN. 5 AND 6	02
A or D	PORT FOR OPTO-ISOLATED AES/ADC SELECTION	03
VALID_IP	STATUS INPUT FOR VERIFICATION	04
UN26/101		
STATUS1	COPY OF EXEC_OP ON FRONT PANEL LEDs	00
STATUS2	FURTHER STATUS ON FRONT PANEL LEDs	01
OK_KICK	TRIGGER FOR GOOD SELF-TEST	02
SIG_STRB	STROBE FOR 676 SIGNALLING	03
EXEC_OP	MAIN FAULT INDICATIONS (OPEN COLLECTOR)	04

5.14.4. STATUS1 Output Port (UN26/101)

This port is configured as an output. The port holds the value to be displayed on the left hand row of LED's on the UN26/101.

This port is only updated once through the main system testing loop. However since the main system testing forms an infinite loop the port will be updated at regular intervals. Intermediate values that are to be output to this port are held in the variable STATUS2_COPY.

Below is a copy of STATUS1 port, the LEDs and corresponding data bus bits. A LED is on if the bit corresponding to the LED is at a low state. Any LED can be turned off by placing a logic high in the relevant bit position.

ASSOCIATION	DATA BUS BITS
Int_Clock ⊙	D7
CH.N fail ⊙	D6
CH.1 fail ⊙	D5
CH.2 fail ⊙	D4
CH.3 fail ⊙	D3
CH.4 fail ⊙	D2
CH.5 fail ⊙	D1
CH.6 fail ⊙	D0

5.14.5. STATUS2 Output Port (UN26/101)

This port is configured as an output. The port holds the value to be displayed on the right hand row of LED's on the UN26/101.

This port is only updated once through the main system testing loop. However since the main system testing forms an infinite loop the port will be updated at regular intervals. Intermediate values that are to be output to this port are held in the variable EXEC_OP_COPY.

Below is a copy of the STATUS2 port, the LEDs and corresponding data bus bits. A LED is on if the bit corresponding to the LED is at a low state. Any LED can be turned off by placing a logic high in the relevant bit position.

DATA BUS BIT	ASSOCIATION
D7 ⊙	AES_Clock_Fail
D6 ⊙	EXT_Clock_Fail
D5 ⊙	EXT_Freq_Fail
D4 ⊙	X_AES_Selected
D3 ⊙	Y_AES_Selected
D2 ⊙	Z_AES_Selected
D1 ⊙	HDB3_Fail
D0 ⊙	Dig_Fail

5.14.6. VALID_IP Input Port (UN26/101)

The input port, VALID_IP is used to obtain the current status of the signals shown in the table below.

DATA BUS BITS	ASSOCIATION
D7	/OLOCK_REF
D6	/OLOCK_X
D5	/OLOCK_Y
D4	/OLOCK_Z
D3	/REFAMP_ERR
D2	/REFFREQ_ERR
D1	/RAIL_FAIL
D0	NOT USED

5.15. /OLOCK_REF

This signal represents the 'in lock' condition of the reference AES/EBU input stage. If /OLOCK_REF is high then the reference is deemed to be a valid clock source.

5.16. /OLOCK_X

The /OLOCK_X signal shows if the AES/EBU input relating to channels 1 and 2 is locked to the signal applied to its input. This signal is used to fail channels 1 and 2 when the X channel input is selected as 'digital' instead of analogue and the AES/EBU receiver in unlocked.

5.17. /OLOCK_Y

The /OLOCK_Y signal shows if the AES/EBU input relating to channels 3 and 4 is locked to the signal applied to its input. This signal is used to fail channels 3 and 4 when the Y channel input is selected as 'digital' instead of analogue and the AES/EBU receiver is unlocked.

5.18. /OLOCK_Z

The /OLOCK_Z signal shows if the AES/EBU input relating to channels 5 and 6 is locked to the signal applied to its input. This signal is used to fail channels 5 and 6 when the Z channel input is selected as 'digital' instead of analogue and the AES/EBU receiver is unlocked.

5.19. /REFAMP_ERR

The /REFAMP_ERR signal, when low, indicates that the amplitude of the external 16 MHz signal is out of the specified range. This signal is used to either fail or set good the EXT_clock_Fail LED on STATUS2.

5.20. /REFFREQ_ERR

The /REFFREQ_ERR signal, when low indicates that the frequency of the external 16 MHz clock source is out of the specified tolerance. The signal is used to make the decision whether or not to fail the EXT_Freq_Fail LED on STATUS2.

5.21. /RAIL_FAIL

If one of the supply rails to the CODER fails this input (bit 1 of VALID_IP) will go low. Therefore, a fault condition is indicated causing the Dig_Fail LED on STATUS2 to be extinguished and all the channels to be failed.

5.22. A_or_D Input Port (UN26/102)

The A_or_D port is used by the CPU to acquire the state of the external analogue or digital input select lines. The port also carries the signal which states whether or not the HDB3 output is working correctly. Channel fault outputs as appropriate are failed if an error occurs.

DATA BUS BITS	ASSOCIATION
D7	NOT USED
D6	NOT USED
D5	NOT USED
D4	NOT USED
D3	HDB3_OK
D2	/SEL_56
D1	/SEL_34
D0	/SEL_12

5.22.1. /SEL_12, /SEL_34, /SEL_56

The state of these 3 signals determines whether the ADC or AES/EBU inputs will be used by the CODER on a "per channel pair" basis.

The fault outputs for a channel pair will be failed if an AES/EBU input is selected and the relevant input stage is out of lock.

5.22.2. HDB3_OK

The HDB3_OK signal reflects the state of the HDB3 output stage and data monitor. This line is active high. Therefore if the line goes low an error is indicated.

5.23. SIGX,SIGY,SIGZ INPUT PORTS (UN26/101)

The three input ports are used to input the six nibbles of 676 kbit/s level signalling information associated with the six channels of audio. This signalling information will typically be RDS (Radio Data System) data and transmitter control signals. This data can be extracted from the bitstream by using a NICAM DECODER with its signalling outputs connected to a NICAM data splitter.

DATA BUS BITS		ASSOCIATION		
		SIGX	SIGY	SIGZ
D7	MSB	CH2	CH4	CH6
D6	'	CH2	CH4	CH6
D5	'	CH2	CH4	CH6
D4	LSB	CH2	CH4	CH6
D3	MSB	CH1	CH3	CH5
D2	'	CH1	CH3	CH5
D1	'	CH1	CH3	CH5
D0	LSB	CH1	CH3	CH5

Every 3 ms the CPU will read the status of the 3 input ports. It will then put the read in values into dedicated RAM locations in the system RAM.

5.24. SIG_STRB OUTPUT PORT (UN26/101)

This output port is used to provide the channel pair signalling strobes. These strobes, when low, indicate a signalling read cycle. Therefore data that is to be represented as signalling information within the NICAM 3 bitstream structure must be valid on the input ports SIGX, SIGY and SIGZ when the signalling strobes CH12_STR, CH34_STR and CH56_STR are low.

DATA BUS BITS	ASSOCIATION
D7	NOT USED
D6	SIGNALLING STROBE
D5	NOT USED
D4	NOT USED
D3	NOT USED
D2	NOT USED
D1	NOT USED
D0	OLOCK_SLUG

This port also provides the signal OLOCK_SLUG which is used to control the main CODER selection. This is an integrated version of the /OLOC_REF signal on the VALID_IP port. A high represents a good condition and will initiate a changeover of clock sources to the AES/EBU reference clock source. It must be noted that this signal will be set low during the execution of the QUICKTEST routines regardless of the conditions of the AES reference clock.

5.25. Private RAM

The private RAM is used by the processor for all local processing. The private RAM holds all stored parameters and is the primary work area of the CPU.

5.26. System RAM

The system RAM is used mainly by the sequencer. However at every reset and at an interrupt the CPU will request access to the SYSTEM RAM to write framing information, justification bits and signalling information. Due to the method of testing the gate-array, the CPU will also read samples from the X channel from the system RAM.

5.27. Stacks

The CPU has two stacks. The first (STACK1) is used during the data processing and the other (STACK2) is used for the QUICKTEST AND SELFTEST routines. STACK1 is initialised to the same value (47FF hex) each time the CPU is reset (i.e. once every 3 ms). STACK2 is only initialised to a fixed value (46FD hex) on 'cold reset' or if it is out of its legal bounds. Subsequently its value is saved in the variable (STACK) when the self-test gets interrupted and restored (within file INITSYS.SRC) after the main bitstream processing has been done.

5.28. Front Panel Displays

Int_Clock	⊙	⊙	AES_Clock_Fail
CH.N fail	⊙	⊙	EXT_Clock_Fail
CH.1 fail	⊙	⊙	EXT_Freq_Fail
CH.2 fail	⊙	⊙	X_AES_Selected
CH.3 fail	⊙	⊙	Y_AES_Selected
CH.4 fail	⊙	⊙	Z_AES_Selected
CH.5 fail	⊙	⊙	HDB3_Fail
CH.6 fail	⊙	⊙	Dig_Fail

The left hand LEDs are the copy of the executive outputs. The right hand LEDs show further system status.

The main test routine is executed as an infinite loop that is interrupted externally. Before testing begins, the previous state of the procedure is restored. Registers AF, IX, IY, HL, stack pointer, flags and accumulator are restored f ı memory.

5.29. Parity Collector PAL and 2048 Level Signalling

This PAL is used to convert the parity error bits that come from the Gate-Array in serial fashion to parallel. The PAL does this by monitoring the Gate-Array commands and shifting in the data on the Gate-Array parity bus (pin34 IC27) when the collect parity bit command (RCLP) is executed by the Gate-Array. The other function of the PAL is to read the 2048 level signalling bit. The sequencer provides a strobe pulse (pin 8 of the PAL) that signals to the PAL to latch the data on the pin 3. This is the 2048 level signalling bit input point. The signalling bit is then written into system RAM under the sequencer control. The CPU then combines the signalling bits into a word with the frame alignment bits.

5.30. 676 Level Signalling

The NICAM bitstream has capacity for carrying signalling data together with the audio. With each channel there are four signalling bits sent every 3 ms. These bits are used for remote switching of transmitters and to convey RDS (Radio Data System) information. The CPU grabs the signalling bits from the opto-coupled inputs when the strobe pulses are low. The signalling bits are stored in the SYSTEM RAM, where they will be extracted by the sequencer and placed into the outgoing bitstream.

5.31. ADC Block

The ADC block uses channel select inputs and a strobe pulse to supply the data to the system data bus. The three channel select lines represent the channel number of the next sample required. The strobe line pulses when the system is ready to accept the next sample value. The sample value (14-bits) is placed on the 16-bit system data bus left justified, ie, msb of the sample value is the msb of the system bus. When the strobe line is not active the ADC block presents the bus with a high impedance. The strobe pulse and the channel select lines are provided by the sequencer thus the timings are determined by the sequencer code generating software.

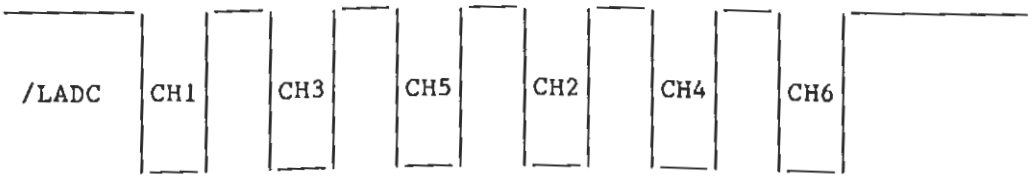
5.32. AES Block

There are three identical AES input circuits for X, Y and Z channel pairs. These circuits are on UN26/101. The main component of each block is the SAA7274 AES DECODER chip which takes the input and converts the data into I^2S format. Each chip produces its own clock from the incoming bitstream. Before the audio data can be presented to the system RAM it must be converted into a parallel, 14 bit, NICAM sign and magnitude format word.

5.33. Audio Input Format Selector (UN26/102 U85)

The MK II NICAM CODER can accept audio inputs (analogue) or digital inputs in the form of 32 kHz sampled AES/EBU signals. It is only possible to select inputs in pairs, ie, a channel pair could be 'digital' and the other 2 channel pairs 'analogue'. The analogue/digital input selection is controlled by PAL U85. This PAL acts on the information provided by the 3 select address lines (/SEL12, /SEL34, /SEL56) produced by opto-coupler U64. The select information is decoded within the PAL to determine which strobe pulses need to be sent to which data buffers. There are 3 strobe signals affected by the select lines. They are /STRADCA, /STRADCB and /STRAES.

The channel read sequence is 1 3 5 2 4 6 as shown below. Therefore channel 1 is read first then channel 3 etc. The /LADC pulse is used within PAL U85 to gate the outputs /STRADCA, /STRADCB, and /STRAES.



5.34. AES De-serialisers Block

The heart of the AES de-serialiser block is the AES_IF2 PAL U54. The AES de-serialiser block consists of 12 sixteen bit, shift and store, registers. Two of the 16 bit registers are associated to each channel. The AES data words are serially output from the SAA7274 on the negative edge of CDR3. The data is loaded into the respective shift registers under the control of the AES_IF2 PAL. The PAL produces 16 clock pulses to load sixteen of the avaliable 24 bits into the shift register. The next audio word will be output from the SAA7274 when there is a transition on the LWSAB line. The LWSAB signal has an unequal mark space ratio and forms the left and right word select signal.

Having loaded the shift register the data is then transferred to a storage latch by a strobe pulse produced by de-serialiser PAL U54. The digital audio word held in the storage latch will be available on the data bus on the negative transition of the appropriate read pulse.

5.35. Monitor DAC Interface

The monitor DAC interface is resident on the UN26/102 and performs 4 basic functions.

(1) 2's Complement to Sign and Magnitude Conversion

14 XOR gates, U79 - U82, are used to convert 2's complement data, from either the ADC's or the AES input stages, to sign and magnitude data. Sign and magnitude is the sample data format used by the gate array and the NICAM transmission system.

(2) Placing Audio Samples on the System Data Bus

Buffers U71 and U72 transfer audio samples in the sign and magnitude format to the system data bus using the /LADC signal from the sequencer.

(3) Sign and Magnitude to 2's Complement Conversion

This stage of data conversion is necessary to check that the ADCs themselves are working and sample data buffers U71 and U72 are operational. This ensures that the audio sample data has been transferred to the system data bus before it has been processed by the monitor DAC block.

(4) Serialising of 14 Bit Audio Sample

The function this part of the circuit is to serialise a 14 bit sample such that it is in a format acceptable to the Philips SAA7220 filter chips. The 14 bit audio sample is parallel loaded form the CHKDAC bus into 1 of 6 shift registers (U36, 40, 41, 48, 50, 51) under the control of the DAC de-serialiser controller and read pulse generator PAL U85.

The de-serialisers require 16 clock pulses to shift the loaded data out, a chip select signal, and a mode select signal which determines whether the shift register is parallel loading data or serially shifting the data out. These signals are derived from the DAC de-serialiser and read pulse generator PAL.

The 4 times oversampling and filter stage requires left and right audio samples to follow each other serially. Therefore 2 shift registers with their outputs connected together are required. One of shift registers will provide the left channel data and the other the right.

5.36. 4 Times Oversampling and Digital Filtering Stage

3 oversampling filters are used within the CODER. The filter chips are the Philips SAA7220. The SAA7220's are used in conjunction with the Philips TDA1541 DAC. The filter chips are resident on the UN26/102 and perform 4 functions.

(a) 4 times oversampling.
(b) Digital filtering
(c) Interpolate erroneous data
(d) Provide a digital output conforming to the Phillips/Sony digital audio interface standard.

Only 3 out of the 4 functions of the filter are used within the CODER design. The data interpolation function is of no use since the samples from the ADC or the AES input stage are what we want to listen to. Thus the ERR input on the SAA7220 is held low.

The filter chips require 4 signals conforming to the Philips I^2S protocol. This serial data transmission protocol consists of data, data clock, word select and an error flag.

The parallel samples from the ADC or the AES input stages are converted into the serial format by the DAC interface. The serialised samples constitute the data input required by the filter chips.

The data clock is CDR3. CDR3 is the 2048 kHz clock generated by the sequencer counter chip U5.

5.37. Cosited/Interleaved Sampling

The NICAM transmission specifies an interleaved sampling process which means corresponding left and right audio samples in the digital domain represent analogue values taken half a sample period apart in time. The digital filter and DAC in the CD2L/41 are designed for use in compact disc players employing co-sited sampling which produces no time difference. It thus is necessary to delay the right channel audio data by half a sample period to achieve correct timing if interleaved sampling is being used. The digital filter IC outputs a bitstream of serial left and right at four times the original sample rate. Each sample is 16 bits long and there are two of them, so one half period of the original sample rate corresponds to $(16 \times 2 \times 4)/2 = 64$ bit periods at this 'over sampled' rate. The CD2L/41 can be selected to work with either interleaved or co-sited monitor outputs as follows:

From the shift registers the data line passes through a selectable delay network that has the effect of delaying right channel samples by half a sampling period if alternate sampling is required; co-sited sampling passes the data through. Describing channel 1: The data (DABD) emerges from U54 and is passed to both the octal latch (U69) and dual 64-bit shift register (U56). If co-sited mode is selected, the /CLR line on the latch is held low which causes the three-state buffer (U67) to pass the DABD signal straight through. When interleaved mode is selected, the /CLR line is held high. WSBD (which flags whether the next sample is for the left or right channel) is latched by U69. When this result is low, U67 is enabled and passes data through as for the co-sited case, (left channel).

When WSBD is latched high, U68 is enabled causing the delayed version of the data to be passed through, (right channel).

5.38. Analogue Outputs

The analogue outputs on the CD2L/41 are monitor outputs of the audio inputs (which can be AES or ADC). They are produced on the CO9/14 card. The input signals are serial data, digital commands and clock; these are routed to the on-card DAC chips. Each DAC package is a dual channel device. The uppermost chip handles channels 1-2; the middle one, channels 3-4; and the bottom one channels 5-6. In the following description, 'X' has the usual meaning of 'don't care'; ie, UX01 means U101, U201 etc, as appropriate.

The DC offset of the DAC is controlled by an auto-zero servo loop, comprising an integrator, (UX01 b), and a current source (QX01,QX04) which balances the current sink within the DAC. The non-inverting input of UX01 b is connected to zero-potential reference. Any difference in voltage between the reference and TPX03 creates an error output from the integrator, which modifies the current in the grounded-base current source QX04. This in turn influences the gate-source potential of QX01,and so controls the magnitude of the current source into the summing-junction UX01a, pin 2. The DC offset at TPX03 is thus dynamically controlled to zero, with limits of accuracy equal to those of the OP-AMP. UX01 b,input offset voltage: ±3 mV max.

The J17 network comprises RX03, RX04, CX01, CX02. The low-pass filter comprises RX05, the combination of RX06, RX07, RX08 and RX09, coils LX01, LX02 and capacitors CX03, CX04, CX05. The filter has a Gaussian response to the -6dB point, so as to achieve a flat group-delay in the audio pass-band and a corresponding transient step response with very small overshoot. The -3dB cut-off frequency is nominally 40 kHz, and the stop-band attenuation at four fold over sampling frequency, (128 kHz) exceeds 40 dB.

There is a balanced output stage, which provides a sending end source impedance equivalent to 45 Ω in series with 100 µH. This is optimum for driving un-terminated twisted pairs. The output stage can also drive into 600 Ω. LX03 is a common mode filter which prevents RF being fed back from the line.

Protection against accidental mis-connection or short circuits is provided by the positive temperature coefficient resistors (self re-setting fuses) RX14 and RX15 in conjunction with diode clamps and relatively low voltage shunt-regulated supplies.

5.39. AES/EBU Outputs

As well as providing six channels of analogue audio, the CD2L/41 also provides digital audio AES/EBU monitor outputs. The three XLR plug connectors on the back panel carry three AES feeds, (channels 1/2, 3/4 and 5/6). The Philips SAA 7220 ICs, (U28, U44 and U54), provide an output on the DOBM line, (pin 14), which is close in format to an AES/EBU signal. Minor changes to the bitstream convert the channel status data from consumer to professional format. The circuit to do this is based around two PALs, a buffer and a transformer providing a balanced earth free output as required.

5.40. Parity Collector PAL (UN26/102)

This PAL consists of two parts. One is a 7- bit shift register and the other part is a latch. The shift register is used to convert the parity error flags that are produced by the Gate-Array into a 6/7-bit parallel word. The conversion is done by shifting the state of the parity bus of the Gate-Array when the Gate-Array outputs the parity bit (The PAL monitors the Gate-Array commands for that). The sequencer controls reading of the parity bits that have been converted to parallel format in the PAL's shift register to the system RAM. The parity bits are converted to parallel words in the PAL so the CPU would be relieved of this time consuming task when preparing channel housekeeping words. The other function of the Parity Collector PAL is to collect the 2048 level signalling bit. The signalling bit is latched under the sequencer control (pin12 IC20). This bit is then written to the System RAM under the control of the sequencer.

5.41. AES_IF2 PAL (UN26/101)

The AES_IF2 PAL is responsible for controlling the 12 AES/EBU data de-serialisers U27 - U38. The PAL produces the necessary clock and shift pulses to enable the double registers U27 - U38 to function correctly. The CLOCKL and CLOCKR signals are a gated 2048 kHz clock. These signals will have 16 clock pulse present on them. This allows the double shift registers to take in the 16 bit word from the AES/EBU receivers.

The PAL also provides another signal, F_SYNC. This signal is used to synchronise 2 CODERS when a reference AES/EBU clock source is present and active on both CODERS.

5.42. HDB3 and Sequencer Controller PAL (UN26/102)

This PAL provides all the necessary control signals for the hardware sequencer. The PAL also contains the HDB3 data monitor which produces the HDB3_OK signal.

5.43. DAC Data De-serialiser Controller and Read Pulse Generator PAL (UN26/102)

This PAL controls the operation of the six parallel to serial converters on the UN26/102 that are used to serialise the data destined for the DAC's. The PAL also produces the six channel read pulses used by the CODER.

5.44. Misc PAL (UN26/102 U35)

This PAL controls the virtual to physical page mapping and CPU wait states. The RAM is split into four physical pages each of 2048 16 bit words. Physical pages 0 › 2 are allocated to pipeline stages 1 - 3 and the mapping is switched every 3 ms. Page 3 is a general purpose page and is not switched. The sequencer is responsible for changing the allocation of pages to pipeline stages every 3 ms in such a way that pages propagate through the pipeline.

When the CPU wishes to access the system RAM this PAL either grants the request, or if the sequencer (which has priority) is using it, the CPU is put into a wait state until the RAM is available.

Monitor the waveform at the output of the J17 de-emphasis network. This should be a squarewave of 103 mV amplitude which looks like the waveform at TPX01. The squarewave should not have more than 5% tilt.

6.24. Analogue Monitor Card (CO9/14)

Measure the voltage at the output of each 3-terminal regulator and each 10 volt zener regulator. The 15 volt regulators, U710 and U711 should have an output voltage between 14.25 and 15.75 volts. The 5 volt regulators UX08 should have an output voltage in the range of 4.75 and 5.25 volts. The 10 volt regulators, D708, D709, D712, D713, D716 and D717. Across each of these diodes there should be a voltage between 9.4 and 10.6 volts.

6.25. Line Driver Output Stage (CO9/14)

Adjustment of the output DC offset. The DC output must be less than 1 mV. The card should be powered-up for at least 10 minutes before this adjustment is made. Measure the line-to-line DC voltage at the output with a digital voltmeter with 1 mV resolution. Adjust RX12 for zero.

6.26. To Check Harmonic Distortion (CO9/14)

Using a J17 emphasis network consisting of a 30 kΩ resistor, 10 nF and 1.2nF capacitors, all in parallel; connect this network between source and TPX01. The source is a low-distortion audio generator. Inject a 1 kHz tone via the emphasis network to TPX01. Terminate the line output in 600 Ohms. Select AES inputs on the testbox. Set the tone level feeding the emphasis network to give +8 dBm across the 600 Ohm line termination and measure THD + noise over a 22 kHz bandwidth. The percentage THD + noise at 1 kHz should be less than 0.01% (80 dB separation).

In the event that the THD figure is not met, check the THD of the tone source. A spectrum analyser is useful in diagnosing other causes, such as spurious noise pick-up, RFI, earth loops, etc

6.27. Channel Monitor Output Stages (CO9/14)

6.27.1. To Adjust the Output DC Offset

Verify test 6.25. above, by checking that with no audio tone or programme, the DC voltage across the corresponding line output (i.e. the line output from which the channel monitor is driven) is less than ±1 mV. Adjust RX43 for zero DC at the channel monitor output, (line to line).

6.27.2. To Check the Harmonic Distortion

Inject a low distortion 1 kHz tone via network A to TPX01, as described in section 6.25. above. Check that the channel monitor output is +8 dBm ±0.2 dB when terminated in 600 Ohms. Measure THD + noise at the channel monitor output. The percentage THD + noise should be less than 0.01% (80 dB separation).

6.28. Group Delay and Frequency Response

Using the J17 pre-emphasis network as described in section 6.23.5.(b) above, feed in a i kHz squarewave/pulse to TPX0i, and set its amplitude to give an output squarewave at the line output, of about 1 volt peak-to-peak amplitude. Note the magnitude of any tilt or overshoot no the output waveform. Tilt and overshoot should not exceed 5%.

If the waveform is incorrect, first check the 'scope probe compensation by monitoring the signal generator squarewave output. If that is correct, then examine the components in the J17 de-emphasis section and/or the 5th order low-pass filter.

6.29. DAC Gain Adjustment (CO9/14)

Feed in a 400 Hz ±5 Hz tone at a level of +8 dBu to the relevant ADC input. The audio tone levels should be set exactly, on properly calibrated equipment.

Set each of the gain-set potentiometers RX07 such that the main audio output levels are +8 dBm, when the outputs are terminated in 600 Ohms. If an EP14/1 is used, this will ensure ±0.2 dB accuracy (0.1 dB for the level monitor, 0.1 dB for the attenuator).

If more accurate level measuring equipment is available, it should be used. A faulty DAC may prevent the correct levels being achieved - check by substitution. The 'gain' of the system measured from a signal, (fed from a generator via network A to TPX01), to the audio output is about -10 dB.

6.30. Frequency Response: ADC + Monitor DAC

Set the sweep generator output to 0 dBu, and the sweep span to encompass 20 Hz to 15 kHz. Feed the generator into each channel input in turn, and observe the response at the corresponding channel output. The audio output level, terminated in 600 Ohms, should be flat within ±0.2 dB up to and including 10 kHz and within +0.3, -0.5 dB above to 15 kHz. If the frequency response is outside of these limits, check for incorrect value components.

6.31. Third-Order Inter-Modulation Distortion

Two tones are input to the channel under test. A two (equal amplitude) tone generator is used. Alternatively two separate generators can be used. The tone frequencies should be approximately 11.5 kHz and 12.5 kHz, and each of a level approximately -2 dBu. (This corresponds to an envelope crest of +4 dBu). The intermodulation products should each be separated from either tone by at least 50 dB.

The intermodulation products at 10.5 kHz and 13.5 kHz at the output from the monitor should be viewed on a spectrum analyser.

If these figures are not met, check for any residual intermodulation in the source. If intermodulation persists check if it is present on the monitoring output as well as the main output. If yes, check the ADC (TPX03). If no, examine the Op-amps in the faulty signal-path.

6.32. Inter-Channel Crosstalk and Output Phasing

Set the audio generator frequency to 10 kHz, and feed its output to one analogue input channel of the CODER. Verify that there is signal at the intended analogue channel output. Selectively measure the outputs of the silent channels. (A spectrum analyser can be used, or other selective meter which provides an effective noise floor at least 85 dB below the tone level). The crosstalk ratio should be better than 75 dB.

To check the output phasing, modulate all 6 channels simultaneously, at any convenient frequency. Connect one channel of a double-beam oscilloscope to one side of a line output and synchronise the oscilloscope to this channel. With the other oscilloscope probe, check each main and monitor (quality-check) output in turn, (measuring from the equivalent side to ground), and verify that they are all in phase. All channels must be in phase.

Do not attempt to measure the line-to-line signal with a grounded oscilloscope: the line outputs are balanced, but not floating. Measure either side to ground, but always the same side. If there is a phase error, this can only be either a wiring fault to the connector, or a cross-over in the windings of the common-mode filters LX41. All outputs have their 'hot' side on the 'a' row of the output connector.

6.33. AES/EBU Outputs (UN26/102)

Connect the AES/EBU output under test to a known working AES/EBU input. Connect an analogue audio signal to the channel that relates to the suspected digital channel pair. Place the UN26/101 on an extender. Using a pair of headphones monitor the main output relating to the channel that the AES/EBU signal was inserted into. Now monitor pin 2 of the relevant ADIC chip. If the Digital output is of the correct frequency and contains preambles in the correct place then pin 2 of the ADIC will be at logic '1'. However if pin 2 is at a logic '0' or oscillating between logic '0' and logic '1' then check the associated EBU_1, EBU_2 PALs and associated line driver. If the PALs Redcodes are correct and the line driver is functioning correctly then check the related oversampling filter (SAA7220). Monitor the DOBM output of the device. This should be a bi-phase mark signal having bit widths of 488 ns.

6.34. HDB3 Output Driver (UN26/102)

Place the UN26/102 on an extender. Monitor PL1a 6 and PL1c 6 terminating the measuring points with 75 Ω. The mid-pulse amplitude of both the positive and negative going pulses should be between 2.1 V and 2.6 V. The pulse widths should be between 219 ns and 244 ns. In the event of incorrect operation work backwards checking the pulse inputs to the driver at U83 pins 3 and 6. If these are incorrect, then check the NRZ input to U45, pin 1, and the clock at pin 2.

6.35. Clock Recovery (HDB3 monitor UN26/102)

Place the UN26/101 on an extender. With SKC terminated with 75 Ω monitor TP1. There should be a sine wave of approximately 150 mV peak-peak amplitude. Adjust L3 for maximum amplitude at TP1. If no signal is present on TP1 look with an oscilloscope at the base of Q8. A series of pulses directly related to the clock should be seen. In the event of no signal being present check the CK output, pin 10 of U45. Monitor pin 12 of U86. There should be a 1:1 square wave at 2048 kHz present on this pin.

6.36. HDB3 Data Recovery (UN26/102)

Place the UN26/102 on an extender. Terminate the HDB3 output at SKC. Monitor the HDB3_ok signal. This signal should now be at a stable logic '0'.

6.37. HDB3 Output Data Monitor (UN26/102)

For the data recovery mechanism to function correctly current must flow through the current recovery transformer L2. Place the UN26/102 on an extender. Using an oscilloscope monitor TP2 with SKC unterminated. The HDB3_OK line (pin 5 of U89) should be toggling between logic '0' and logic '1'. Now terminate SKC with a 75 Ω load. The HDB3_OK line should now be at a stable logic '0'.

6.38. Noise Generator (UN26/102)

Place the UN26/102 on an extender. Monitor pin 7 of U65 and adjust R12 for 1.5 V peak-peak noise amplitude. If the noise amplitude is low but U65(b) and associated components are in order, it may occasionally be necessary to change D9.

Appendix A

Sequencer Controller (UN26/102)

OUTPUT PINS	U58
20	P536
21	AA75
25	0310
26	8868
30	1871
31	8F0C

Sequencer Counter Chain (UN26/102)

OUTPUT PINS	U2	U3	U4	U5
19	C30F	5468	2169	0HU4
18	2U37	6093	5348	CAA7
17	PA8C	94AP	7925	931F
16	UU78	185F	69H9	96FC
15	6361	UFH2	0000	41PA
13	77P8	1649	C53U	6491
12	P425	628U	873F	A38F
11	2P4C	7244	U126	PUH6

Sequencer PROMs (UN26/102)

INPUT PINS	U10	U9	U8	U7	U6
2	U4P0	U4P0	U4P0	U4P0	U4P0
23	U03F	U03F	U03F	U03F	U03F
21	4671	4671	4671	4671	4671
24	A9H9	A9H9	A9H9	A9H9	A9H9
25	H68A	H68A	H68A	H68A	H68A
3	38A2	38A2	38A2	38A2	38A2
4	53CA	53CA	53CA	53CA	53CA
5	0920	0920	0920	0920	0920
6	42C6	42C6	42C6	42C6	42C6
7	U4P8	U4P8	U4P8	U4P8	U4P8
8	CA69	CA69	CA69	CA69	CA69
9	53FP	53FP	53FP	53FP	53FP
10	U452	U452	U452	U452	U452
OUTPUT PINS					
19	C30F	5468	2169	0HU4	FA47
18	2U37	6093	5348	CAA7	3812
17	PA8C	94AP	7925	931F	562F
16	UU78	185F	69H9	96FC	1P3U
1	6361	UFH2	0000	41PA	PF2P
13	77P8	1649	C53U	6491	0920
12	P425	628U	873F	A38F	U9AF
11	2P4C	7244	U126	PUH6	U41F

Sequencer Output Latches (UN26/102)

OUTPUT PINS	U20	U18	U17
2	0120	99U2	86UA
5	6FUU	77PC	UA0P
6	F22F	51F6	7590
9	F39P	3248	7U51
12	53H9	A0U5	8U1U
15	3HAA	4C65	2250
16	35H4	498P	954U
19	20P2	5H53	6F65

System RAM Address Bus Latches (UN26/102)

OUTPUT PINS	U88	U21
2	C9A2	PA28
5	7014	0U97
6	3126	3715
9	6772	XXXX
12	88UC	XXXX
15	717F	50CF
16	1P13	UF47
19	369P	C612

XXXX = UNSTABLE

Misc PAL (UN26/102)

device	pin no.	signature
U12	20	9249
U12	22	6021
U12	27	H8CH
U13	20	9F33
U13	22	6021
U13	27	H8CH

Bus Controller PAL (UN26/102)

device	pin no.	signature
U11	4	4604
U11	5	946A
U11	6	44PU
U11	7	8613
U11	8	73UP
U11	9	1P98
U11	10	0000
U11	11	0000
U11	12	028A
U11	13	1P98
U11	14	H8CH
U11	15	H8CH
U11	16	6021
U11	17	448P
U11	18	HA37
U11	19	9F33

System RAM (UN26/102)

device	pin no.	signature
U19	12	4PP6
U19	13	HA25
U19	15	0000
U19	18	XXXX
U19	19	XXXX

XXXX = UNSTABLE

AES/EBU Data De-serialiser Controller PAL (UN26/101)

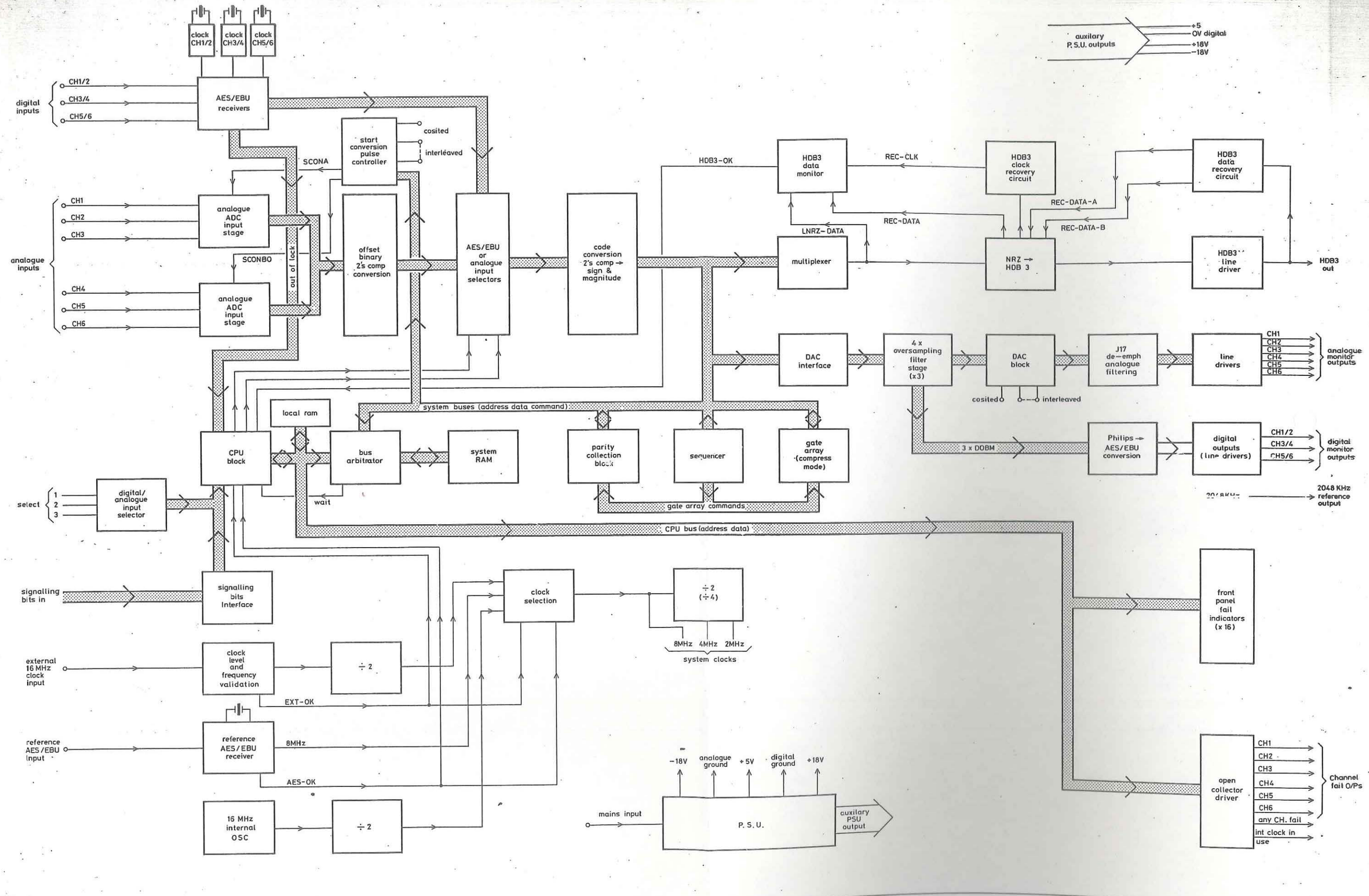
device	pin no.	signature
U54	2	954U
U54	3	H1P8
U54	4	67A0
U54	5	H5U4
U54	6	4H9A
U54	7	XXXX
U54	8	XXXX
U54	9	0000
U54	10	0000
U54	11	2250

XXXX = UNSTABLE

APPENDIX B

A table of programmable devices and their REDCODES

Card	IC No.	Name	Type	Redc'	P/F No.
UN26/101	U45	CPU_PROM	27128A		F5478A
UN26/101	U54	AES_IF_2	EP610DC	0011	F1096A
UN26/102	U87	SEQ CONT+HDB3 MON	EP910JC	1F5A	F1103B
UN26/102	U85	DAC CONT+READ PLSE GEN	EP910JC	7769	F1095A
UN26/102	U11	BUS CONT	16R6	23A0	F1111A
UN26/102	U14	PCOLL	20X8	EEFF	F1094A
UN26/102	U19	MISC PAL	16R4	8F51	F1110A
UN26/102	U26	EBU1 PAL	EP610DC	E436	F1041B
UN26/102	U27	EBU2 PAL	EP610DC	ABB4	F1042B
UN26/102	U42	EBU1 PAL	EP610DC	E436	F1041B
UN26/102	U43	EBU2 PAL	EP610DC	ABB4	F1042B
UN26/102	U52	EBU1 PAL	EP610CD	E436	F1041B
UN26/102	U53	EBU2 PAL	EP610DC	ABB4	F1042B



SCALE:- 0

THIRD ANGLE PROJECTION

ORIGINAL FRAME SIZE 574mm x 821mm

ISS	CHANGE
1	13/4/89
2	4/5/89
3	28/6/89
4	2/8/89
5	9/1/90

DS/A1/1

R292

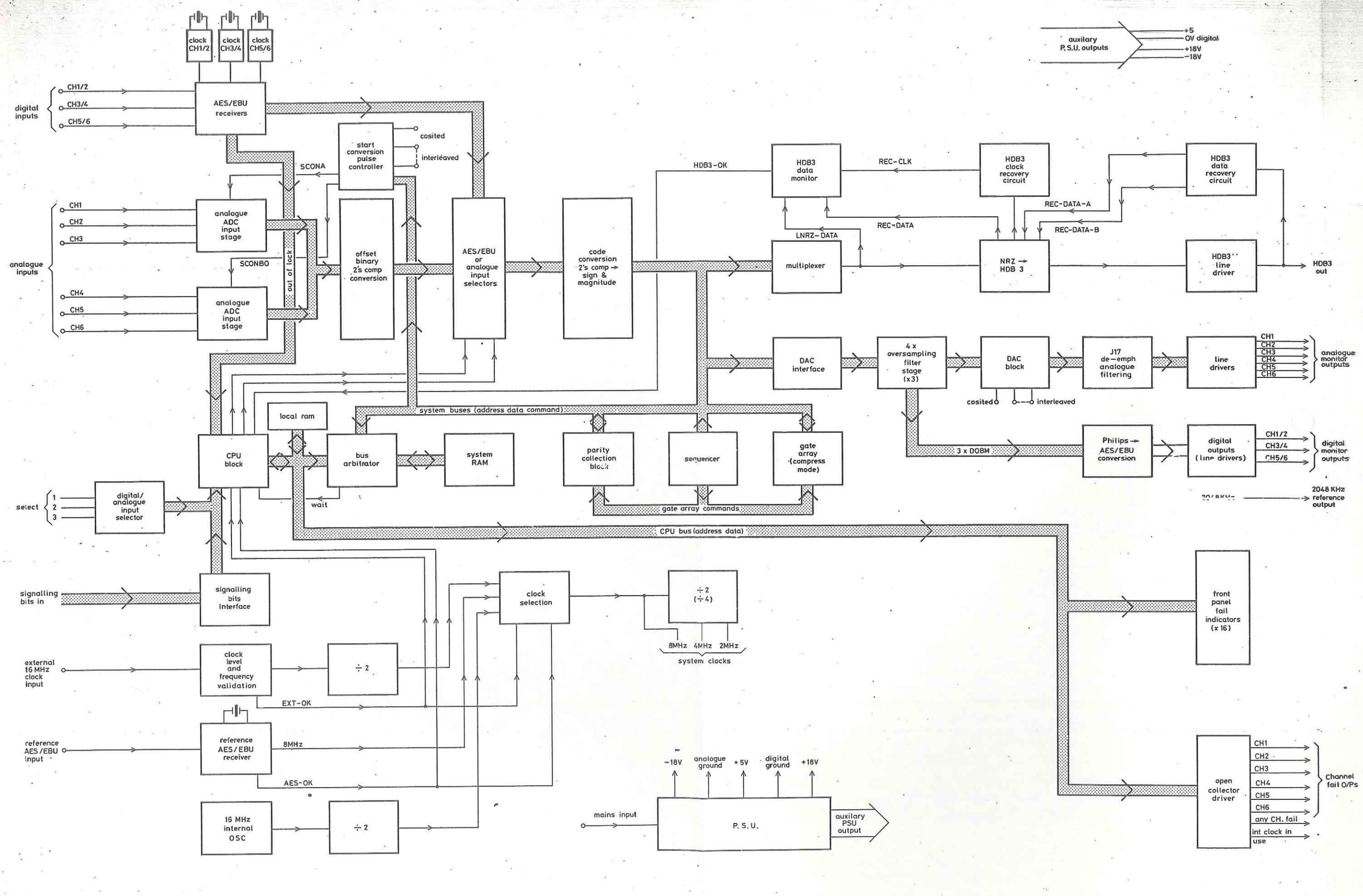
All dimensions in millimetres unless otherwise stated. Normal tolerances:
no decimal place – ± 1 mm unless
one decimal place – ± 0.3 mm otherwise
two decimal places – ± 0.1 mm stated

DRN.	JDB
TCD.	
CKD.	
APPD.	ecc

DESIGN & EQUIPMENT DEPARTMENT

CD2L/41
BLOCK DIAGRAM

D63597A1



SCALE: - 0

THIRD ANGLE PROJECTION

ORIGINAL FRAME SIZE 574mm x 821mm

ISS	CHANGE
1	13/4/89
2	4/5/89
3	28/6/89
4	2/8/89
5	9/1/90

DS/A1/1

R292

CD2L/41
BLOCK DIAGRAM

All dimensions in millimetres unless otherwise stated: Normal tolerances:
no decimal place – ± 1 mm unless
one decimal place – ± 0.3 mm otherwise
two decimal places – ± 0.1 mm stated

DRN.	JDB	DESIGN & EQUIPMENT DEPARTMENT
TCD.		
CKD.		D63597A1
APPD.	CCE	

CHANGE	ISS.
5/9/88	1

ITEM No.	No. OFF		DESCRIPTION	C'C'T REF.	BBC REF. OR DRG. No.
			DRAWING LIST		
			BLOCK DIAGRAM		D63921 A1
			PARTS LIST		D63922 A4
			ASSEMBLY AND WIRING (2 SHTS)		D63923 A1
			DETAIL 1 - FRONT PANEL		D63924 A2
			DETAIL 2 - LACING BAR		D63925 A4
			PBd MASTERS		D63926 A3s
			PBd DRILLING		D63927 A2
			WIRING SCHEDULE		D63928 A4
			FRONT PANEL LEGEND		D63929 A2
			FURTHER INFORMATION REQUIRED FOR MANUFACTURE		
			WIRING SPEC ED 122.		
			UNIT WIRING (VIDEO) EA10139		
			UNIT WIRING (PBd) EA10140		
			UNIT ASSEMBLY EA10484		
			UNIT SPEC ED/CD2L/41		
			SPEC ED 3002 INSULATING TUBING & SLEEVING		
			REAR PANEL DETAIL (REF, ONLY IF REQD). DSK27494 A1		
1	1	*	PRINTED BOARD TO SPEC ED/PB/CD2L/41/PTH		-0635486
			MANUFACTURED TO :-		D63926 A3s, D63927 A2
2					
3	1		FRONT PANEL		D63924 A2- DET 1
			MADE BY CONTRACTOR TO :-		D63929 A1
			SCREEN PRINTED BY CONTRACTOR TO :-		
4					
5	1		REAR PANEL LACING BAR		D63925 A4 - DET 2
			MADE BY CONTRACTOR TO :-		
6	1	*	POLARISING SCREEN 100mm x 125mm HNCP 37 STD	0.76	- 0628684
7	1	*	FUSE HOLDER, MAINS, PANEL MOUNTING		S22229 - 0614124
			(1) FS1		
8	1	*	FUSE, QUICK ACTING, 5x20, 3.15A		S22444 - 0369439
9	1	*	FUSE INSULATING COVER, RED		S22332 - 0483808

BBC

CD2L/41
6 CHANNEL NICAM II CODER

DRN.	MPF
TPD	
CKD	
APPD	R.A.A.

D & ED

D63922 A4

SHT 1 OF 7

RABIDOS 2770/87 (9

D63922A4

ISS.	CHANGE	
1	5/9/86	

ITEM No.	No. OFF		DESCRIPTION	C'C'T REF.	BBC REF. OR DRG. No.
10	2	9+	CO8/19		
11	1	9+	CO9/14		
12	1	9+	UN26/101		
13	1	9+	UN26/102 - CUSTOMISED TO DSK 27539 A4		
14	1	9+	PS4/51		
15	1	*	EUROCONNECTOR BLANKING KIT (PIN 23)		-063226
16	1	*	CODING BAR, PLASTIC		-062814
17	14	*	PBd RUNNERS, PLASTIC		-062545
18	6	*	PBd MOUNTING BLADE, VERTICAL, RS533-689		
19	6	*	CRIMP CONNECTOR, INSULATED, RS533-005		
			PLUGS & SOCKETS		
20	10	*	SOCKET, FIXED, 64 POLE, PBd MOUNTING (10) SKL, SKM, SKN, SKO, SKP, SKQ, SKR, SKS, SKT, SKU.		S27890 - 0610089
21	2	*	SOCKET, FIXED, 11 POLE, PBd MOUNTING (2) SKX, SKY.		S27892 - 038332
22	1	*	SOCKET, FIXED, 56 POLE VARICON (1) SKK		S27953 - 0206311
23	1	*	SOCKET, FIXED, 37 POLE D TYPE (1) SKA		S27819 - 045462
24	1	*	SOCKET, FIXED, 25 POLE, D TYPE (1) SKF		S27819 - 0351294
25	1	*	SOCKET FIXED, 15 POLE D TYPE (1) SKB		S27819 - 0351286
26	1	*	SOCKET FIXED, 9 POLE D TYPE (1) SKAA		S27819 - 0491875
27	1	*	SOCKET FIXED, 3 POLE, MAINS. (1) SKZ		S27700 - 0023036
28	3	*	SOCKET FIXED, BNC, OPEN CABLE ENTRY (3) SKC, SKD, SKE.		S27502 - 0236524
29	4		SOCKET, FIXED, 3 POLE XLR. SKG, H, I, J.		S27733 - 0236165

BBC
DS / PLA4

CD2L/41
PARTS LIST

DRN.	MPF
TPD	
CKD.	
APPD	R.B.A.

D & ED
D63922 A4
SHT 2 OF 7

CHANGE	ISS.
5/D/BD	1

ITEM No.	No. OFF		DESCRIPTION	C'C'T REF.	BBC REF. OR DRG. No.
30	3	*	PLUG, FIXED, 3POLE XLR		S24933 - 0091829
			(3) PLA, PLB, PLC,		
31	1	*	PLUG, FIXED, 38 POLE VARICON		S25183 - 0205984
			(1) PLD.		
32	11	*	SOCKET TERMINAL, STRAIGHT ENTRY, FREE		S27893 - 0379539
33	11	*	INSULATOR, SOCKET TERMINAL		S27893 - 0379555
34	2		SPADE CONNECTOR, CRIMP FEMALE.		-0629102
35	94	*	SOLDER CONTACT, VARICON		S25124 - 0210276
36	1	*	INSULATING COVER, RED, XLR		S25131 - C4C3844
37	6	*	INSULATING WASHER		-0463005
38	25	*+	TY-RAP FOR 1·5-44·0 DIA		S19100-0250641
39					
			CABLE		
40	1m	*	PSF 1/7		S17355 - 038219X
41	A/R	*+	PUF1/3M BLACK		S14708 - 0201540
42	A/R	*+	PUF1/3M PINK		S14708 - 037586C
43	A/R	*+	PUF1/3M BROWN		S14708 - 020150E
44	A/R	*+	PUF1/3M RED		S14708 - 0201532
45	A/R	*+	PUF1/3M ORANGE		S14708 - 0201488
46	A/R	*+	PUF1/3M YELLOW		S14708 - 020155?
47	A/R	*+	PUF1/3M GREEN		S14708 - 0201496
48	A/R	*+	PUF1/3M BLUE		S14708 - 020147X
49	A/R	*+	PUF1/3M VIOLET		S14708 - 0201567
50	A/R	*+	PUF1/3M RED/WHITE		S14708 - 040618C
51	A/R	*+	PUF1/3M SLATE		S14708 - 020151E

BBC

DS / PLA4

CD2L/41 PARTS LIST

DRN.	MPF
TPD	
CKD.	
APPD.	R.B.D.

D & ED

D63922 A4

SHT 3 OF 7

ISS.	CHANGE	
1	5/9/89	

ITEM No.	No. OFF		DESCRIPTION	C'C'T REF	BBC REF. OR DRG. No.
52	A/R	*+	PUF1/3M ORANGE/WHITE		S14708 - 0406093
53	A/R	*+	PUF1/3M SLATE / WHITE		S14708 - 0406121
54	A/R	*+	PUF1/3M BROWN / WHITE		S14708 - 0406113
55	A/R	*+	PUF 1/3M GREEN/WHITE		S14708 - 0406105
56					
57					
58	A/R	*+	PSN2/4M BLUE/WHITE		S12403 - 0216919
59	A/R	*+	PSN2/4M ORANGE/WHITE		S12403 - 0216927
60	A/R	*+	PSN2/4M GREEN/WHITE		S12403 - 0216935
61	A/R	*+	PSN2/4M BROWN/WHITE		S12403 - 0216943
62	A/R	*+	PSN2/4M SLATE/WHITE		S12403 - 0216951
63	A/R	*+	PSN2/4M BROWN/RED		S12403 - 0216994
64	A/R	*+	PSN2/4M GREEN/RED		S12403 - 0216986
65					
66	A/R	*+	PUN1/1M BLACK		S14626 - 0216568
67					
68	A/R	*+	PUF1/5M BLUE		S14739 - 020253X
69	A/R	*+	PUF1/5M ORANGE		S14739 - 0202505
70	A/R	*+	PUF1/5M GREEN		S14739 - 0202521
71	A/R	*+	PUF1/5M BROWN		S14739 - 0202485
72	A/R	*+	PUF 1/5M SLATE		S14739 - 0216769
73	A/R	*+	PUF1/5M WHITE		S14739 - 0216777
74	A/R	*+	PUF1/5M GREEN / YELLOW		S14739 - 021678[illegible]
75					
76					
77					

BBC
DS/PLA4

CD2L/41
PARTS LIST

DRN.	NPF
TPD	
CKD	
APPD	R.B.D.

D & ED

D63922 A4

SHT 4 OF 7

ISS.	CHANGE
1	5/2/85

ITEM No.	No. OFF		DESCRIPTION	C'C'T REF.	BBC REF. OR DRG. No.
78	A/R	*+	SLEEVING, SYMEL, 1·5mm BORE, WHITE		0254100
79	50	*	BINDING, WHITE, 25·4 x 3·0 BORE		S19768-0052059
80	A/R	*+	PUF1/6M ORANGE		S14708 – 0201488
81	A/R	*+	PUF1/6M GREEN		S14708 – 0201496
82	A/R	*+	PUF1/6M BROWN		S14708 – 0201508
83	A/R	*+	PUF1/6M SLATE		S14708 – 0201516
84	A/R	*+	PUF1/6M WHITE		S14708 – 0201524
85					
86					
87	0·5m	*+	MAINS CABLE, 6AMP, 3CORE		– 0602874
			FIXINGS		
100	8	*	M3x16 LG, VARICON MOUNTING SCREWS		S25135 – 0384151
101	4	*	JACK POST ASSEMBLIES, D TYPE		S25150 – 0377384
102					
103	2	*	THUMBSCREW KIT (PAIR OFF)		– 0626769
					FOR FIXING ITEMS
104	4		M2·5 x 8 LG, INST HD, M.S., CHR. PL.		14
105	10		M2·5 x 6 LG, M.S. Zn PL, PAN HD		1
106	26		M2·5 x 10 LG, MS, Zn PL, PAN HD		16, 21, 20
107					
108	17		M3 x 8 LG, CH PL, Ms, INST HD		27, 29, 30, 34
109	2		M3 x 8 LG, Ms, Zn PL, PAN HD		5
110	1		M3 x 10, M.S, Zn PL, PAN HD		126
112	24		NUT, FULL, HEX, M2·5		20, 21

BBC S/PLA4

CD2L/41 PARTS LIST

DRN.	MPF
TPD.	
CKD.	
APPD.	R.B.D.

D&ED

D63922 A4

SHT 5 OF 7

D63922 A4

ISS.	CHANGE
1	5/9/89

ITEM No.	No. OFF		DESCRIPTION	C'C'T REF	BBC REF. OR DRG. No.
113	24		NUT, FULL, HEX, M3		22,27,29,30,31.
114	2	*	NUT, LOCKING, M3, BINX BX213		0629393
115	36		WASHER, PLAIN, M2·5		1,20,21.
116	18		WASHER, PLAIN, M3		5,27,29,30.
117					
118					
119	1	*	P CLIP, 6·4 Ø, FIXED.		S19095-0052513
120	1	*+	MAINS WARNING LABEL 26x80, SELF ADHESIVE		S54977-0256984
121	9		SOLDER TAG, SINGLE ENDED, M3		
122	1	*	EARTH TAG, DOUBLE ENDED		-0629176
123					
124					
125					
126	1	*	SPACER, M3 x 5mm TAPPED		-0211352
140	1		CARTON CARDBOARD TO SPEC ED/CD2L/41		

Notes:

*	Denotes items supplied to the contractor on embodiment loan
*+	Denotes items supplied to the contractor on embodiment loan, requiring special costing or supply action by B.B.C.
θ*	Denotes components supplied and fitted by B.B.C. on test.
θ+	Denotes coded plug in units supplied and fitted by B.B.C. on test.
Ø	Denotes items supplied and fitted by B.B.C. on installation.

BBC
DS/PLA4

CD2L/41
PARTS LIST

DRN.	MPF
TPD.	
CKD.	
APPD.	R.B.D.

D&ED
D63922 A4
SHT 6 OF 7

SHT.	ISS.	DETAILS OF CHANGE	SHT.	ISS.	DETAILS OF CHANGE

ORIGINAL
FRAME SIZE
190mm x 277mm

ALL DIMENSIONS IN MILLIMETRES UNLESS
OTHERWISE STATED

BBC

VM 418/A4

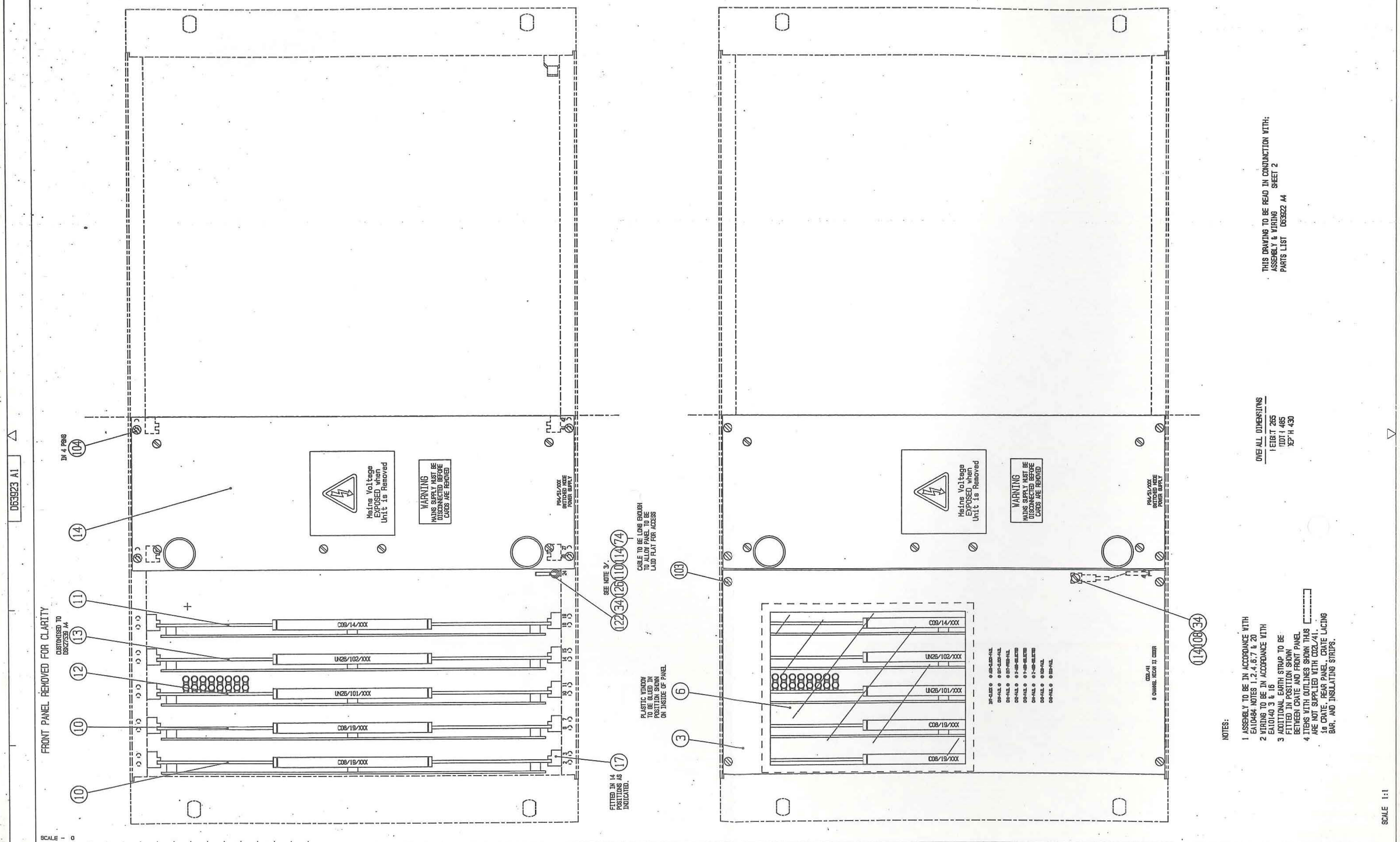
DESIGNS DEPARTMENT

CODE CD2L/41 5/9/89

PARTS LIST CHANGE RECORD, ISSUE :- 1

D63922 A4

SHEET 7



FRONT PANEL REMOVED FOR CLARITY
CUSTOMISED TO DSK27539 A4
IN 4 POSNS
Mains Voltage EXPOSED when Unit is Removed
WARNING MAINS SUPPLY MUST BE DISCONNECTED BEFORE CARDS ARE REMOVED
SWITCHED MODE POWER SUPPLY
C09/14/XXX
UN26/102/XXX
UN26/101/XXX
C08/19/XXX
SEE NOTE 3.
CABLE TO BE LONG ENOUGH TO ALLOW PANEL TO BE LAID FLAT FOR ACCESS
FITTED IN 14 POSITIONS AS INDICATED.
PLASTIC WINDOW TO BE GLUED IN POSITION SHOWN ON INSIDE OF PANEL
OVERALL DIMENSIONS
THIS DRAWING TO BE READ IN CONJUNCTION WITH:
ASSEMBLY & WIRING SHEET 2
PARTS LIST D63922 A4
NOTES:
1 ASSEMBLY TO BE IN ACCORDANCE WITH EA10484 NOTES 1,2,4,6,7 & 20
2 WIRING TO BE IN ACCORDANCE WITH EA10140 3 & 16
3 ADDITIONAL EARTH STRAP TO BE FITTED IN POSITION SHOWN BETWEEN CRATE AND FRONT PANEL
4 ITEMS WITH OUTLINES SHOWN THUS ARE NOT SUPPLIED WITH CD2L/41. ie CRATE, REAR PANEL, CRATE LACING BAR, AND INSULATING STRIPS.
SCALE 1:1
D63923 A1

SCALE – 0

THIRD ANGLE PROJECTION

ORIGINAL FRAME SIZE 574mm X 821mm

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CD2L/41 ASSEMBLY & WIRING

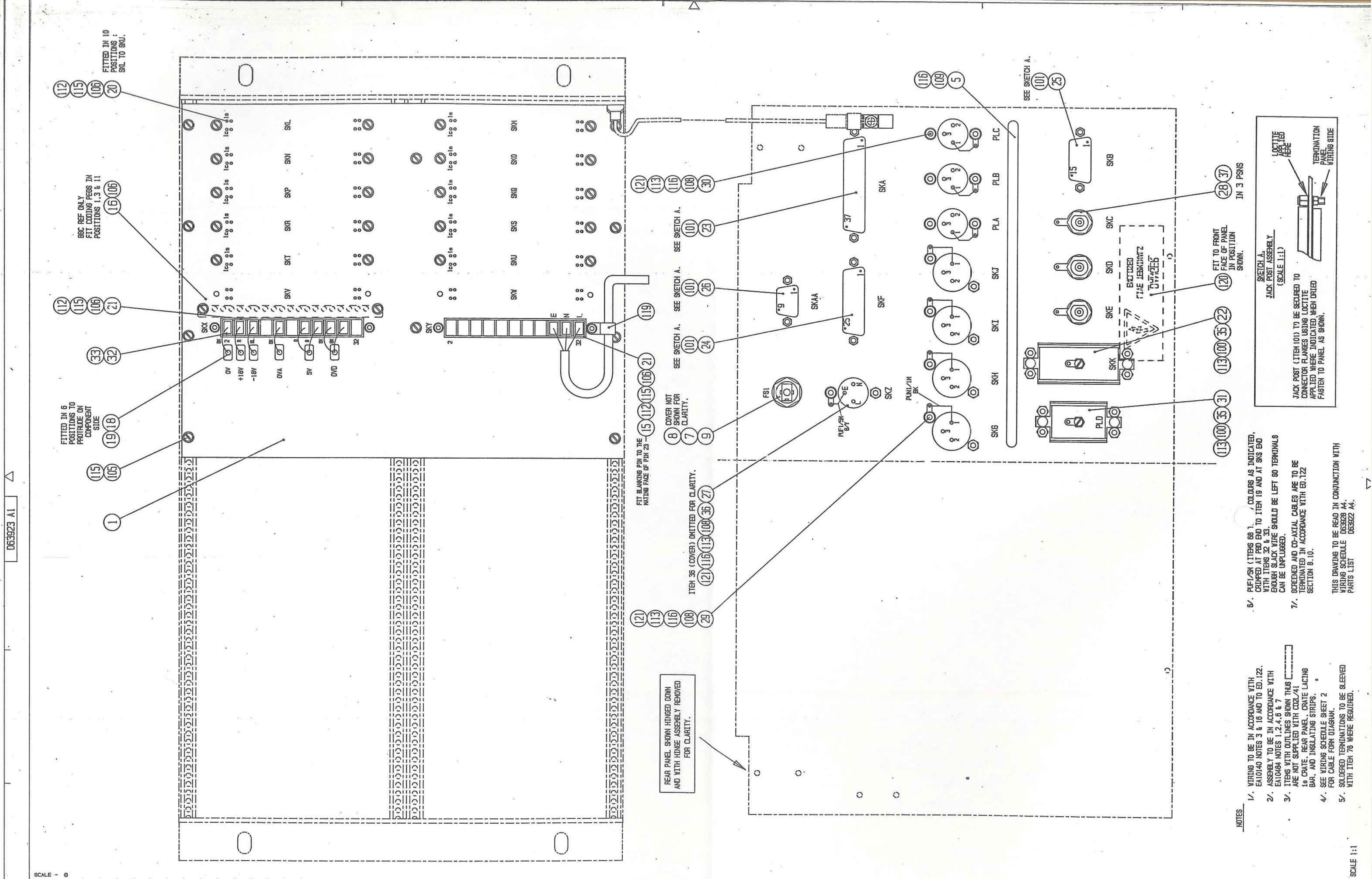
All dimensions in millimetres unless otherwise stated: Normal tolerances: no decimal places ± 1 mm, one decimal place ± 0.3mm, two decimal places ± 0.1mm. Unless otherwise stated

PLTD. | TCD. | CKD. | APPD.

DESIGN AND EQUIPMENT DEPARTMENT

D63923 A1

SHT 1 OF 2 SHTS



D63923 A1
FITTED IN 10 POSITIONS : SKL TO SKU.
BBC REF ONLY FIT CODING PEGS IN POSITIONS 1,3 & 11
FITTED IN 6 POSITIONS TO PROTRUDE ON COMPONENT SIDE
FIT BLANKING PIN TO THE MATING FACE OF PIN 23
COVER NOT SHOWN FOR CLARITY.
ITEM 36 (COVER) OMITTED FOR CLARITY.
REAR PANEL SHOWN HINGED DOWN AND WITH HINGE ASSEMBLY REMOVED FOR CLARITY.
SEE SKETCH A.
FIT TO FRONT FACE OF PANEL IN POSITION SHOWN.
IN 3 PSNS
SKETCH A. JACK POST ASSEMBLY (SCALE 1:1)
LOCTITE APPLIED HERE
TERMINATION PANEL WIRING SIDE
JACK POST (ITEM 101) TO BE SECURED TO CONNECTOR FLANGES USING LOCTITE APPLIED WHERE INDICATED. WHEN DRIED FASTEN TO PANEL AS SHOWN.
SKL SKN SKP SKR SKT SKV SKM SKO SKQ SKS SKU SKW SKX SKY
0V +18V -18V 0VA 5V 0VD
FS1 SKZ SKAA SKF SKA SKB SKC SKD SKE SKK PLD PLA PLB PLC SKG SKH SKI SKJ
NOTES
1/. WIRING TO BE IN ACCORDANCE WITH EA10140 NOTES 3 & 18 AND TO ED.122.
2/. ASSEMBLY TO BE IN ACCORDANCE WITH EA10484 NOTES 1,2,4,6 & 7
3/. ITEMS WITH OUTLINES SHOWN THUS ARE NOT SUPPLIED WITH CD2L/41 ie CRATE, REAR PANEL, CRATE LACING BAR, AND INSULATING STRIPS.
4/. SEE WIRING SCHEDULE SHEET 2 FOR CABLE FORM DIAGRAM.
5/. SOLDERED TERMINATIONS TO BE SLEEVED WITH ITEM 78 WHERE REQUIRED.
6/. PUF1/SH (ITEMS 68) COLOURS AS INDICATED, CRIMPED AT PRD END TO ITEM 19 AND AT SKS END WITH ITEMS 32 & 33. ENOUGH SLACK WIRE SHOULD BE LEFT SO TERMINALS CAN BE UNPLUGGED.
7/. SCREENED AND CO-AXIAL CABLES ARE TO BE TERMINATED IN ACCORDANCE WITH ED.122 SECTION 8.10.
THIS DRAWING TO BE READ IN CONJUNCTION WITH WIRING SCHEDULE D63928 A4. PARTS LIST D63922 A4.
SCALE 1:1

SCALE - 0

THIRD ANGLE PROJECTION

ORIGINAL FRAME SIZE 574mm X 821mm

CD2L/41 ASSEMBLY & WIRING

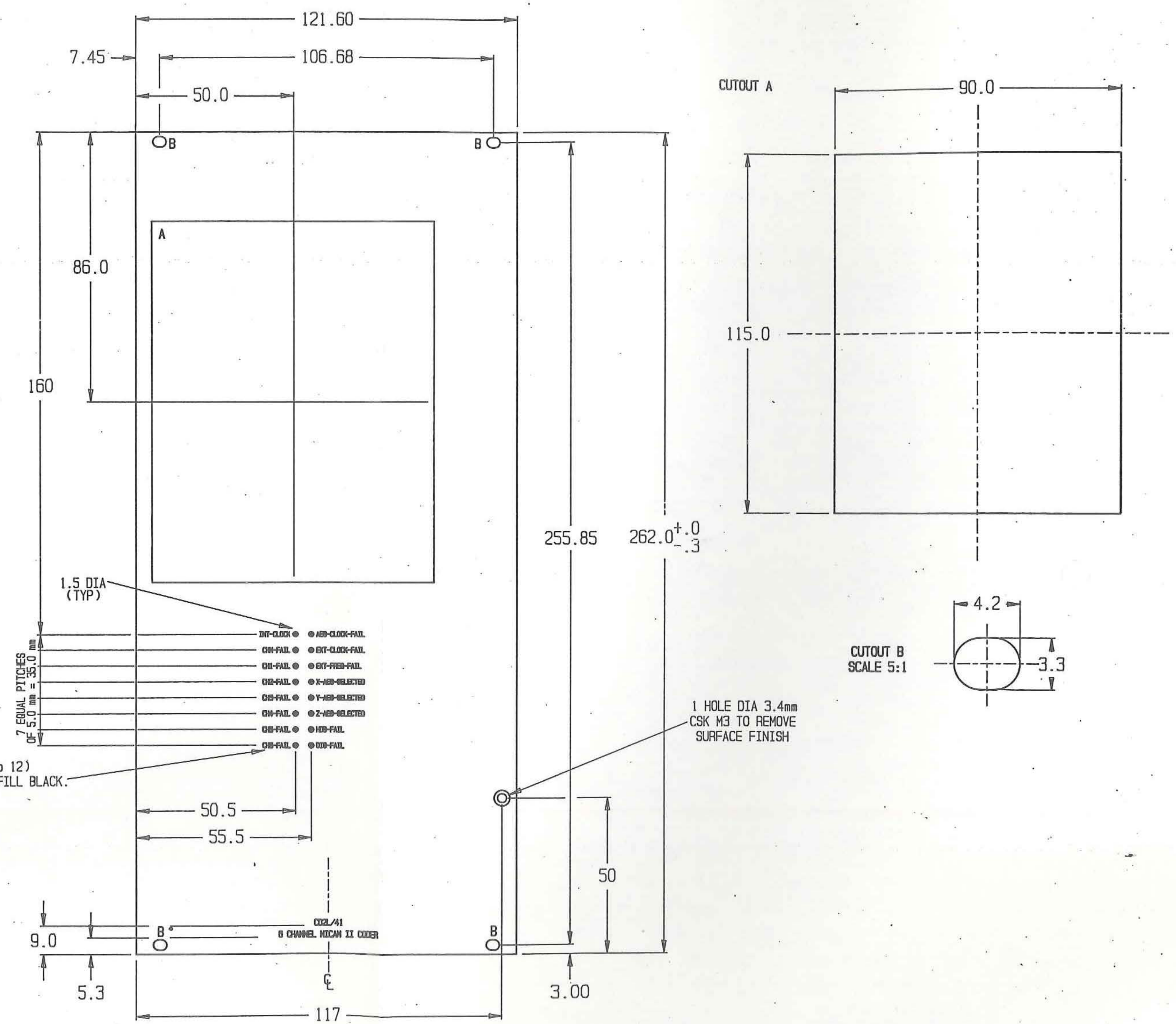
All dimensions in millimetres unless otherwise stated: Normal tolerances: no decimal place ± 1 mm; one decimal place ± 0.3mm; two decimal places ± 0.1mm — Unless otherwise stated

PLTD. MRF | TCD. | CKD. | APPD.

DESIGN AND EQUIPMENT DEPARTMENT

D63923 A1

SHT 2 OF 2 SHTS



MATERIAL

2.5 mm THK AL.ALLOY
NS4-H6 TO BS1470

FINISH

SPRAY PAINT TO TRIMITE COLOUR
R33846S 60/3 (PALE BLUE).

SILK SCREEN PRINT FRONT PANEL
TO D63929 A2. BLACK CHARACTERS.

ALTERNATIVELY ENGRAVE FRONT PANEL
AS DESCRIBED.
ENGRAVING TO BE IN 1.9mm HIGH
CHARACTERS FILLED BLACK. DO NOT
ENGRAVE DIMS OR DIM LINES.

SCALE - 0

THIRD ANGLE PROJECTION

ORIGINAL FRAME SIZE 400mm X 574mm

CHANGE	18/8/88
ISS	1

BBC

CD2L/41 DETAIL 1 FRONT PANEL

All dimensions in millimetres unless otherwise stated:
Normal tolerances:
no decimal place- ± 1 mm Unless
one decimal place- ± 0.3mm otherwise
two decimal places ± 0.1mm stated

PLTD.	MPF
TCD.	
CKD.	
APPD.	R.B.D.

DESIGN AND EQUIPMENT DEPARTMENT

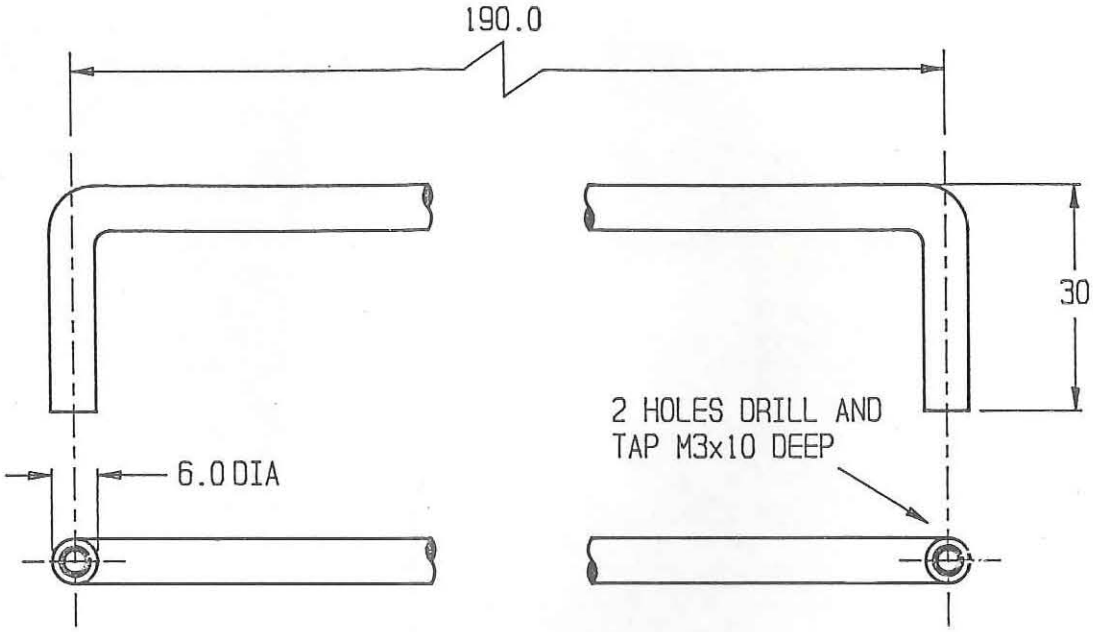
D63924 A2

D63925 A4

ORIGINAL FRAME SIZE 190mm x 277mm

THIRD ANGLE PROJECTION

All dimensions in millimetres unless otherwise stated:
Normal tolerances:
no decimal place - ± 1 mm
one decimal place - ± 0.3 mm
two decimal places - ± 0.1 mm
Unless otherwise stated



DETAIL 2 - REAR PANEL LACING BAR

MATERIAL :- ALUMINIUM ALLOY BAR TO HE 15 TF DIA 6.0mm

FINISH :- CLEAN AND FREE FROM BURRS

SCALE 1:1 PARTS LIST D63922 A4

SCALE - 0

BBC

D3I\CADKEY\A4-1

ISS	CHANGE
1	21/7/89

CD2L/41 DETAIL 2

PLTD.	M P F	DESIGN AND EQUIPMENT DEPARTMENT
TCD.		
CKD.		D63925 A4
APPD.	R.B.A.	

D63928 A4

ORIGINAL FRAME SIZE 190mm x 277mm

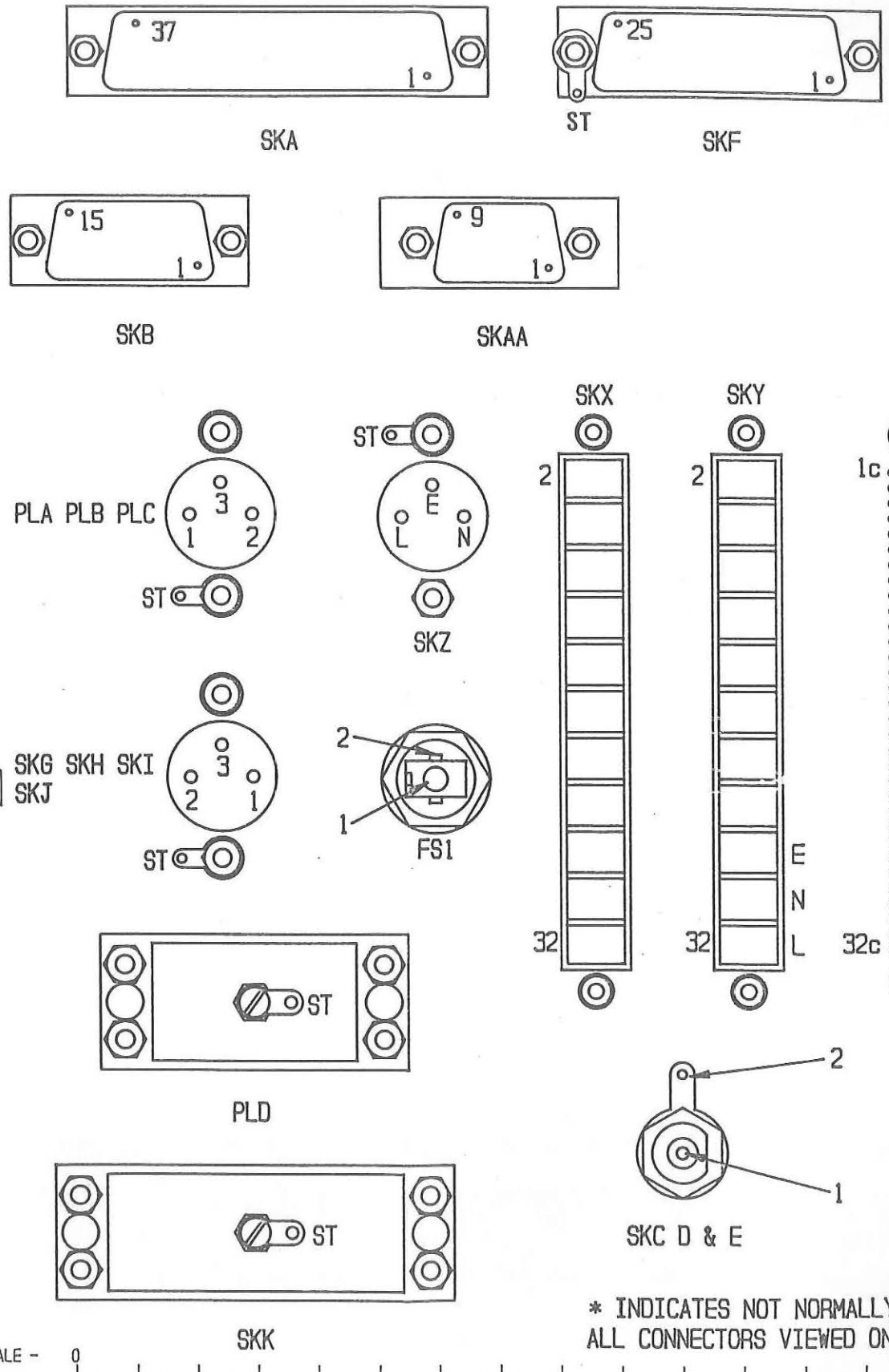
THIRD ANGLE PROJECTION

All dimensions in millimetres unless otherwise stated:
Normal tolerances:

			Unless otherwise stated
no decimal place	-	± 1 mm	
one decimal place	-	± 0.3 mm	
two decimal places	-	± 0.1 mm	

BBC

DSI\CADKEY\M4-1



* INDICATES NOT NORMALLY FITTED
ALL CONNECTORS VIEWED ON PINS

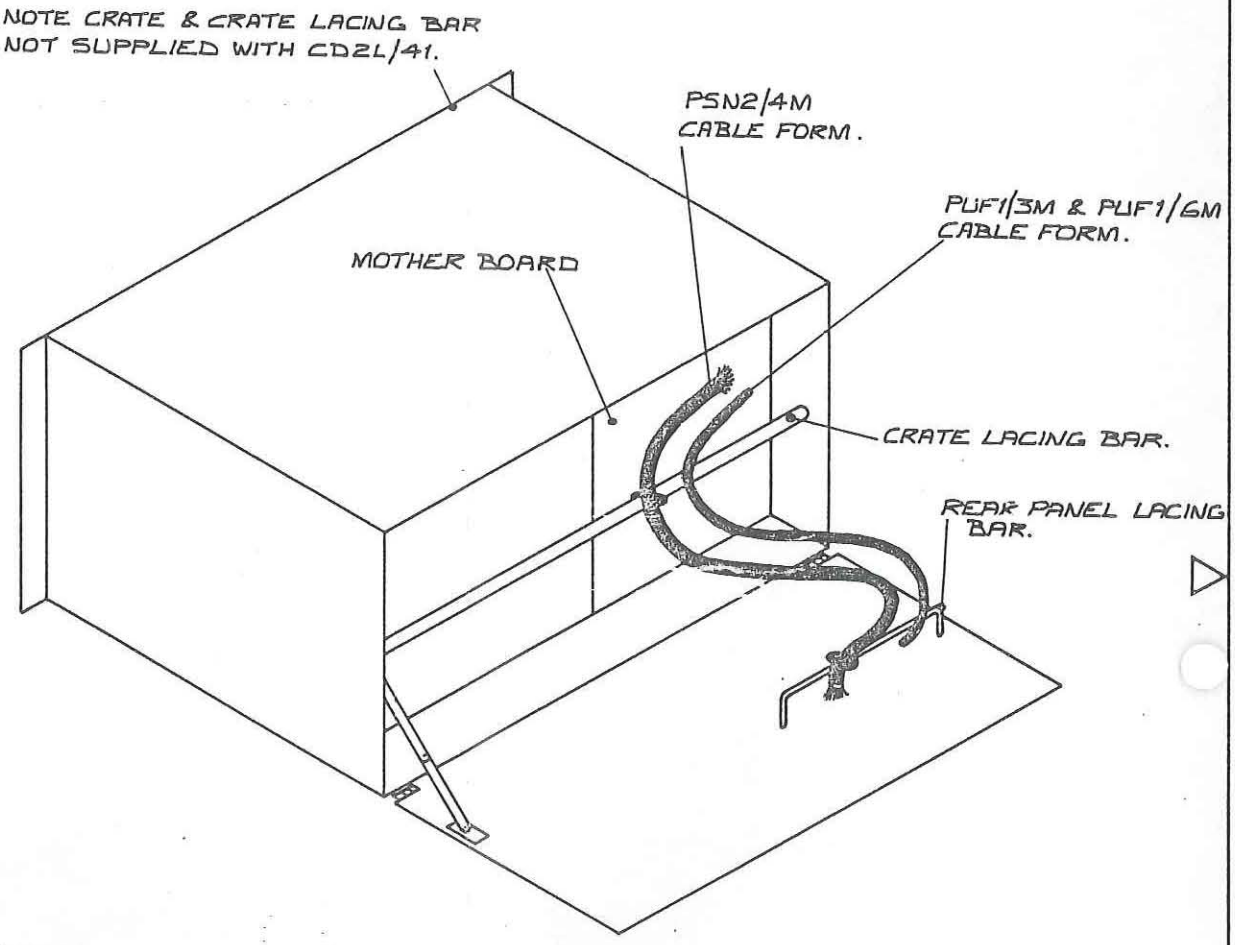
SCALE - 0

ISS	CHANGE
1	20/7/88

CD2L/41 WIRING SCHEDULE

PLTD.	MPF	DESIGN AND EQUIPMENT DEPARTMENT
TCD.		
CKD.		D63928 A4
APPD.	R.B.I.	SHT 1 OF 12

GENERAL LAY OF CABLE FORMS



NOTES :-

1. CABLE FORMS MUST BE SECURELY FIXED TO LACING BARS SO THAT NO CABLES MOVE AT THEIR JOINTS WHEN REAR PANEL IS OPENED OR CLOSED.
2. SECURE CABLES WITH TY-RAPS ITEM 37 ON P/L.
3. CABLE FORMS TO BE 'GOOSE NECK' IN SHAPE SO THEY WILL COIL AND FIT NEATLY WITHIN CRATE WHEN REAR PANEL CLOSED (SEE ED 122 SECTION B7.10).
4. CABLES TO BE SLEEVED AND TERMINATED IN ACCORDANCE WITH ED 122.

SCALE:- 0

ORIGINAL FRAME SIZE 190mm x 277mm

THIRD ANGLE PROJECTION

All dimensions in millimetres unless otherwise stated:
Normal tolerances:
no decimal place – ± 1 mm unless
one decimal place – ± 0.3 mm otherwise
two decimal places – ± 0.1 mm stated

BBC

DS/A4

ISS	CHANGE
1	15/1/90

CD2L/41 WIRING SCHEDULE

DRN.	MPF	D & E.D.
TCD.		D63928A4
CKD.		
APPD.	A.B.H.	SHT 2 OF 14

R297

ISS	CHANGE	
1	19/1/90	

ITEM No.	CROSS REF.	Level	FROM COMP	FROM TAG	TO COMP	TO TAG	WIRE TYPE	COLOUR	ROUTE VIA 1	ROUTE VIA 2	GP or FM	REMARKS
1	5		PLA	1	PLA	S.T.	PUN1/1M	BK				
2			"	"			PSN2/4M	SCN				
3	408		"	2	SKR	18C	"	B				
4	407		"	3	"	18A	"	W				
5	1R		"	S.T	PLA	1	PUN1/1M	BK				
6												
7												
8	12		PLB	1	PLB	S.T.	PUN1/1M	BK				
9			"	"			PSN2/4M	SCN				
10	410		"	2	SKR	19C	"	O				EBU OUT
11	409		"	3	"	19A	"	W				
12	8R		"	S.T.	PLB	1	PUN1/1M	BK				
13												
14												
15	19		PLC	1	PLC	S.T.	PUN1/1M	BK				
16			"	"			PSN2/4M	SCN				
17	412		"	2	SKR	20C	"	G				
18	411		"	3	"	20A	"	W				
19	15R		"	S.T.	PLC	1	PUN1/1M	BK				
20												
21												
22	247		PLD	A	SKM	2A	PSN2/4M	SCN				CH1 IN
23	284		"	B	SKO	1A	"	S				" 2 "
24	285		"	C	"	1C	"	W				" " "
25	253		"	D	SKM	6A	"	SCN				" 3 "
26	245		"	E	"	1A	"	BN				" 1 "
27	246		"	F	"	1C	"	W				" " "
28	286		"	H	SKO	2A	"	SCN				" 2 "
29	251		"	J	SKM	5A	"	B				" 3 "
30	252		"	K	"	5C	"	R				" " "
31	293		"	L	SKO	6A	"	SCN				" 4 "
32			"	M								N/U
33			"	N								"
34	260		"	P	SKM	10A	PSN2/4M	SCN				CH5 IN
35	291		"	R	SKO	5A	"	O				" 4 "
36	292		"	S	"	5C	"	R				" " " AUDIO IN
37	258		"	T	SKM	9A	"	G				" 5 "
38	259		"	U	"	9C	"	R				" " "
39			"	V								N/U
40			"	W								"
41			"	X								"
42			"	Y								"
43	298		"	Z	SKO	9A	PSN2/4M	BN				CH 6 IN
44	299		"	AA	"	9C	"	R				" " "
45			"	BB								N/U
46			"	CC								"
47			"	DD	SKO	10A	PSN2 4M	SCN				CH 6 IN
48			"	EE								N/U
49			"	↓								"
50			"	JJ								"

BBC

VM441A4/1

CD2L/41 WIRING SCHEDULE

DRN	MPF	D & E.D.
CKD		D63928 A4
APPD	R.E.P.	SHT 3 OF 14

ISS	1
CHANGE	16/1/80

ITEM No.	CROSS REF.	level	FROM COMP	FROM TAG	TO COMP	TO TAG	WIRE TYPE	COLOUR	ROUTE VIA 1	ROUTE VIA 2	GP or FM	REMARKS
51			PLD	KK								N/U
52			"	↓								"
53			"	↓								"
54			"	TT								"
55												
56												
57												
58												
59	332		SKA	1	SKP	13C	PUF1/3M	P				
60	330		"	2	"	12C	"	R				
61	336		"	3	"	15C	"	Y				
62	334		"	4	"	14C	"	B				
63	353		"	5	"	24A	"	S				
64	361		"	6	"	28A	"	R/W				
65	76		"	"	SKA	17	"	"				
66	339		"	7	SKP	17A	"	BN				
67	337		"	8	"	16A	"	O				
68	343		"	9	"	19A	"	G				
69	341		"	10	"	18A	"	V				
70	360		"	11	"	27C	"	G/W				
71	348		"	12	"	21C	"	P				
72	346		"	13	"	20C	"	R				
73	352		"	14	"	23C	"	Y				
74	350		"	15	"	22C	"	B				
75	355		"	16	"	25A	"	S/W				
76	65R		"	17	SKA	6	"	R/W				
77	79		"	"	"	19	"	"				
78	416		"	18	SKR	22C	"	G/W				CHANNEL 1-6 SIGNAL BITS + STROBES.
79	77R		"	19	SKA	17	"	R/W				
80	91		"	"	"	30	"	"				
81	331		"	20	SKP	13A	"	BN				
82	329		"	21	"	12A	"	O				
83	335		"	22	"	15A	"	G				
84	333		"	23	"	14A	"	V				
85	358		"	24	"	26C	"	O/W				
86	340		"	25	"	17C	"	P				
87	338		"	26	"	16C	"	R				
88	344		"	27	"	19C	"	Y				
89	342		"	28	"	18C	"	B				
90	354		"	29	"	24C	"	W				
91	80R		"	30	SKA	19	"	R/W				
92	347		"	31	SKP	21A	"	BN				
93	345		"	32	"	20A	"	O				
94	351		"	33	"	23A	"	G				
95	349		"	34	"	22A	"	V				
96	362		"	35	"	28C	"	BN/W				
97	415		"	36	SKR	22A	"	O/W				
98	417		"	37	"	23A	"	S/W				
99												
100												

BBC	CD2L/41 WIRING SCHEDULE	DRN	MPF	D & E.D.
VM441A4/1		CKD		D63928 A4
		APPD	K.G.F.	SHT 4 OF 14

ISS	CHANGE
1	15/1/90

ITEM No.	CROSS REF.	level	FROM COMP	FROM TAG	TO COMP	TO TAG	WIRE TYPE	COLOUR	ROUTE VIA 1	ROUTE VIA 2	GP or FM	REMARKS
101												
102												
103	584		SKB	1	PB1	0V	PUF1/6M	BK				
104	586		"	2	"	+18V	"	R				
105	116		"	"	SKB	10	"	"				
106			"	3								N/U
107	588		"	4	PB1	-18V	PUF1/6M	B				
108	118		"	"	SKB	12	"	"				
109			"	5								N/U
110	591		"	6	PB1	+5V	PUF1/6M	O				POWER SUPPLY
111	120		"	"	SKB	14	"	"				WIRING. NOTE: PB1
112			"	7								N/U REFERS TO BLADES
113	593		"	8	PB1	0VD	PUF1/6M	BK				MOUNTED ON PB1
114	121		"	"	SKB	15	"	"				ADJACENT TO SKV.
115			"	9								N/U
116	105R		"	10	SKB	2	PUF1/6M	R				
117			"	11								N/U
118	108R		"	12	SKB	4	PUF1/6M	B				
119			"	13								N/U
120	111R		"	14	SKB	6	PUF1/6M	O				
121	114R		"	15	"	8	"	BK				
122												
123												
124												
125												
126	396		SKC	1	SKR	6A	PSF1/7M	INNER				HDB3 O/P
127	397		"	2	"	6C	"	SCN				
128												
129												
130	401		SKD	1	SKR	9A	PSF1/7M	INNER				2048 KHz
131	402		"	2	"	9C	"	SCN				
132												
133												
134	357		SKE	1	SKP	26A	PSF1/7M	INNER				16 MHz I/P
135	359		"	2	"	27A	"	SCN				
136												
137												
138	318		SKF	1	SKP	6A	PUF1/3M	B/W				
139	319		"	2	"	6C	"	B/O				
140	320		"	3	"	7A	"	B/G				
141	321		"	4	"	7C	"	B/BN				
142	322		"	5	"	8A	"	B/S				CHANNEL FAIL
143	323		"	6	"	8C	"	R/B				
144	324		"	7	"	9A	"	R/O				
145	325		"	8	"	9C	"	R/G				
146	313		"	9	"	1C	"	R/W				
147	155		"	10	"	S.T.	"	BK				0V
148			"	11								N/U
149			"	12								"
150			"	13								"

BBC

VM441A4/1

CD2L/41 WIRING SCHEDULE

DRN	MPF	D & E.D.
CKD		D63928 A4
APPD	K.B.D.	SHT 5 OF 14

ISS	CHANGE
1	19/1/90

ITEM No.	CROSS REF.	level	FROM COMP	FROM TAG	TO COMP	TO TAG	WIRE TYPE	COLOUR	ROUTE VIA 1	ROUTE VIA 2	GP or FM	REMARKS
151			SKF	18								N/U
152			"	↓								"
153			"	↓								"
154			"	25								"
155	147R		"	S.T.	SKF	10	PUF1/3M	BK				
156												
157												
158												
159	163		SKG	1	SKG	S.T.	PUN1/1M	BK				
160			"	"			PSN2/4M	SCN				
161	380		"	2	SKQ	29C	"	S				
162	379		"	3	"	29A	"	R				
163	159R		"	S.T.	SKG	1	PUN1/1M	BK				
164												
165												
166	170		SKH	1	SKH	S.T.	PUN1/1M	BK				
167			"	"			PSN2/4M	SCN				
168	382		"	2	SKQ	30C	"	W				
169	381		"	3	"	30A	"	R				
170	166R		"	S.T.	SKH	1	PUN1/1M	BK				
171												EBU IN
172												
173	177		SKI	1	SKI	S.T.	PUN1/1M	BK				
174			"	"			PSN2/4M	SCN				
175	384		"	2	SKQ	31C	"	B				
176	383		"	3	"	31A	"	W				
177	173R		"	S.T.	SKI	1	PUN1/1M	BK				
178												
179												
180	184		SKJ	1	SKJ	S.T.	PUN1/1M	BK				
181			"	"			PSN2/4M	SCN				
182	386		"	2	SKQ	32C	"	O				
183	385		"	3	"	32A	"	W				
184	180R		"	S.T.	SKJ	1	PUN1/1M	BK				
185												
186												
187	457		SKK	A	SKU	3A	PSN2/4M	SCN				CH 1 OUT
188	459		"	B	"	4A	"	O				" 2 "
189	460		"	C	"	4C	"	W				" " "
190	469		"	D	"	9A	"	SCN				" 3 "
191	453		"	E	"	1A	"	B				" 1 "
192	454		"	F	"	1C	"	W				" " "
193	463		"	H	"	6A	"	SCN				" 2 "
194	465		"	J	"	7A	"	G				" 3 "
195	466		"	K	"	7C	"	W				" " "
196	475		"	L	"	12A	"	SCN				" 4 "
197	477		"	M	"	13A	"	S				" 5 "
198	478		"	N	"	13C	"	W				" " "
199	487		"	P	"	18A	"	SCN				" 6 "
200	471		"	R	"	10A	"	BN				" 4 "

BBC

VM441A4/1

CD2L/41 WIRING SCHEDULE

DRN	MPF	D.R.E.D.
CKD		D63928 A4
APPD	R.B.D	SHT 6 OF 14

ISS	CHANGE
1	19/1/90

ITEM No.	CROSS REF.	level	FROM COMP	FROM TAG	TO COMP	TO TAG	WIRE TYPE	COLOUR	ROUTE VIA 1	ROUTE VIA 2	GP or FM	REMARKS
201	472		SKK	S	SKU	10C	PSN2/4M	W				CH4 OUT
202	481		"	T	"	15A	"	SCN				" 5 "
203	483		"	U	"	16A	"	B				" 6 "
204	484		"	V	"	16C	"	R				" " "
205			"	W								N/U
206			"									"
207			"									"
208			"									"
209			"									"
210			"	t								"
211	493		"	u	SKU	22A	PSN2/4M	B				CH 1 MON
212	494		"	v	"	22C	"	W				" " "
213	495		"	w	"	23A	"	SCN				" 2 "
214	501		"	x	"	26A	"	G				" 3 "
215	502		"	y	"	26C	"	W				" " "
216	491		"	z	"	21A	"	SCN				" 1 "
217	497		"	AA	"	24A	"	O				" 2 "
218	498		"	BB	"	24C	"	W				" " "
219	499		"	CC	"	25A	"	SCN				" 3 "
220	505		"	DD	"	28A	"	BN				" 4 "
221	506		"	EE	"	28C	"	W				" " "
222	507		"	FF	"	29A	"	SCN				" 5 "
223	513		"	HH	"	32A	"	B				" 6 "
224	514		"	JJ	"	32C	"	R				" " "
225	503		"	KK	"	27A	"	SCN				" 4 "
226	509		"	LL	"	30A	"	S				" 5 "
227	510		"	MM	"	30C	"	W				" " "
228	511		"	NN	"	31A	"	SCN				" 6 "
229												
230												
231												
232												
233			SKL	1A								N/U
234			"	1C								"
235			"									"
236			"									"
237			"									"
238			"									"
239			"	32A								"
240			"	32C								"
241												
242												
243												
244												
245	26R		SKM	1A	PLD	E	PSN2/4M	BN				
246	27R		"	1C	"	F	"	W				
247	22R		"	2A	"	A	"	SCN				
248			"	2C								N/U
249			"									"
250			"	4C								"

BBC

VM441A4/1

CD2L/41 WIRING SCHEDULE

DRN	MPF	D & E. D.
CKD		D63928 A4
APPD	K.G.A.	SHT 7 OF 14

ISS	CHANGE
1	19/1/90

ITEM No.	CROSS REF.	level	FROM COMP	FROM TAG	TO COMP	TO TAG	WIRE TYPE	COLOUR	ROUTE VIA 1	ROUTE VIA 2	GP or FM	REMARKS
251	29R		SKM	5A	PLD	J	PSN2/4M	B				
252	30R		"	5C	"	K	"	R				
253	25R		"	6A	"	D	"	SCN				
254			"	6C								N/U
255			"	↓								"
256			"	↓								"
257			"	8C								"
258	37R		"	9A	PLD	T	PSN2/4M	G				
259	38R		"	9C	"	U	"	R				
260	34R		"	10A	"	P	"	SCN				
261			"	10C								N/U
262			"	↓								"
263			"	↓								"
264			"	↓								"
265			"	↓								"
266			"	32A								"
267			"	32C								"
268												
269												
270												
271												
272			SKN	1A								N/U
273			"	1C								"
274			"	↓								"
275			"	↓								"
276			"	↓								"
277			"	↓								"
278			"	32A								"
279			"	32C								"
280												
281												
282												
283												
284	23R		SKO	1A	PLD	B	PSN2/4M	S				
285	24R		"	1C	"	C	"	W				
286	28R		"	2A	"	H	"	SCN				
287			"	2C								N/U
288			"	↓								"
289			"	↓								"
290			"	4C								"
291	35R		"	5A	PLD	R	PSN2/4M	O				
292	36R		"	5C	"	S	"	R				
293	31R		"	6A	"	L	"	SCN				
294			"	6C								N/U
295			"	↓								"
296			"	↓								"
297			"	8C								"
298	43R		"	9A	PLD	Z	PSN2/4M	BN				
299	44R		"	9C	"	AA	"	R				
300	47R		"	10A	"	DD	"	SCN				

BBC	CD2L/41 WIRING SCHEDULE	DRN	MPF	D & E.D.
VM441A4/1		CKD		D63928 A4
		APPD	K.B.P.	SHT 8 OF 14

ISS	CHANGE
1	19/1/90

ITEM No.	CROSS REF.	level	FROM COMP	FROM TAG	TO COMP	TO TAG	WIRE TYPE	COLOUR	ROUTE VIA 1	ROUTE VIA 2	GP or FM	REMARKS
301			SKD	10C								N/U
302			"	↓								"
303			"									"
304			"									"
305			"	↓								"
306			"	32A								"
307			"	32C								"
308												
309												
310												
311												
312			SKP	1A								N/U
313	146R		"	1C	SKF	9	PUF1/3M	R/W				
314			"	2A								N/U
315			"	↓								"
316			"	↓								"
317			"	5C								"
318	138R		"	6A	SKF	1	PUF1/3M	B/W				
319	139R		"	6C	"	2	"	B/O				
320	140R		"	7A	"	3	"	B/G				
321	141R		"	7C	"	4	"	B/BN				
322	142R		"	8A	"	5	"	B/S				
323	143R		"	8C	"	6	"	R/B				
324	144R		"	9A	"	7	"	R/O				
325	145R		"	9C	"	8	"	R/G				
326			"	10A								N/U
327			"	↓								"
328			"	11C								"
329	82R		"	12A	SKA	21	PUF1/3M	O				
330	60R		"	12C	"	2	"	R				
331	81R		"	13A	"	20	"	BN				
332	59R		"	13C	"	1	"	P				
333	84R		"	14A	"	23	"	V				
334	62R		"	14C	"	4	"	B				
335	83R		"	15A	"	22	"	G				
336	61R		"	15C	"	3	"	Y				
337	67R		"	16A	"	8	"	O				
338	87R		"	16C	"	26	"	R				
339	66R		"	17A	"	7	"	BN				
340	86R		"	17C	"	25	"	P				
341	69R		"	18A	"	10	"	V				
342	89R		"	18C	"	28	"	B				
343	68R		"	19A	"	9	"	G				
344	88R		"	19C	"	27	"	Y				
345	93R		"	20A	"	32	"	O				
346	72R		"	20C	"	13	"	R				
347	92R		"	21A	"	31	"	BN				
348	71R		"	21C	"	12	"	P				
349	95R		"	22A	"	34	"	V				
350	74R		"	22C	"	15	"	B				

BBC

VM441A4/1

CD2L/41 WIRING SCHEDULE

DRN	MPF	D & E.D.
CKD		D63928 A4
APPD	R.G.L.	SHT 9 OF 14

ISS	CHANGE	
1	19/11/80	

ITEM No.	CROSS REF.	level	FROM COMP	FROM TAG	TO COMP	TO TAG	WIRE TYPE	COLOUR	ROUTE VIA 1	ROUTE VIA 2	GP or FM	REMARKS
351	94R		SKP	23A	SKA	33	PUF1/3M	G				
352	73R		"	23C	"	14	"	Y				
353	63R		"	24A	"	5	"	S				
354	90R		"	24C	"	29	"	W				
355	75R		"	25A	"	16	"	S/W				
356			"	25C								N/U
357	134R		"	26A	SKE	1	PSF1/7M	INNER				
358	85R		"	26C	SKA	24	PUF1/3M	O/W				
359	135R		"	27A	SKE	2	PSF1 7M	SCN				
360	70R		"	27C	SKA	11	PUF1/3M	G/W				
361	64R		"	28A	"	6	"	R/W				
362	96R		"	28C	"	35	"	BN/W				
363			"	29A								N/U
364			"	↓								"
365			"	↓								"
366			"	32A								"
367			"	32C								"
368												
369												
370												
371												
372			SKQ	1A								N/U
373			"	1C								"
374			"	↓								"
375			"	↓								"
376			"	↓								"
377			"	↓								"
378			"	28C								"
379	162R		"	29A	SKG	3	PSN2/4M	R				
380	161R		"	29C	"	2	"	S				
381	169R		"	30A	SKH	3	"	R				
382	168R		"	30C	"	2	"	W				
383	176R		"	31A	SKI	3	"	"				
384	175R		"	31C	"	2	"	B				
385	183R		"	32A	SKJ	3	"	W				
386	182R		"	32C	"	2	"	O				
387												
388												
389												
390												
391			SKR	1A								N/U
392			"	1C								"
393			"	↓								"
394			"	↓								"
395			"	5C								"
396	126R		"	6A	SKC	1	PSF1/7M	INNER				
397	127R		"	6C	"	2	"	SCN				
398			"	7A								N/U
399			"	↓								"
400			"	8C								"

BBC

VM441A4/1

CD2L/41 WIRING SCHEDULE

DRN	MPF	D.R.E.D.
CKD		D63928 A4
APPD	K.B.O.	SHT 10 OF 14

ISS	CHANGE
1	19/1/90

ITEM No.	CROSS REF.	level	FROM COMP	FROM TAG	TO COMP	TO TAG	WIRE TYPE	COLOUR	ROUTE VIA 1	ROUTE VIA 2	GP or FM	REMARKS
401	130R		SKR	9A	SKD	1	PSF1/7M	INNER				
402	131R		"	9C	"	2	"	SCN				
403			"	10A								N/U
404			"	↓								"
405			"	↓								"
406			"	17C								"
407	4R		"	18A	PLA	3	PSN2/4M	W				
408	3R		"	18C	"	2	"	B				
409	11R		"	19A	PLB	3	"	W				
410	10R		"	19C	"	2	"	O				
411	18R		"	20A	PLC	3	"	W				
412	17R		"	20C	"	2	"	G				
413			"	21A								N/U
414			"	21C								"
415	97R		"	22A	SKA	36	PUF1/3M	O/W				
416	78R		"	22C	"	18	"	G/W				
417	98R		"	23A	"	37	"	S/W				
418			"	23C								N/U
419			"	↓								"
420			"	↓								"
421			"	32A								"
422			"	32C								"
423												
424												
425												
426												
427			SKS	1A								N/U
428			"	1C								"
429			"	↓								"
430			"	↓								"
431			"	↓								"
432			"	↓								"
433			"	30C								"
434	566		"	31A	SKAA	1	PUF1/3M	B				
435	567		"	31C	"	2	"	O				
436	568		"	32A	"	3	"	G				
437	569		"	32C	"	4	"	BN				
438												
439												
440												
441												
442			SKT	1A								N/U
443			"	1C								"
444			"	↓								"
445			"	↓								"
446			"	↓								"
447			"	32A								"
448			"	32C								"
449												
450												

BBC

VM441A4/1

CD2L/41 WIRING SCHEDULE

DRN	MPF	D & E.D.
CKD		D63928 A4
APPD	R.B.L.	SHT 11 OF 14

ISS	CHANGE
1	19/11/90

ITEM No.	CROSS REF.	level	FROM COMP	FROM TAG	TO COMP	TO TAG	WIRE TYPE	COLOUR	ROUTE VIA 1	ROUTE VIA 2	GP or FM	REMARKS
451												
452												
453	191R		SKU	1A	SKK	E	PSN2/4M	B				
454	192R		"	1C	"	F	"	W				
455			"	2A								N/U
456			"	2C								"
457	187R		"	3A	SKK	A	PSN2/4M	SCN				
458			"	3C								N/U
459	188R		"	4A	SKK	B	PSN2/4M	O				
460	189R		"	4C	"	C	"	W				
461			"	5A								N/U
462			"	5C								"
463	193R		"	6A	SKK	H	PSN2/4M	SCN				
464			"	6C								N/U
465	194R		"	7A	SKK	J	PSN2/4M	G				
466	195R		"	7C	"	K	"	W				
467			"	8A								N/U
468			"	8C								"
469	190R		"	9A	SKK	D	PSN2/4M	SCN				
470			"	9C								N/U
471	200R		"	10A	SKK	R	PSN2/4M	BN				
472	201R		"	10C	"	S	"	W				
473			"	11A								N/U
474			"	11C								"
475	196R		"	12A	SKK	L	PSN2/4M	SCN				
476			"	12C								N/U
477	197R		"	13A	SKK	M	PSN2/4M	S				
478	198R		"	13C	"	N	"	W				
479			"	14A								N/U
480			"	14C								"
481	202R		"	15A	SKK	T	PSN2/4M	SCN				
482			"	15C								N/U
483	203R		"	16A	SKK	U	PSN2/4M	B				
484	204R		"	16C	"	V	"	R				
485			"	17A								N/U
486			"	17C								"
487	199R		"	18A	SKK	P	PSN2/4M	SCN				
488			"	18C								N/U
489			"	↓								"
490			"	20C								"
491	216R		"	21A	SKK	Z	PSN2/4M	SCN				
492			"	21C								N/U
493	211R		"	22A	SKK	W	PSN2/4M	B				
494	212R		"	22C	"	Y	"	W				
495	213R		"	23A	"	W	"	SCN				
496			"	23C								N/U
497	217R		"	24A	SKK	AA	PSN2/4M	O				
498	218R		"	24C	"	BB	"	W				
499	219R		"	25A	"	CC	"	SCN				
500			"	25C								N/U

BBC

VM441A4/1

CD2L/41 WIRING SCHEDULE

DRN	MPF	D & E.D.
CKD		D63928 A4
APPD	R.B.D.	SHT 12 OF 14

ISS	CHANGE
1	16/11/90

ITEM No.	CROSS REF.	level	FROM COMP	FROM TAG	TO COMP	TO TAG	WIRE TYPE	COLOUR	ROUTE VIA 1	ROUTE VIA 2	GP or FM	REMARKS
501	214R		SKU	26A	SKK	x	PSN2/4M	G				
502	215R		"	26C	"	y	"	W				
503	225R		"	27A	"	KK	"	SCN				
504			"	27C								N/U
505	220R		"	28A	SKK	DD	PSN2/4M	BN				
506	221R		"	28C	"	EE	"	W				
507	222R		"	29A	"	FF	"	SCN				
508			"	29C								N/U
509	226R		"	30A	SKK	LL	PSN2/4M	S				
510	227R		"	30C	"	MM	"	W				
511	228R		"	31A	"	NN	"	SCN				
512			"	31C								N/U
513	223R		"	32A	SKK	HH	PSN2/4M	B				
514	224R		"	32C	"	JJ	"	R				
515												
516												
517												
518												
519			SKV									NOT FITTED
520												
521												
522												
523												
524			SKW									NOT FITTED
525												
526												
527												
528												
529	585		SKX	2	PB1.	OV	PUF1/6M	BK				
530	587		"	5	"	+18V	"	R				
531	589		"	8	"	-18V	"	B				
532			"	11								N/U
533	590		"	14	PB1.	OVA	PUF1/6M	BK				POWER SUPPLY
534			"	17								N/U WIRING. NOTE: PB1.
535	592		"	20	PB1.	+5V	PUF1/6M	O				REFERS TO BLADES
536	537		"	"	SKX	23	"	"				MOUNTED ON PB1.
537	536R		"	23	"	20	"	"				ADJACENT TO SKV.
538	594		"	26	PB1.	OVD	"	BK				
539	540		"	"	SKX	29	"	"				
540	539R		"	29	"	26	"	"				
541			"	32								N/U
542												
543												
544												
545												
546			SKY	2								N/U
547			"	↓								"
548			"									"
549			"	23								" (MUST BE BLANKED OF WITH KIT ITEM 15)
550	559		"	26	SKZ	E	GA BASED	G/Y				

BBC

VM441A4/1

CD2L/41 WIRING SCHEDULE

DRN	MPF	D & E.D.
CKD		D63928 A4
APPD	R.G.A.	SHT 13 OF 14

ISS	CHANGE
1	19/1/90

ITEM No.	CROSS REF.	level	FROM COMP	FROM TAG	TO COMP	TO TAG	WIRE TYPE	COLOUR	ROUTE VIA 1	ROUTE VIA 2	GP or FM	REMARKS
551	558		SKY	29	SKZ	N	6A BASEC	B				
552	579		"	32	FS1	2	"	BN				
553												
554												
555												
556												
557	578		SKZ	L	FS1	1	6A BASEC	BN				
558	551R		"	N	SKY	29	"	B				
559	550R		"	E	"	26	"	G/Y				
560	561		"	"	SKZ	S.T.	"	"				
561	560R		"	S.T.	"	E	"	"				
562												
563												
564												
565												
566	434R		SKAA	1	SKS	31A	PUF1/3M	B				EBU SEL
567	435R		"	2	"	31C	"	O				EBU SEL
568	436R		"	3	"	32A	"	G				EBU SEL
569	437R		"	4	"	32C	"	BN				EBU SEL
570			"	5								N/U
571			"	↓								"
572			"	↓								"
573			"	9								"
574												
575												
576												
577												
578	557R		FS1	1	SKZ	L	6A BASEC	BN				
579	552R		"	2	SKY	32	"	"				
580												
581												
582												
583												
584	103R		PB1.	0V	SKB	1	PUF1/6M	BK				
585	529R		"	"	SKX	2	"	"				
586	104R		"	+18V	SKB	"	"	R				
587	530R		"	"	SKX	5	"	"				
588	107R		"	-18V	SKB	4	"	B				
589	531R		"	"	SKX	8	"	"				
590	533R		"	0VA	"	14	"	BK				
591	110R		"	+5V	SKB	6	"	O				
592	535R		"	"	SKX	20	"	"				
593	113R		"	0VD	SKB	8	"	BK				
594	538R		"	"	SKX	26	"	"				
595												
596												
597												
598												
599												
600												

BBC	CD2L/41 WIRING SCHEDULE	DRN MPF	D & E.D.
VM441A4/1		CKD	D63928 A4
		APPD R.C.J.	SHT 14 OF 14

MINIMUM SIZE TO CUT NEGATIVE

D63929A2

TOP

INT – CLOCK ● AES – CLOCK – FAIL

CHN – FAIL ● EXT – CLOCK – FAIL

CH1 – FAIL ● EXT – FREQ – FAIL

CH2 – FAIL ● X – AES – SELECTED

CH3 – FAIL ● Y – AES – SELECTED

CH4 – FAIL ● Z – AES – SELECTED

CH5 – FAIL ● HDB – FAIL

CH6 – FAIL ● DIG – FAIL

CD2L/41

6 CHANNEL NICAM II CODER

D63929A2

SCALE 2 : 1

CHARACTERS AND LINES TO BE PRINTED IN BLACK
TO BE USED IN CONJUNCTION WITH D63924A2
LETTERING USED LETRASET HELVETICA MEDIUM CONDENSED 12PT DIDOT

SCALE: – 0

THIRD ANGLE PROJECTION

ORIGINAL FRAME SIZE
400mm x 574mm

ISS 1 CHANGE 15/11/90

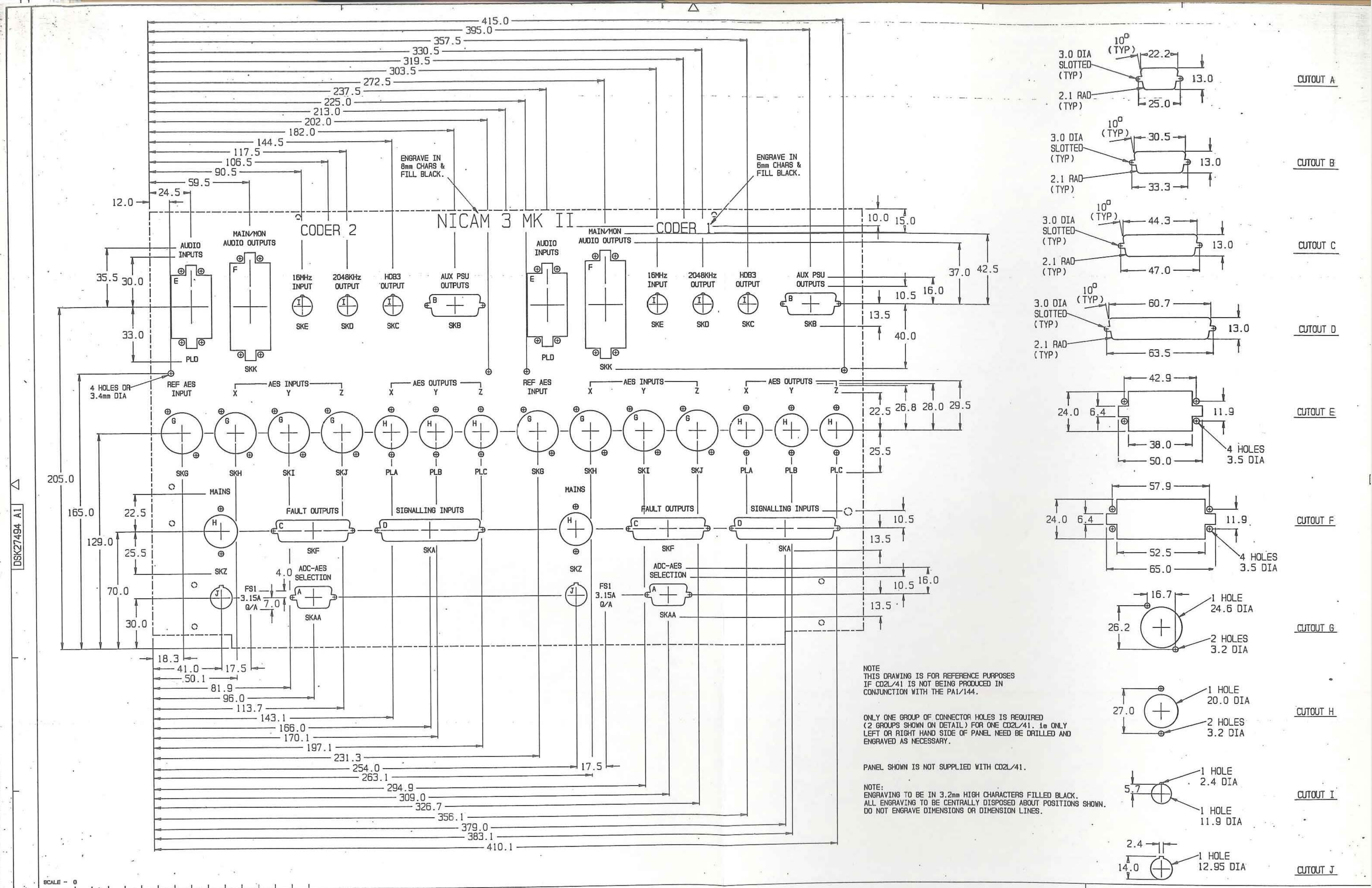
6 CHANNEL NICAM II CODER

CD2L/41
FRONT PANEL LEGEND

All dimensions in millimetres unless otherwise stated: Normal tolerances:
no decimal place – ± 1 mm unless
one decimal place – ± 0.3 mm otherwise
two decimal places – ± 0.1 mm stated

DRN.	C.M.D.	DESIGN & EQUIPMENT DEPARTMENT
TCD.		D63929A2
CKD.		
APPD	R.B.L.	

R293



NOTE
THIS DRAWING IS FOR REFERENCE PURPOSES IF CD2L/41 IS NOT BEING PRODUCED IN CONJUNCTION WITH THE PA1/144.

ONLY ONE GROUP OF CONNECTOR HOLES IS REQUIRED (2 GROUPS SHOWN ON DETAIL) FOR ONE CD2L/41. ie ONLY LEFT OR RIGHT HAND SIDE OF PANEL NEED BE DRILLED AND ENGRAVED AS NECESSARY.

PANEL SHOWN IS NOT SUPPLIED WITH CD2L/41.

NOTE:
ENGRAVING TO BE IN 3.2mm HIGH CHARACTERS FILLED BLACK.
ALL ENGRAVING TO BE CENTRALLY DISPOSED ABOUT POSITIONS SHOWN.
DO NOT ENGRAVE DIMENSIONS OR DIMENSION LINES.

THIRD ANGLE PROJECTION

ORIGINAL FRAME SIZE 574mm X 821mm

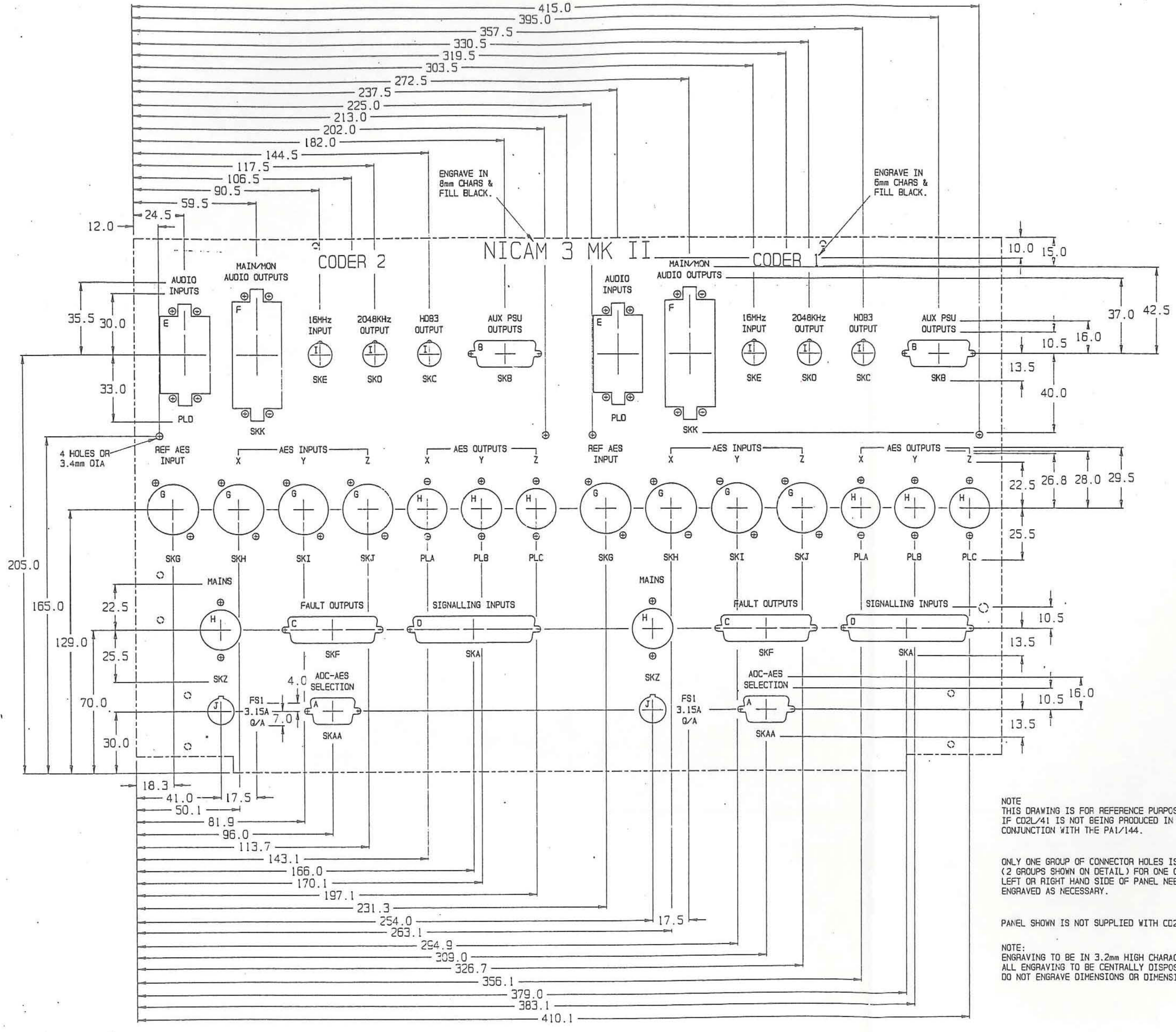
SCALE – 0

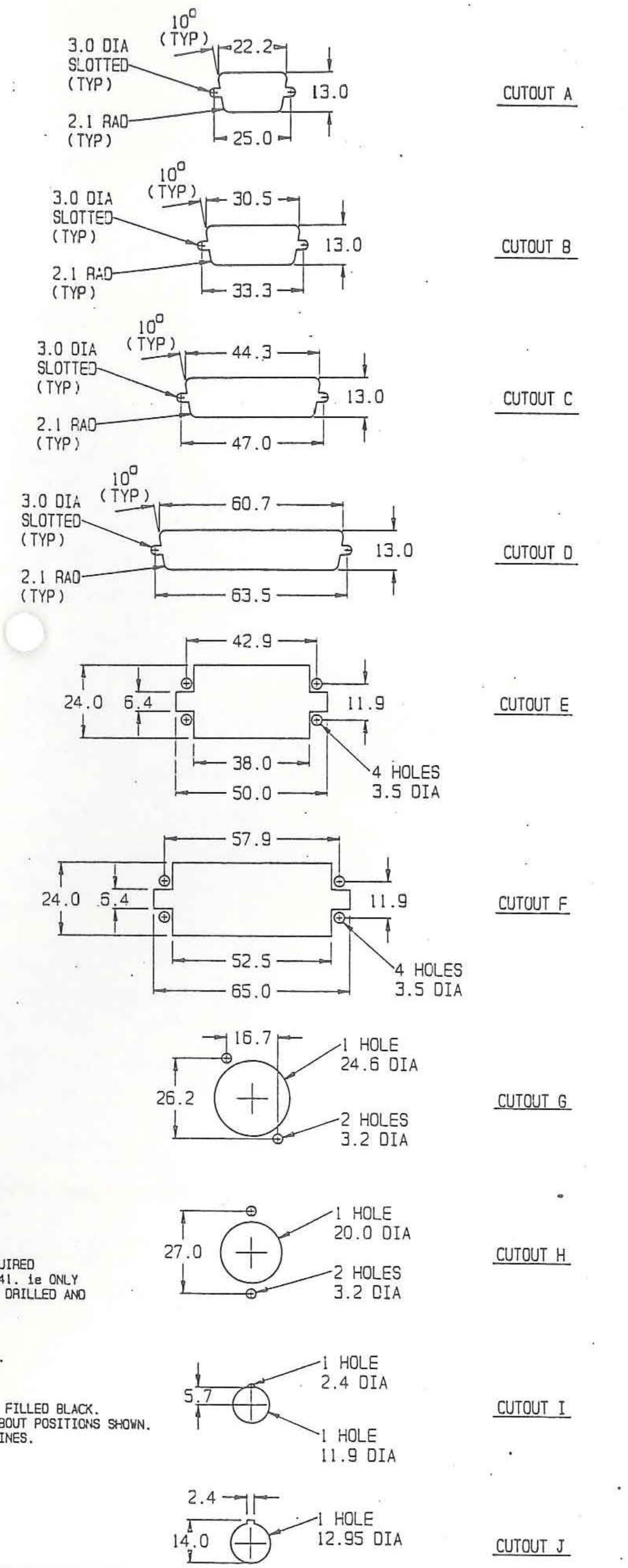
CD2L/41 REAR PANEL DETAIL

All dimensions in millimetres unless otherwise stated.

DESIGN AND EQUIPMENT DEPARTMENT

DSK27494 A1





NOTE
THIS DRAWING IS FOR REFERENCE PURPOSES IF CD2L/41 IS NOT BEING PRODUCED IN CONJUNCTION WITH THE PA1/144.

ONLY ONE GROUP OF CONNECTOR HOLES IS REQUIRED (2 GROUPS SHOWN ON DETAIL) FOR ONE CD2L/41. ie ONLY LEFT OR RIGHT HAND SIDE OF PANEL NEED BE DRILLED AND ENGRAVED AS NECESSARY.

PANEL SHOWN IS NOT SUPPLIED WITH CD2L/41.

NOTE:
ENGRAVING TO BE IN 3.2mm HIGH CHARACTERS FILLED BLACK.
ALL ENGRAVING TO BE CENTRALLY DISPOSED ABOUT POSITIONS SHOWN.
DO NOT ENGRAVE DIMENSIONS OR DIMENSION LINES.

SCALE - 0

THIRD ANGLE PROJECTION

ORIGINAL FRAME SIZE 574mm X 821mm

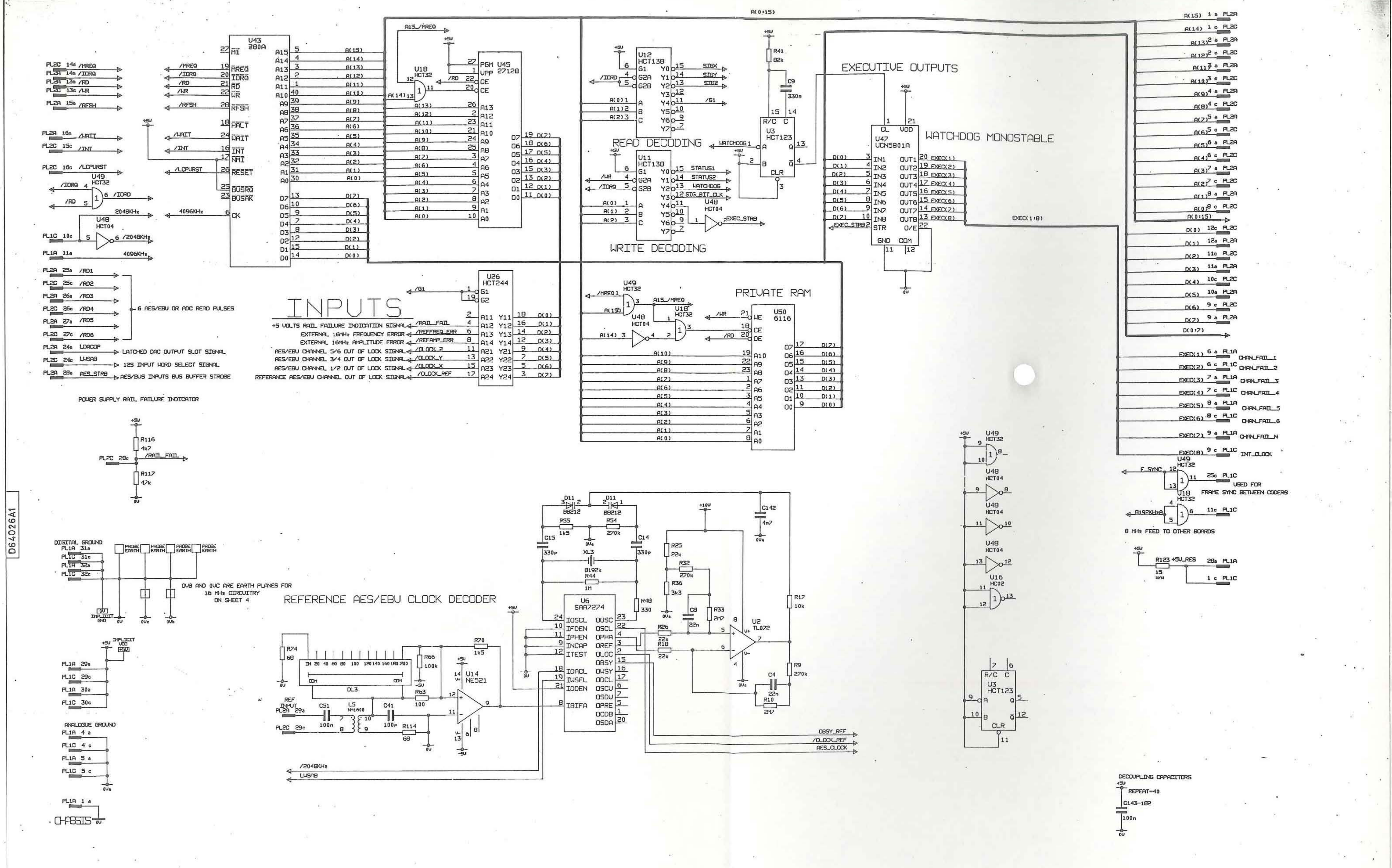
CHANGE 2/8/88 16/8/88

CD2L/41 REAR PANEL DETAIL

All dimensions in millimetres unless otherwise stated. Normal tolerances: no decimal places ± 1 mm; one decimal place ± 0.3 mm; two decimal places ± 0.1 mm unless otherwise stated

DESIGN AND EQUIPMENT DEPARTMENT

DSK27494 A1


INPUTS
READ DECODING
WRITE DECODING
EXECUTIVE OUTPUTS
WATCHDOG MONOSTABLE
PRIVATE RAM
REFERENCE AES/EBU CLOCK DECODER
U43 Z80A
U45 27128
U12 HCT138
U11 HCT138
U3 HCT123
U47 UCN5801A
U26 HCT244
U50 6116
U6 SAA7274
U2 TL072
U14 NE521
6 AES/EBU OR ADC READ PULSES
LATCHED DAC OUTPUT SLOT SIGNAL
12S INPUT WORD SELECT SIGNAL
AES/BUS INPUTS BUS BUFFER STROBE
POWER SUPPLY RAIL FAILURE INDICATOR
+5 VOLTS RAIL FAILURE INDICATION SIGNAL
EXTERNAL 16MHz FREQUENCY ERROR
EXTERNAL 16MHz AMPLITUDE ERROR
AES/EBU CHANNEL 5/6 OUT OF LOCK SIGNAL
AES/EBU CHANNEL 3/4 OUT OF LOCK SIGNAL
AES/EBU CHANNEL 1/2 OUT OF LOCK SIGNAL
REFERANCE AES/EBU CHANNEL OUT OF LOCK SIGNAL
DIGITAL GROUND
0VB AND 0VC ARE EARTH PLANES FOR 16 MHz CIRCUITRY ON SHEET 4
ANALOGUE GROUND
CHASSIS
USED FOR FRAME SYNC BETWEEN CODERS
8 MHz FEED TO OTHER BOARDS
DECOUPLING CAPACITORS
REPEAT=40
C143-182
D64026A1

NICAM II CODER
PROCESSING UNIT (1)
SHEET 1 OF 4

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DESIGN & EQUIPMENT DEPARTMENT

D64026A1

SIGNALLING BIT INPUTS

D(0:7)

+5V

R91 470 — SIGX, /IORD — U21 HCT541 (G1, G2; A1–A8 / Y1–Y8 → D(2), D(6), D(5), D(4), D(3), D(2), D(1), D(0))

R89 470 — SIGY, /IORD — U20 HCT541 (G1, G2; A1–A8 / Y1–Y8 → D(2), D(6), D(5), D(4), D(3), D(2), D(1), D(0))

R87 470 — /IORD, SIG2 — U19 HCT541 (G1, G2; A1–A8 / Y1–Y8 → D(2), D(6), D(5), D(4), D(3), D(2), D(1), D(0))

R92 470 — PL1A 25a, CH56_COM+

R90 470 — PL1C 24c, CH34_COM+

R88 470 — PL1A 24a, CH12_COM+

	Q10 TLP521-4A	Q9 TLP521-4A	Q8 TLP521-4A
PL1A 22a	CH6_SIG3	CH4_SIG3	CH2_SIG3
PL1C 22c	CH6_SIG2	CH4_SIG2	CH2_SIG2
PL1A 23a	CH6_SIG1	CH4_SIG1	CH2_SIG1
PL1C 23c	CH6_SIG0	CH4_SIG0	CH2_SIG0

	Q6 TLP521-4A	Q5 TLP521-4A	Q4 TLP521-4A
PL1A 20a	CH5_SIG3	CH3_SIG3	CH1_SIG3
PL1C 20c	CH5_SIG2	CH3_SIG2	CH1_SIG2
PL1A 21a	CH5_SIG1	CH3_SIG1	CH1_SIG1
PL1C 21c	CH5_SIG0	CH3_SIG0	CH1_SIG0

0V

U40 HCT377 (G, CK; D1–D8 ← D(0), D(1), D(2), D(3), D(4), D(5), D(6), D(2); Q1–Q8 → 20LOCK_SLV6)

SIG_BIT_CLK

SIGNALLING BIT STROBES
CH12_STR 26c PL1C
CH34_STR 27c PL1C
CH56_STR 28c PL1C

R121 2k7 — R122 470 — R120 1k — R119 1k — R118 1k

Q14 2N3904 — Q13 2N3904 — Q12 2N3904 — Q11 2N3904

0V

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NICAM II CODER
PROCESSING UNIT (1)
SHEET 2 OF 4

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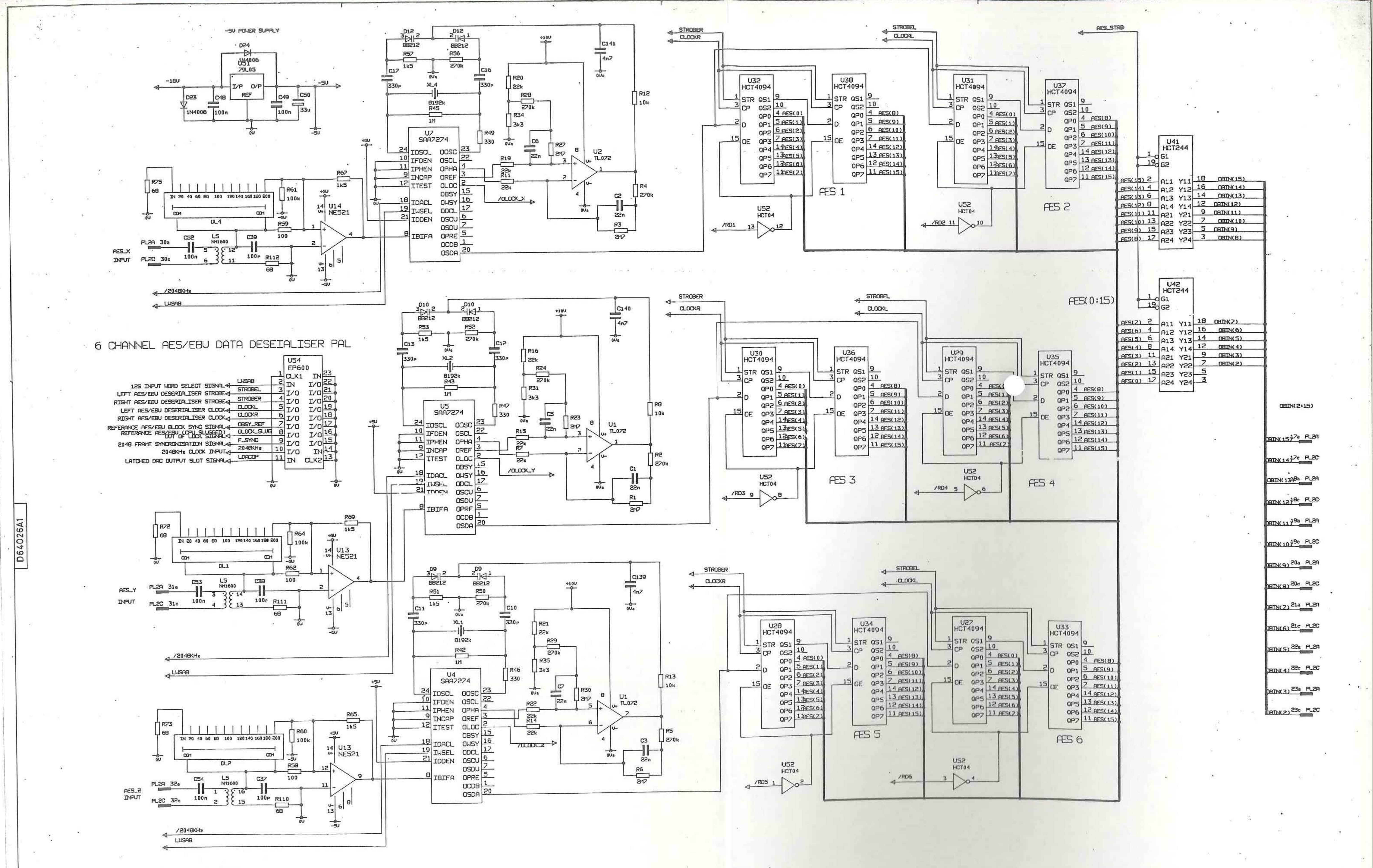
APPD R.O.A

DESIGN & EQUIPMENT DEPARTMENT

D64026A1


-5V POWER SUPPLY
6 CHANNEL AES/EBU DATA DESEIALISER PAL
AES_X INPUT
AES_Y INPUT
AES_Z INPUT
AES 1
AES 2
AES 3
AES 4
AES 5
AES 6
AES(0:15)
12S INPUT WORD SELECT SIGNAL
LEFT AES/EBU DESERIALISER STROBE
RIGHT AES/EBU DESERIALISER STROBE
LEFT AES/EBU DESERIALISER CLOCK
RIGHT AES/EBU DESERIALISER CLOCK
REFERANCE AES/EBU BLOCK SYNC SIGNAL
REFERANCE AES/EBU (CPU SLUGGED) OUT OF LOCK SIGNAL
2048 FRAME SYNCRONISATION SIGNAL
2048KHz CLOCK INPUT
LATCHED DAC OUTPUT SLOT SIGNAL

NICAM II CODER
PROCESSING UNIT (1)
SHEET 3 OF 4

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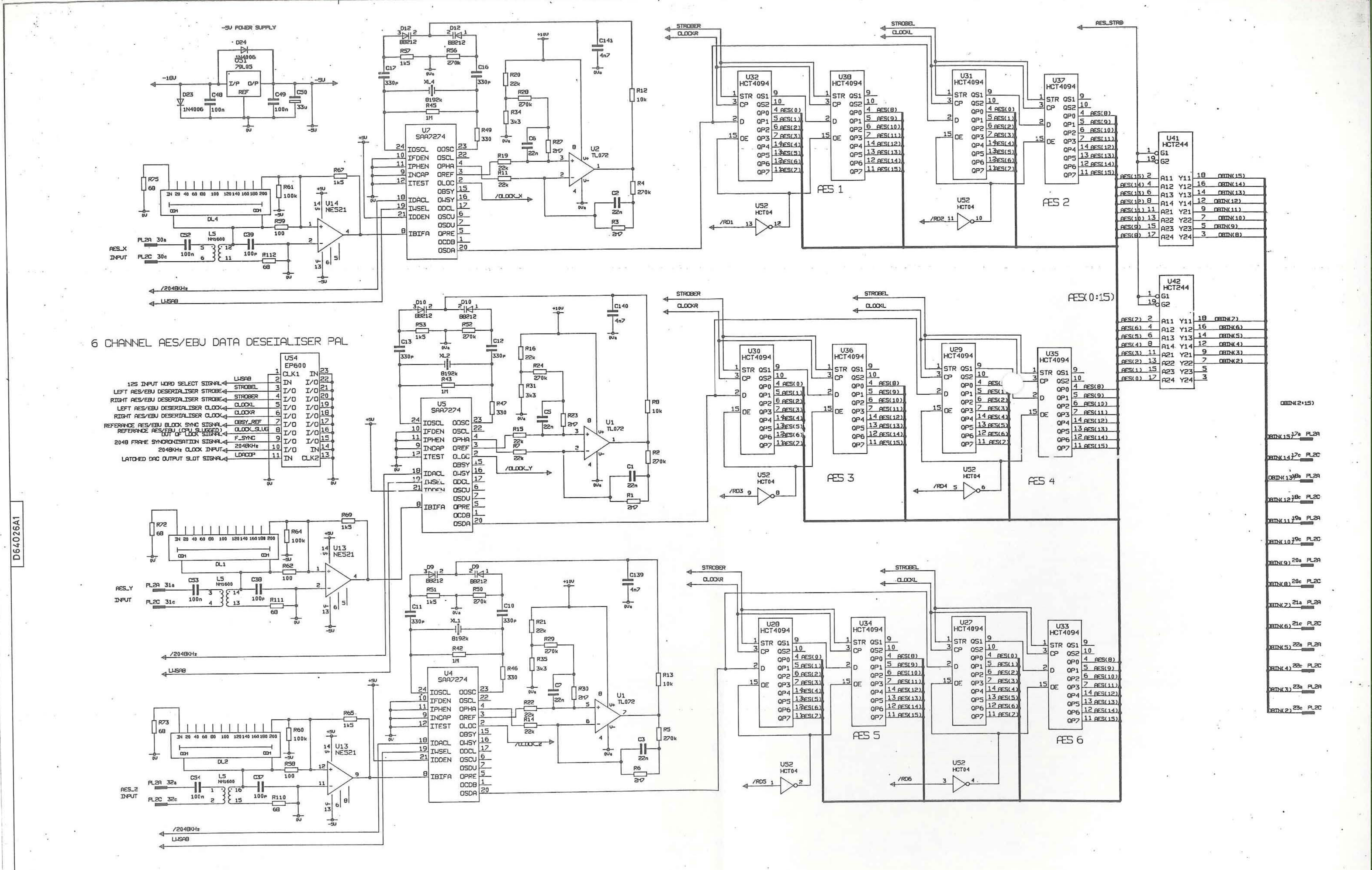
DESIGN & EQUIPMENT DEPARTMENT

D64026A1



NICAM II CODER
PROCESSING UNIT (1)
SHEET 3 OF 4

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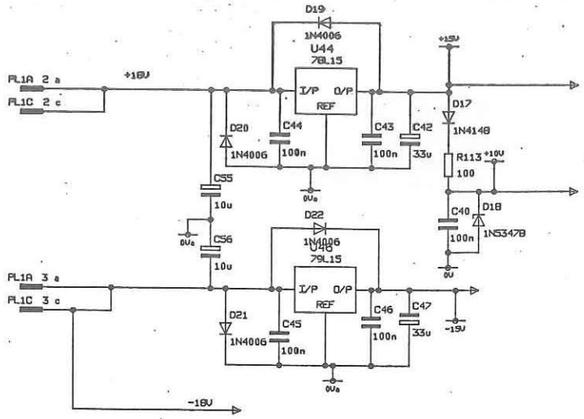
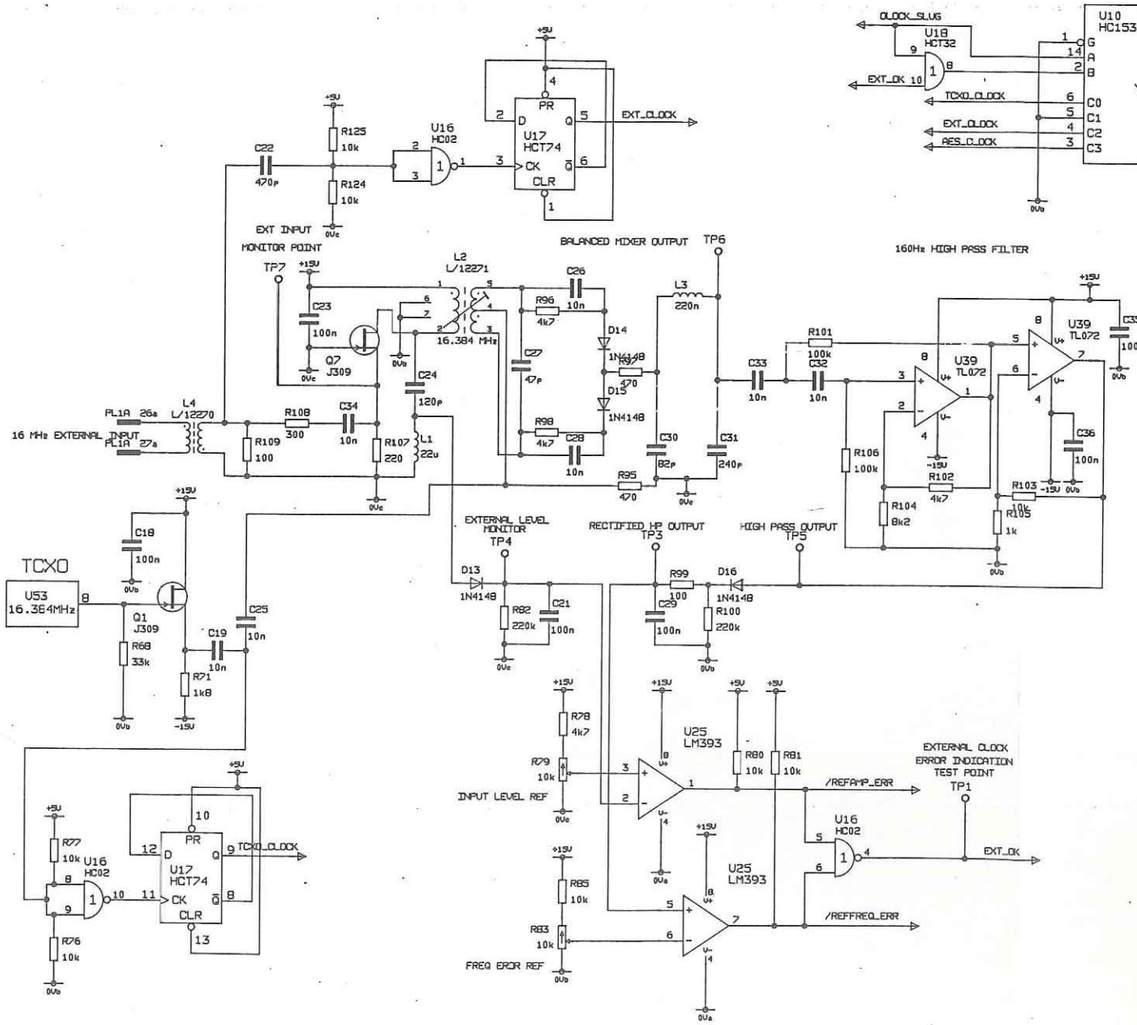
DESIGN & EQUIPMENT DEPARTMENT

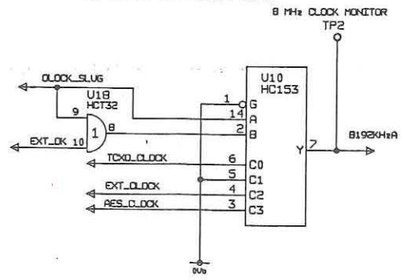
D64026A1

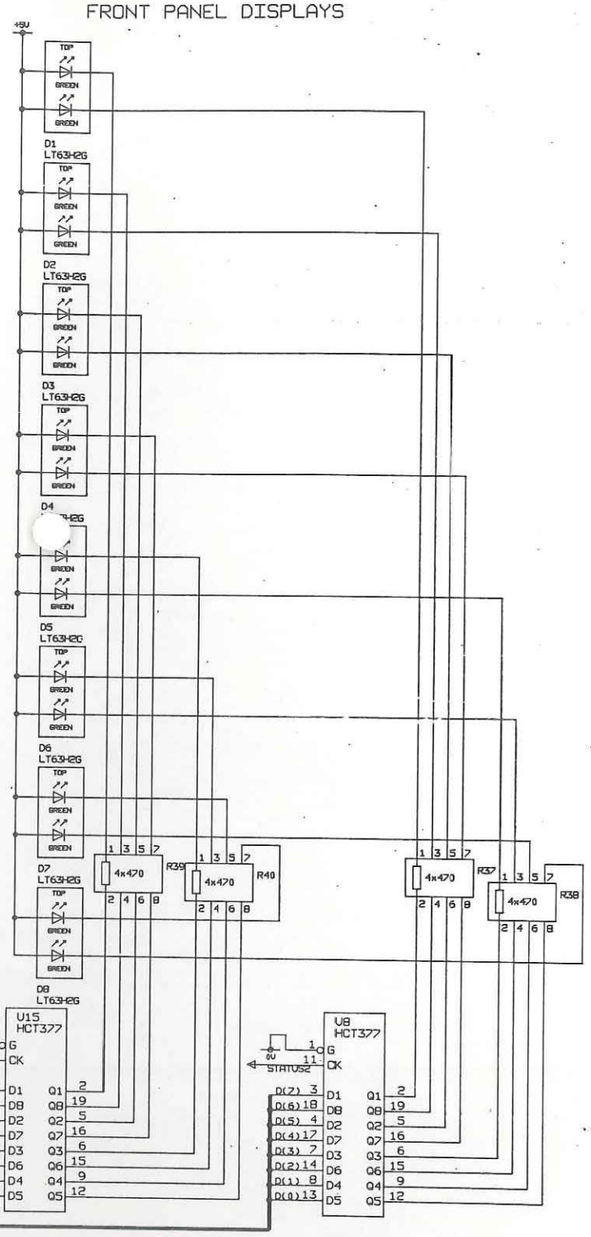
CLOCK SELECTION

FRONT PANEL DISPLAYS









D64026A1

NICAM II CODER
PROCESSING UNIT (1)
SHEET 4 OF 4

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CKD
APPD R.B.D

DESIGN & EQUIPMENT DEPARTMENT

D64026A1

D 64027 A4

UN26/101

PARTS LIST

CHANGE	ISS.
19th Jan. 1990	1

ITEM No.	No. OFF		DESCRIPTION	C'C'T REF.	BBC REF. OR DRG. No.
			Drawing List		
			Circuit (4 Sheets) D 64026 A1		
			Parts List D 64027 A4		
			Assembly D 64028 A2		
			Details D 64029 A2		
			P.B. Wiring (7 Sheets) D 64030 A2s		(Photo - Plots)
			P.B. Drilling D 64031 A2		
			P.B. Comp. Loc. (Copy) DSK 27564 A2		(For Information only)
			Further Information required for manufacture:-		
			Unit assembly information EA 10484		
			Unit wiring information EA 10140		
			Prom. Sheets P5478, F1096,		
			Specification ED/UN26/101		
1	1	*	Printed Board To Spec. ED/PB/UN26/101		-0635494
			P.B. Wiring:-		D64030A2s
			P.B. Drilling:-		D64031 A2
2	1		Screen/Coding Plate, 6U x 280mm		-0628483
			Slot positions (None)		
			Modified by contractor to:-		D64029A2 Det.
3	1		Handle, P.C.B. red.		-0388169
			Engraved by contractor to:-		D64029 A2 Det.
4	2		Fixed plug 64 pole PL1,	PL2	-0610062
5					
6	1		Transmission socket 22 pole x .4" (10.1)		-0445035
7	1		Transmission socket 24 pole x .3" (7.6)		-0633859
8	4		Transmission socket 24 pole x .6" (15.2)		-044547X
9	1		Transmission socket 28 pole x .6" (15.2)		-0445043
10	1		Transmission socket 40 pole x .6" (15.2)		-0445488
11					
12					
13					
14	7		Test point 'Vero' TP1 –	TP7	-039229X
15					
16	2		Spacer, ceramic, 3.4 dia x 3.4		-0255420
17					
18	A/R		Wire, PUNI/1M, Yellow		-0216576
19					
20					
21					
22					
23	A/R		1.6, B.T.C. Wire		
24	1		Anti-static bag		-0613387
25	1		SSD Caution label self adhesive		-0604990
26					

BBC

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UN26/101
6 CHANNEL NICAM II PROCESSING UNIT (1)
PARTS LIST

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CKD.		Sheet 1 of 10
APPD.		

CHANGE	ISS.
19th Jan. 1990	1

ITEM No.	No. OFF		DESCRIPTION	C'C'T REF.	BBC REF. OR DRG. No.
			Capacitors		
27	1		47pF, Ceramic, 100V, Single Plate. C27		-0429812
28					
29	1		82pF, Polystyrene, 63V, Rectangular C30		-0606108
30					
31	4		100pF, Ceramic, 100V, Multilayer. C37, C38, C39, C41		-0204743
32					
33	1		120pF, Ceramic, 100V, Single Plate. C24		-0437733
34					
35	1		240pF, Polystyrene, 63V, Rectangular C31		-045005X
36					
37	8		330pF, Polystrene, 63V, Rectongular. C10 – C17		-0450092
38					
39	1		470pF, Polystrene, 63V, Rectonglar. C22		-0450120
40					
41	5		10nF, Ceramic, 100V, Multilayer. C19, C25, C26, C28, C34		-0099669
42					
43	2		10nF, Polyester, 100V, Rectongular C32, C33		-046620E
44					
45	8		22nF, Polystyrene, 63V, Rectongular C1 – C8		-060622
46					
47	53		100nF, Ceramic, 50V, Multilayer C35, C36, C40, C43 - C46, C48, C49, C51 - C54 C143 - C182		-020464E
49	2		100nF, Polycarbonate, 160V, Rectongular C18, C23,		-0208951
50					
51	2		100nF, Polyester, 63V, Rectongular C21, C29,		-0466153

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Parts List

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TPD.		D64027A4
CKD.		Sheet 2 of 10
APPD.	R.B.O	

ISS.	CHANGE
1	19th Jan. 1990

ITEM No.	No. OFF	DESCRIPTION	C'C'T REF.	BBC REF. OR DRG. No.
52	1	330nF, Polyester, 100V, Rectangular		-0209120
		C9		
53				
54	2	10µF, Electrolytic, 25V, General Purpose, Min.		-0204901
		C55, C56		
55				
56	3	33µF, Electrolytic, 16V, General Purpose, Min.		-0204881
		C42, C47, C50		
57				
58	4	4·7nF, Ceramic, 100V, Multilayer		-0207745
		C139 - C142		
		Resistors		
59	8	68Ω, Metal Film, 0·4W, 2%		-0227882
		R72 - R75, R110, R111, R112, R114		
60				
61	7	100Ω, Metal Film, 0·4W, 2%		-0099007
		R58, R59, R62, R63, R99, R109, R113		
62				
63	1	220Ω, Metal Film, 0·4W, 2%		-0099023
		R107		
64				
65	1	300Ω, Metal Film, 0·4W, 2%		-0099338
		R108		
66				
67	4	330Ω, Metal Film, 0·4, 2%		-0099031
		R46 - R49		
68				
69	3	470Ω, Metal Film, 0·4W, 2%		-009904x
		R95, R97, R122		
70				
71				
72				
73	4	1k, Metal Film, 0·4W, 2%		-009908
		R105, R118, R119, R120		
74				
75	4	1K5, Metal Film, 0·4W, 2%		-0099110
		R51, R53, R55, R57, R65, R67, R69, R70		
76				

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Parts List

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Design and Equipment De,

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ITEM No.	No. OFF		DESCRIPTION	C'C'T REF.	BBC REF. OR DRG. No.
77					
78					
79	1		1K8, Metal Film, 0·4W, 2%		-0099484
			R71		
80					
81	1		2K7, Metal Film, 0·4W, 2%		-0099492
			R121		
82					
83	4		3K3, Metal Film, 0·4W, 2%		-0099161
			R31, R34, R35, R36		
84					
85	5		4K7, Metal Film, 0·4W, 2%		-0099425
			R78, R96, R98, R102, R116		
86					
87					
88					
89	1		8K2, Metal Film, 0·4W, 2%		-0099216
			R104		
90					
91	12		10K, Metal Film, 0·4W, 2%		-0099224
			R8, R12, R13, R17, R76, R77, R80, R81, R85, R103		
			R124, R125		
93	12		22K, Metal Film, 0·4W, 2%		-0228078
			R7, R11, R14, R15, R16, R18-R22, R25, R26		
94					
95	1		33K, Metal Film, 0·4W, 2%		-0099259
			R68		
96					
97	1		47K, Metal Film, 0·4W, 2%		-0099267
			R117		
98					
99	1		82K, Metal Film, 0·4W, 2%		-0228165
			R41		
100					
101	6		100K, Metal Film, 0·4W, 2%		-0228181
			R60, R61, R64, R66, R101, R106		
102					

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Parts List

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Design and Equipment Dept

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Sheet 4 of 10

ISS.	CHANGE
1	19th Jan. 1990

ITEM No.	No. OFF	DESCRIPTION	C'C'T REF.	BBC REF. OR DRG. No.
103	2	220k, Metal Film, 0·4W, 2%		-0228244
		R82, R100		
104				
105	12	270K, Metal Film, 0·4W, 2%		-0228260
		R2, R4, R5, R9, R24, R28, R29, R32, R50, R52, R54	R56	
106				
107	4	1M, Metal Film, 0·4W, 2%		-0099283
		R42 - R45		
108				
109	8	2M7, Metal Film, 0·4W, 2%		-039194X
		R1, R3, R6, R10, R23, R27, R30, R33		
110				
111	1	15Ω, Wire Wound, 2·5W, 5%		-023201X
		R123		
112				
113	6	470Ω x 8, S.I.L., 9 Pin		-0427964
		R87 - R92		
114				
115	4	470Ω x 4, S.I.L., 8 Pin		-042815X
		R37 - R40		
116				
117	2	10k, Variable, Top adjust		-0307670
		R79, R83		
118				
		Diodes		
119	6	IN4006		-0102592
		D19 - D24		
120				
121	5	IN4148		-0102612
		D13 - D17		
122				
123	1	IN5347B, Zener		-0531728
		D18		
124				
125	8	L.E.D., Dual, Green/Green (LTG3H2G)		-0531263
		D1 - D8		
126				
127	4	BB212, Twin Varicap		-0500262
		D9 - D12		

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Parts List

DRN.	b.w.m.	Design and Equipment De
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CKD.		
APPD.	R.B.D	Sheet 5 of 10

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ITEM No.	No. OFF	DESCRIPTION	C'C'T REF.	BBC REF. OR DRG. No.
		Transistors		
128	6	TLP 521-4A		-0531736
		Q4, Q5, Q6, Q8, Q9, Q10		
129				
130				
131				
132	4	2N3904		-0122792
		Q11 - Q14		
133				
134	2	J309, N-Channel, FET		-0196750
		Q1, Q7		
135				
136				
		Transformers / Inductors		
137	1	220n, RF. Unshielded		-0206484
		L3		
138				
139	1	22μ, RF. Unshielded		-0209514
		L1		
140				
141	1	L/12270		-0635506
		L4		
142				
143	1	L/12271		-0635514
		L2		
144				
145	1	NM 1600		-0635522
		L5		
146				
147				
		Miscellaneous		
148	4	Delay Line, 200nS, IIACB20112E		-0635530
		DL1 - DL4		
149				
150	4	Crystal, 8192kHz, Cathodeon 8192-2020		-0626880
		XL1 - XL4		
151				

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Parts List

DRN.	b.w.m
TPD.	
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APPD.	R.A.J

Design and Equipment De.

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ISS.	CHANGE
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ITEM No.	No. OFF		DESCRIPTION	C'C'T REF.	BBC REF. OR DRG. No.
			Integrated Circuits		
			CAUTION SSD To avoid damage from static charges great care should be taken when handling these devices		
152	4		SAA 7274 U4. U5, U6, U7		-0531882
153					
154	12		DIC 74 HCT 4094 P U27 – U38		-N10122
155					
156	1		DIC 74 HC 153N U10		-N10183
157					
158	2		DIC 74 HCT 32N U18, U49		-N10014
159					
160	3		DIC 74 HCT 244N U26, U41, U42		-N10063
161					
162	3		TL072CP U1, U2, U39		-0194800
163					
164	1		LM 79L15AC U46		-0198850
165					
166	1		Z80A-CPU U43		-0503824
167					
168	1		LM79L05 AC U51		-0506597
169					
170	1		DIC 6116 LP U50		-051885X
171					
172	1		DIC 74HCT 74N U17		-0522073

BBC
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UN26/101
Ports List

DRN.	b.w.m.	Design and Equipment Dep
TPD.		D64027 A4
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1	19th Jan. 1990

ITEM No.	No. OFF	DESCRIPTION	C'C'T REF.	BBC REF. OR DRG. No.
173				
174				
175	3	DIC 74HCT 377N U8, U15, U40,		-0522152
176				
177	1	UCN5801A U47		-0522274
178				
179	1	DIC 74HC02N U16		-0523109
180				
181	1	DIC 74HCT 123N U3		-0525722
182				
183	2	DIC 74HCT 04N U48, U52,		-052685X
184				
185	3	DIC 74 HCT 541N U19, U20, U21		-0526912
186				
187	2	DIC 74 HCT 138N U11, U12		-056203X
188				
189	1	LM 78L15 AC U44		-0531890
190				
191	1	LM393N U25		-0531866
192				
193	2	NE521N U13, U14		-0531874
194				
195	1	OSCILLATOR, 16·384 MHz U53,		-053472X
196				
197				
198				

BBC

DS/PLA4

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Parts List

DRN.	b.w.m.	Design and Equipment Dept
TPD.		D64027 A4
CKD.		
APPD.	R.D.A.	Sheet 8 of 10

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1	19th Jan. 1990

ITEM No.	No. OFF		DESCRIPTION	C'C'T REF.	BBC REF. OR DRG. No.
199	1		DIC 27128N - 250ns		- 0514049
			Programmed to:- P5478 issue A	U45	- 7001965
200	1		EP 600 DC		- 053009X
			Programmed to:- F109G issue A	U54	- 7001973
201					
202					
			Screws		For Fixing items
203	4		M2·5 x 10 lg. pan hd. m.s. zn. p.		4,
204	9		M2·5 x 8 lg. pan hd. m.s. zn. p.		2,
205					
206					
			Nuts		
207	4		M2·5 hex. full m.s. zn. p.		4,
208					
209					
210					
			Washers		
211	9		M2·5 fibre		2,
212					
213					
214					
215	1		Carton Cardboard to:-		Spec. ED/UN26/101
			Notes		
	*		Denotes items supplied to the contractor on embodiment loan		
	*+		Denotes items supplied to the contractor on embodiment loan,		
			requiring special costing or supply action by B.B.C.		
	Θ*		Denotes components supplied and fitted by B.B.C. on test.		
	Θ+		Denotes coded plug in units supplied and fitted by		
			B.B.C. on test.		
	Ø		Denotes items supplied and fitted by B.B.C. on installation.		

BBC

DS PLA4

UN26/101

Parts List

DRN.	b.w.m
TPD.	
CKD.	
APPD	R.B.P

Design and Equipment Dept

D64027 A/

SHT.	ISS.	DETAILS OF CHANGE	SHT.	ISS.	DETAILS OF CHANGE

ORIGINAL
FRAME SIZE
190mm x 277mm

ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED

BBC

VM 418/A4

DESIGNS DEPARTMENT

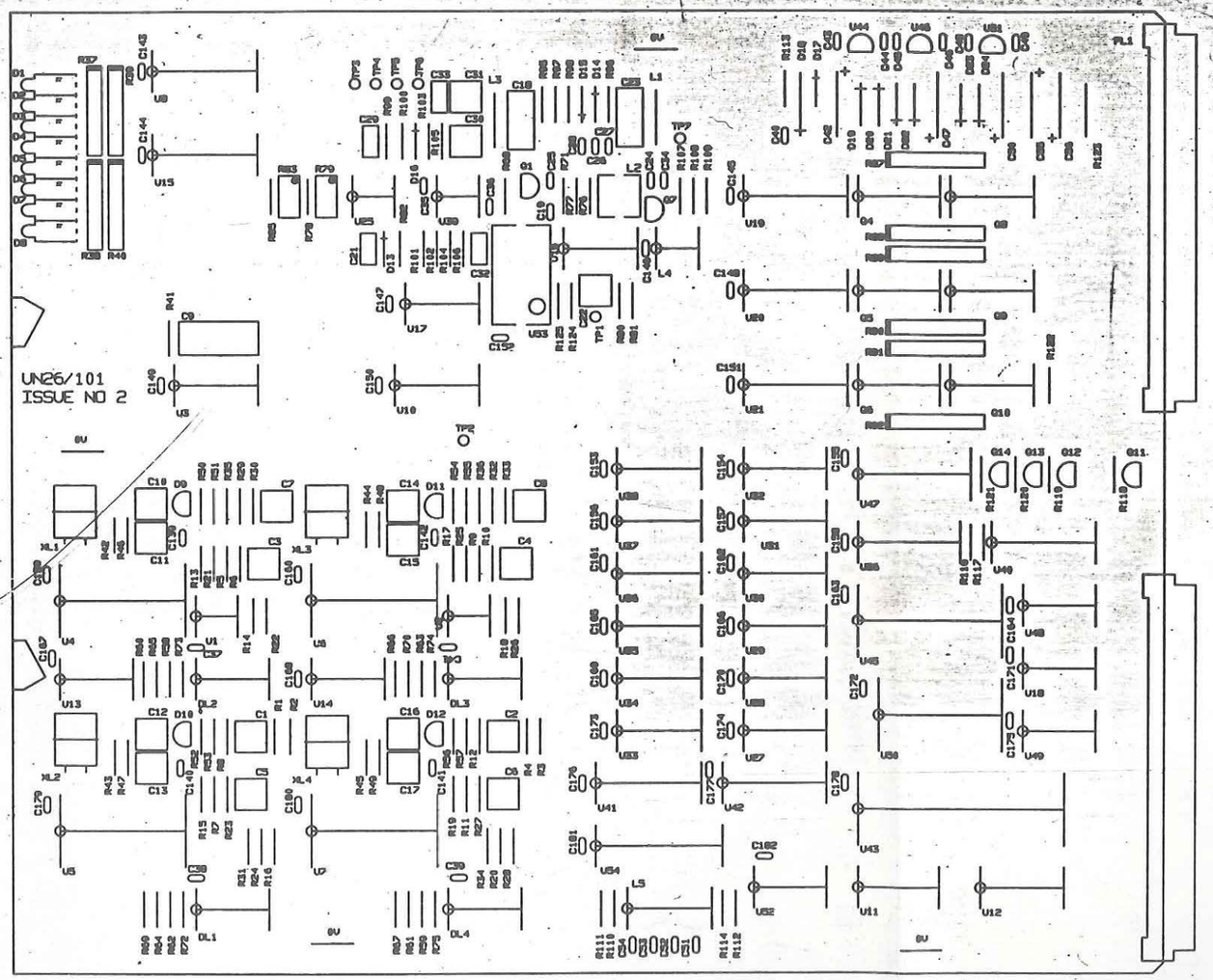
CODE UN26/101

PARTS LIST CHANGE RECORD, ISSUE :- /

D 64027 A4

SHEET 10

UN26/101
ISSUE NO 2
PTH BOARD



SCALE:- 0

THIRD ANGLE PROJECTION

ORIGINAL FRAME SIZE
400mm x 574mm

DS/A2/1

ISS	CHANGE	
2	19th Jan. 1990	

Issue no. of this drawing must be the same as the photo-master issue.

COPY OF COMP. LOCATION PHOTO PLOT UN26/101

All dimensions in millimetres unless otherwise stated
Normal tolerances
no decimal place — ± 1 mm unless
one decimal place — ± 0·3 mm otherwise
two decimal places — ± 0·1 mm stated

DRN	b.w.m.	Design and Equipment Department
TCD		
CKD		DSK 27564 A2
APPD		

SEQUENCER COUNTER CONTROL SIGNALS

F_RESET
CLR_CNT
ENT
ENP

U2 HCT163
U3 HCT163
U4 HCT163
U5 HCT163

CNT(0:12)

U10 2764
U9 2764
U8 2764
U7 2764
U6 2764

A(0:15)

U27 HCT157
U35 HCT157
U34 HCT157
U33 HCT157

SA(0)
SA(1)
SA(2)
SA(3)
SA(4)
SA(5)
SA(6)
SA(7)
SA(8)
SA(9)
SA(10)
SA(11)
SA(12)
CNSC0
CNSC1
CNSC2
/CPU
/CPUBRST
SRD/SWR
/RA
RA0
RA1
CB0
CB1
CB2
CB3
CN0
CN1
CN2
/SER
CHA
CHB
COLLECT
SIG
DACOP
WSAB
/INTERRUPT

U19 16R4
/RFSH
/MREQ
2048KHz
8192KHzA

U88 HCT377
U21 HCT377
U20 HCT377
U18 HCT377
U17 HCT377

/CDR1
8192KHzA
A(0)
/RD

RAM(0)
RAM(1)
RAM(2)
RAM(3)
RAM(4)
RAM(5)
RAM(6)
RAM(7)
AUDIO SAMPLES,PARITY BITS, RANGE CODE AND HOUSE KEEPING BITS

RAM(8)
RAM(9)
RAM(10)
RAM(11)
RAM(12)
CHANNEL NUMBER
RAM PAGE AREA

LONGC(0)
LONGC(1)
LONGC(2)
READ PULSE NUMBER OR GATE ARRAY COMMAND

U75 HCT04
CDR3-1
CDR3-2
GATED 2048KHz AND 4096KHz CLOCK INVERTED

LA0 — LATCHED CPU ADDRESS BUS BIT A(0)
/LRD — LATCHED CPU READ PLUSE
/LCPUR0 — CPU REQUESTING USE OF THE SYSTEM RAM
/LCPURST — CPU RESET PULSE
LSR0 — SEQUENCER'S SYSTEM RAM READ PULSE
/LADC — ADC SLOT INDICATION SIGNAL
/LGA — GATE ARRAY CHIP ENABLE SIGNAL
LRA0 — GATE ARRAY RANGE CODE ADDRESS
/WAIT — CPU WAIT SIGNAL
/CDR3 — INVERTED 2048KHz CLOCK

LRA1 — GATE ARRAY RANGE CODE ADDRESS
LCB(0)
LCB(1)
LCB(2)
LCB(3) — OUTPUT SERIALISER ADDRESS
LCN(0)
LCN(1)
LCN(2) — LOW ORDER ADDRESS BITS FOR F189'S

/LSER — LOAD OUTPUT SERIALISER SIGNAL
/SCONA — CHANNEL 1,3,5 ADC START CONVERSION PULSE
/SCONB — CHANNEL 2,4,6 ADC START CONVERSION PULSE
P_COLL — PARITY COLLECTOR PAL ENABLE SIGNAL
LSTG — 2048KHz SIGNALLING BIT MONOSTABLE KICK SIGNAL
LDACOP — DAC OUTPUT SLOT WINDOW
LWSAB — AUDIO INPUT AND OUTPUT WORD SELECT SIGNAL
/INT — CPU INTERRUPT SIGNAL

2048KHz — 2.048Mhz CLOCK
4096KHz — 4.096Mhz CLOCK

U75 HCT04
U76 F08
8192KHzA
8192KHzB
PL1C 11c

PL1C 25c F_SYNC
PL2A 30a /EOT1
PL2C 30c /EOC1
PL2A 13a /RD
PL2C 13c /WR
PL2A 14a /IORQ
PL2A 16a /WAIT
PL2C 14c /MREQ
PL2A 15a /RFSH

C24-93
100n
REPEAT=70
DECOUPLING CAPACITORS

SEQUENCER PROMS ADDRESS BUS — CNT(0:12)
CPU ADDRESS — A(0:15)
SYSTEM RAM ADDRESS BUS — RAM(0:12)
D(0:7)

CPU ADDRESS BUS
A(15) 1 a PL2A
A(14) 1 c PL2C
A(13) 2 a PL2A
A(12) 2 c PL2C
A(11) 3 a PL2A
A(10) 3 c PL2C
A(9) 4 a PL2A
A(8) 4 c PL2C
A(7) 5 a PL2A
A(6) 5 c PL2C
A(5) 6 a PL2A
A(4) 6 c PL2C
A(3) 7 a PL2A
A(2) 7 c PL2C
A(1) 8 a PL2A
A(0) 9 c PL2C

CPU DATA BUS
D(7) 9 a PL2A
D(6) 9 c PL2C
D(5) 10a PL2A
D(4) 10c PL2C
D(3) 11a PL2A
D(2) 11c PL2C
D(1) 12a PL2A
D(0) 12c PL2C

/STR1 28c PL2C — LEFT ADC CARD CHANNEL 1 STROBE PULSE
/RD1 25a PL2A
/RD2 25c PL2C
/RD3 26a PL2A
/RD4 26c PL2C
/RD5 27a PL2A
/RD6 27c PL2C — 6 ADC OR AES CHANNEL DATA READ PULSES (FROM SHEET 3)
/LCPURST 16c PL2C — LATCHED CPU RESET SIGNAL
/SCONA 24a PL1A
/SCONB0 24c PL1C — START CONVERSION PULSES FOR LEFT AND RIGHT ADC CARDS
LDACOP 24a PL2A
LWSAB 24c PL2C
/STRADCA 29a PL2A
/STRADCB 29c PL2C
/STRAES 28a PL2A
/INT 15c PL2C

U83 HCT00
D19
1N4148
D18
EXTERNAL 2048KHz FEED
2048KHz
4096KHz
9 a PL1A
9 c PL1C
10c PL1C
11a PL1A
29a PL1A
29c PL1C
30a PL1A
30c PL1C
31a PL1A
31c PL1C
32a PL1A
32c PL1C
1 a PL1A

IMPLICIT VCC (+5V)
PROBE EARTH
IMPLICIT END

ISS	DATE
2	17-1-1990

6-CHANNEL NICAM II PROCESSING UNIT (2)
SHEET 1 OF 4

UN26/102

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APPD R.B.B.

DESIGN & EQUIPMENT DEPARTM

D 64033 A

CPU DATA BUS

INTERNAL SYSTEM DATA BUS

SEQUENCER CONTROLLER & HDB3 MONITOR PAL

HDB3 RECOVERED DATA ERROR MONITOR POINT

BUS CONTROLLER PAL

SYSTEM RAM

OUTPUT SERIALISER

HDB3 ENCODER/DECODER

+15V AND -15V POWER SUPPLIES

HDB3 CLOCK RECOVERY

HDB3 DATA RECOVERY CIRCUIT

HDB3 DATA RECOVERY CURRENT TRANSFORMER

HDB3 OUTPUT

HDB3 OUTPUT DRIVER STAGE

NICAM GATE ARRAY

PARITY COLLECTOR PAL

ADC SAMPLING SCHEME SELECTION

6-CHANNEL NICAM II
PROCESSING UNIT (2)
SHEET 2 OF 4

UN26/102

ISS	DATE
2	17 1 1990

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APPD

DESIGN & EQUIPMENT DEPARTMENT

D 64033 A1

2SC>SIGN+MAG CONVERSION

SIGN+MAG>2SC CONVERSION

DAC DATA SERIALISERS

CHECK DAC SAMPLING SCHEME SELECTION

AES/ADC SELECTION

DAC DESERIALISER CONTROLLER + READ PULSE GENERATOR

6-CHANNEL NICAM II
PROCESSING UNIT (2)
SHEET 3 OF 4

UN26/102

ISS	DATE
2	17-1-1990

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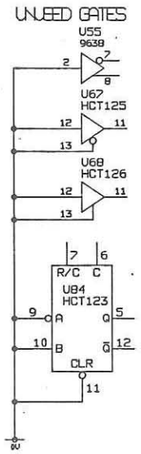
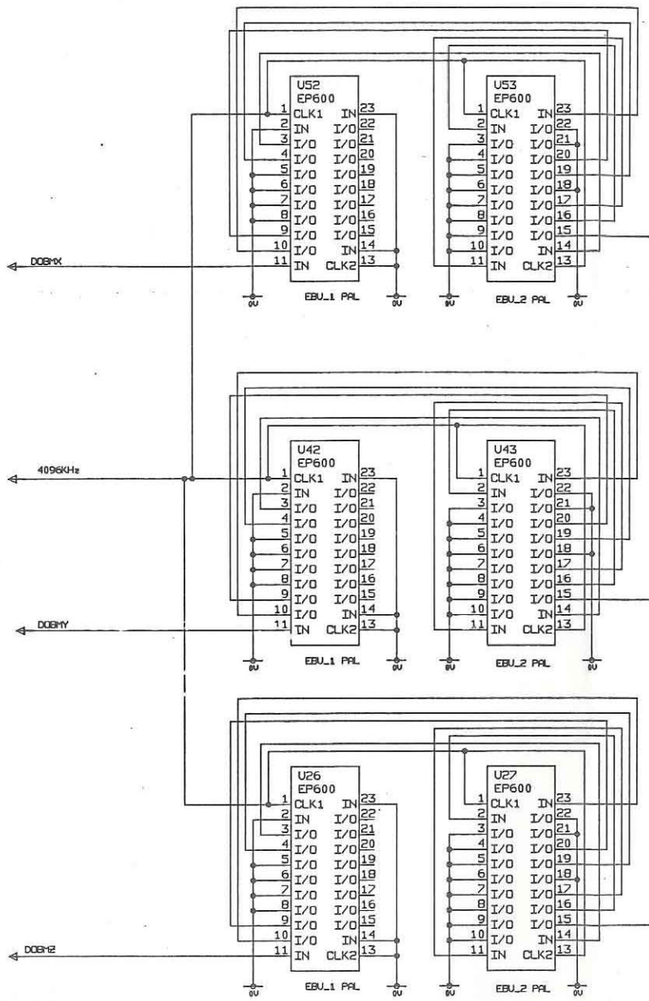
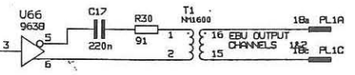
APPD A.J.J.

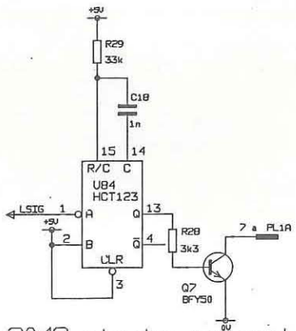
DESIGN & EQUIPMENT DEPARTMENT

D 64033 A1

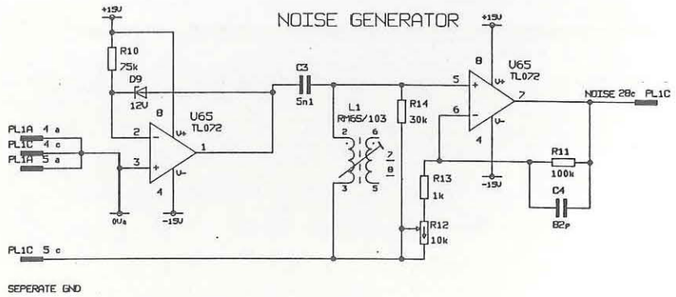








2048 strobe generation



6-CHANNEL NICAM II
PROCESSING UNIT (2)

UN26/102

SHEET 4 OF 5

ISS	DATE
2	17-1-1990

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CKD
APPD A.B.W.

DESIGN & EQUIPMENT DEPAR

D 64033 A1

D64034 A4

UN27/102

PARTS LIST

ISS.	CHANGE
1	19th Jan. 1990

ITEM No.	No. OFF		DESCRIPTION	C'C'T REF.	BBC REF. OR DRG. No.
			Drawing List		
			Circuit (4 Sheets) D 64033 A1		
			Parts List D 64034 A4		
			Assembly D 64035 A2		
			Details D 64036 A2		
			P.B. Wiring (7 Sheets) D 64037 A2S		(Photo-Plots)
			P.B. Drilling D 64038 A2		
			P.B. Comp. Loc. (Copy) DSK 27565 A2		(For Information only)
			Further information required for manufacture:-		
			Unit assembly information EA 10484		
			Unit wiring information EA 10140		
			Prom. Sheets P5473, P5474, P5475, P5476,	P5559	
			F1041, F1042 P5477, F1094, F1095, F1103	P5560	
			Specification ED/UN26/102		
1	1	*	Printed Board To Spec. ED/PB/UN26/102		-0635565
			P.B. Wiring :-		D64037 A2S
			P.B. Drilling :-		D64038 A2
2	1		Screen/Coding Plate. 6U x 280mm		-0628483
			Slot positions (None)		
			Modified by contractor to :-		D64036 A2 Det.
3	1		Handle, P.C.B. yellow		-0388185
			Engraved by contractor to:-		D64036 A2 Det.
4	2		Fixed plug 64 pole	PL1, PL2	-0610062
5					
6					
7	2		Transmission socket 44 pole square PLCC		-0637184
8	2		Transmission socket 20 pole x .3 (7.6)		-0439423
9	7		Transmission socket 24 pole x .3 (7.6)		-0633859
10	3		Transmission socket 24 pole x .6 (15.2)		-044547X
11	5		Transmission socket 28 pole x .6 (15.2)		-0445043
12	1		Transmission socket 40 pole x .6 (15.2)		-0445488
13	1		Transistor mounting pad TO5		-0257748
14	4		Transistor mounting pad TO18		-025773X
15	1		Header Bergstic 0.1" pitch 36 pole		-047930X
16	2		Header 3 pole (mode from item 15)		-0464325
17	2		Link Bergstic mini-jump LK1,	LK2	-0216403
18	A/R		Wire PUN1/1M Blue		-039022X
19	3		Test point 'Vero' TP1 -	TP3	-0361867
20	1		Spacer M3 x 10 lg., round, Tufnol.		
21	A/R		1.6 B.T.C. Wire		-0613387
22	1		Anti-static bag		-0604990
23	1		SSD Caution label self-adhesive		

BBC

UN26/102

6 CHANNEL NICAM II PROCESSING UNIT (2)

PARTS LIST

DRN.	b.w.m.
TPD.	
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APPD.	R.C.A.

Design and Equipment Dept.

D 64034 A

ISS.	CHANGE
1	19th Jan. 1990

ITEM No.	No. OFF	DESCRIPTION	C'C'T REF.	BBC REF. OR DRG. No.
		Capacitors		
24	1	82p, Polystyrene, 63V. Rectangular		-0606108
		C4		
25				
26	1	390p, Polystyrene, 63V, Rectangular		-0450104
		C19		
27				
28	1	5·1nF, Polystyrene, 63V, Rectangular		-0450372
		C3		
29				
30	2	10nF, Polycarbonate, 250V, Rectangular		-0208919
		C5, C7		
31				
32	2	100nF, Polycarbonate, 160V, Rectangular		-0208951
		C1, C2,		
33				
34	74	100nF, Ceramic, 50V, Multilayer		-0204648
		C6, C8, C14, C15, C24 – C93		
35				
36	1	1nF, Polystyrene, 63V, Rectangular		-045020X
		C18.		
37				
38	4	220nF, Polycarbonate, 160V, Rectangular		-020896X
		C12, C13, C16, C17.		
39				
40	2	33μF, Electrolytic, 16V, General Purpose, Min		-0204881
		C9, C10		
41	1	20p, Polystyrene, 160V, Tubular		-020827X
		C23		
42	3	1nF, Multilayer, 100V, Radial Leads		-0207737
		C20, C21, C22		
		Resistors		
43	2	10Ω, Metal Film, 0·4W, 2%		-0099433
		R2, R6.		
44				
45	2	47Ω, Metal Film, 0·4W, 2%		-0099291
		R1, R5		
46				

BBC

DS / PLA4

UN26/102

Parts List

DRN.	b.w.m.	Design and Equipment De
TPD.		D64034 A4
CKD.		
APPD.	R.B.B.	Sheet 2 of 9

ISS.	CHANGE	
1	19th Jan. 1990	

ITEM No.	No. OFF		DESCRIPTION	C'C'T REF.	BBC REF. OR DRG. No.
47	1		75Ω, Metal Film, 0·4W, 2%		-0098992
			R4		
48	3		91Ω, Metal Film, 0·4W, 2%		-0202600
			R30, R31, R32		
49	2		100Ω, Metal Film, 0·4W, 2%		-0099007
			R26, R27		
50					
51	2		330Ω, Metal Film, 0·4W, 2%		-0099031
			R9, R45		
52					
53	3		470Ω, Metal Film, 0·4W, 2%		-009904X
			R33, R36, R37		
54	1		560Ω, Metal Film, 0·4W, 2%		-0227953
			R46		
55	1		1k, Metal Film, 0·4W, 2%		-009908?
			R13		
56	1		1K8, Metal Film, 0·4W, 2%		-0099484
			R41		
57	2		1K5, Metal Film, 0·4W, 2%		-0099110
			R17, R21		
58	1		2K, Metal Film, 0·4W, 2%		-0099137
			R39		
59	3		3K, Metal Film, 0·4W, 2%		-009936?
			R19, R23, R43		
60	1		2K7, Metal Film, 0·4W, 2%		-009949?
			R44		
61	5		3K3, Metal Film, 0·4W, 2%		-0099161
			R16, R18, R20, R22, R28		
62					
63	2		10K, Metal Film, 0·4W, 2%		-009922?
			R24, R38		
64					
65	1		30K, Metal Film, 0·4W, 2%		-0228094
			R14		
66	1		33K, Metal Film, 0·4W, 2%		-009925?
			R29		
67	1		22K, Metal Film, 0·4W, 2%		-022807?
			R42		
68	1		24K, Metal Film, 0·4W, 2%		-022808?
			R40		
69	1		75K, Metal Film, 0·4W, 2%		-0228157
			R10		
70					
71	1		100K, Metal Film, 0·4W, 2%		-0228181
			R11		
72					

BBC

DS / PLA4

UN26/102

Ports List

DRN.	b.w.m.
TPD.	
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Design and Equipment Dep

D64034 A/

CHANGE	ISS.
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ITEM No.	No. OFF		DESCRIPTION	C'C'T REF.	BBC REF. OR DRG. No.
73	1		470Ω x 4, S.I.L., 8 Pin.		-042815X
			R8		
74					
75	1		4K7 x 4, S.I.L., 8 Pin		-0428212
			R7		
76	1		47K x 8, S.I.L., 9 Pin		-0428054
			R34, R35		
77	1		10K, Variable, Top adjust		-0483552
			R12		
78					
79					
			Diodes		
80	2		IN4006		-0102592
			D14, D15		
81					
82	14		IN4148		-0102612
			D1 - D8, D10 - D13, D18, D19		
83					
84	1		VZ12M4, Zener		-0147282
			D9		
85					
86	2		VZ15M4, Zener		-0147345
			D16, D17		
87					
88					
			Transistors		
89	2		BC108, NPN.		-0520943
			Q5, Q6		
90					
91	2		BC107, NPN.		-0112266
			Q1, Q3		
92					
93	1		BFY50, NPN.		-0113779
			Q7		
94					
95	2		VN10KM, FET, N-Channel		-0501889
			Q2, Q4		
96					
97	2		2N3904		-0122792
			Q8, Q9		

BBC

DS / PLA4

UN26/102

Parts List

DRN.	b.w.m.	Design and Equipment Dept
TPD.		D64034 A/
CKD.		Sheet 4 of 9
APPD.	R.B.D.	

RAPIDOS 2770/87

CHANGE	ISS.
19th Jan. 1990	1

ITEM No.	No. OFF	DESCRIPTION	C'C'T REF.	BBC REF. OR DRG. No.
		Transformers/Inductors		
98	2	L/12269 (BBC)		-0635068
		L4, L5		
99				
100	1	L/12292 (BBC)		-0637192
		L2,		
101	1	15uH, TOKO 119ANA5873HM - PINK		-0481428
		L3,		
102	1	RMGS/103 (BBC)		-0637204
		L1		
103	1	TRANSFORMER NM 1600		-0637212
		T1		
		Integrated Circuits		
		CAUTION SSD		
		To avoid damage from		
		static charges great		
		care should be taken		
		when handling these devices		
104	2	HM6264P-10		-0531779
		U12, U13		
105				
106	3	SAA 7220/A		-0531787
		U28, U44, U54		
107				
108	2	TDC 1005		-0531795
		U56, U57		
109				
110	6	DIC 74LS674N		-0531807
		U36, U40, U41, U49, U50, U51		
111				
112	1	LM 319N		-0187213
		U86		
113				
114	1	TLP 521-4A		-0531736
		U64		
115				
116	7	DIC 74HCT 86N		-N10020
		U60, U61, U62, U79, U80, U81, U82		
117				
118	1	DIC 74HCT 126N		-N10027
		U68		

BBC

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Parts List

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TPD.		D64034 A/
CKD.		
APPD.		Sheet 5 of 9

ISS.	CHANGE
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ITEM No.	No. OFF		DESCRIPTION	C'C'T REF.	BBC REF. OR DRG. No.
119	1		DIC 74HCT 125N		-N10026
			U67		
120					
121					
122					
123	4		DIC 74HCT 163N		-N10041
			U2, U3, U4, U5		
124					
125	2		DIC 74HCT 251N		-N10066
			U32, U46		
126					
127	3		DIC 74F 189N		-0531815
			U15, U30, U37		
128					
129	2		DIC 74 HCT 244N		-N10063
			U71, U72		
130					
131	1		DIC 74HCT 273N		-N10071
			U69		
132					
133					
134					
135					
136					
137	1		TLO 72 CP		-0194800
			U65		
138					
139	1		DIC 74F08N		-0507551
			U76		
140					
141	2		9638RC		-0508717
			U55, U66		
142					
143	2		DIC 74HCT 00N		-0521356
			U83		
144					

BBC

DS / PLA4

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Parts List

DRN.	b.w.m	Design and Equipment Dep
TPD.		D 64034 A
CKD.		
APPD.	R.C.A	Sheet 6 of 9

ISS.	CHANGE
1	19th Jan. 1990

ITEM No.	No. OFF	DESCRIPTION	C'C'T REF.	BBC REF. OR DRG. No.
145				
146				
147	5	DIC 74HCT 377N		-0522152
		U17, U18, U20, U21, U88		
148				
149	1	LSA 010G		-0524279
		U29		
150				
151	1	DIC 74HCT 123N		-0525722
		U84		
152				
153	1	DIC 74HCT 04N		-052685X
		U75		
154				
155	1	DIC 74 HCT 541N		-0526912
		U89		
156				
157	2	DIC 74 HCT 245N		-0529772
		U24, U25		
158				
159	4	DIC 74HCT 157N		-0529949
		U23, U33, U34, U35		
160				
161	1	MJ1440DP		-053011X
		U45		
162				
163				
164				
165				
166				
167	1	PAL 16R4		-0531823
		Programmed to:- P5559 issue A	U19	-7001949
168				
169	1	PAL 16R6		-0531831
		Programmed to:- P5560 issue A	U11	-7001957
170				

BBC

DS / PLA4

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Parts List

DRN.	b.w.m
TPD.	
CKD.	
APPD.	R.B.J

Design and Equipment Dep

D64034 A/

ISS.	CHANGE
1	19th Jan. 1990

ITEM No.	No. OFF		DESCRIPTION	C'C'T REF.	BBC REF. OR DRG. No.
171	1		DMPAL 20X8NC		-053184X
			Programmed to:- F1094 issue A	U14	-700199X
172	5		DIC 2764 N		-0513758
			1 Programmed to:- P5477 issue A	U6	-7002012
			1 Programmed to:- P5476 issue A	U7	-7002020
			1 Programmed to:- P5475 issue A	U8	-7002039
			1 Programmed to:- P5474 issue A	U9	-7002047
			1 Programmed to:- P5473 issue A	U10	-7002055
173	6		EP600DC		-053009X
			3 Programmed to:- F1041 issue A	U26	-700000X
				U42	-700000X
				U52	-700000X
			3 Programmed to:- F1042 issue A	U27	-7000018
				U43	-7000018
				U53	-7000018
174	2		EP900LC		-0534904
			1 Programmed to:- F1095 issue A	U85	-7002004
			1 Programmed to:- F1103 issue A	U87	-7002256
175					
			Screws		For Fixing items
176	4		M2·5 x 10 lg. pan hd. m.s. zn. p.		4.
177	9		M2·5 x 8 lg. pan hd. m.s. zn. p.		2,
178	2		M3 x 6 lg. cheese hd. nylon. (R.S. 527-971)		100,
179					
			Nuts		
180	4		M2·5 hex. full m.s. zn. p.		4,
181					
182					
183					
			Washers		
184	9		M2·5 fibre		2,
185	2		M3 fibre		100,
186					
187					
188	1		Carton Cardboard to:-		Spec. ED/UN26/102

Notes:

	*	Denotes items supplied to the contractor on embodiment loan
	*+	Denotes items supplied to the contractor on embodiment loan, requiring special costing or supply action by B.B.C.
	Θ*	Denotes components supplied and fitted by B.B.C. on test.
	Θ+	Denotes coded plug in units supplied and fitted by B.B.C. on test.
	Ø	Denotes items supplied and fitted by B.B.C. on installation.

BBC

DS/PLA4

UN26/102

Parts List

DRN.	b.w.m
TPD.	
CKD.	
APPD.	R.G.d.

Design and Equipment Dep

D64034 A

SHT.	ISS.	DETAILS OF CHANGE	SHT.	ISS.	DETAILS OF CHANGE

ORIGINAL FRAME SIZE 190mm x 277mm

ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED

BBC

VM 418/A4

DESIGNS DEPARTMENT

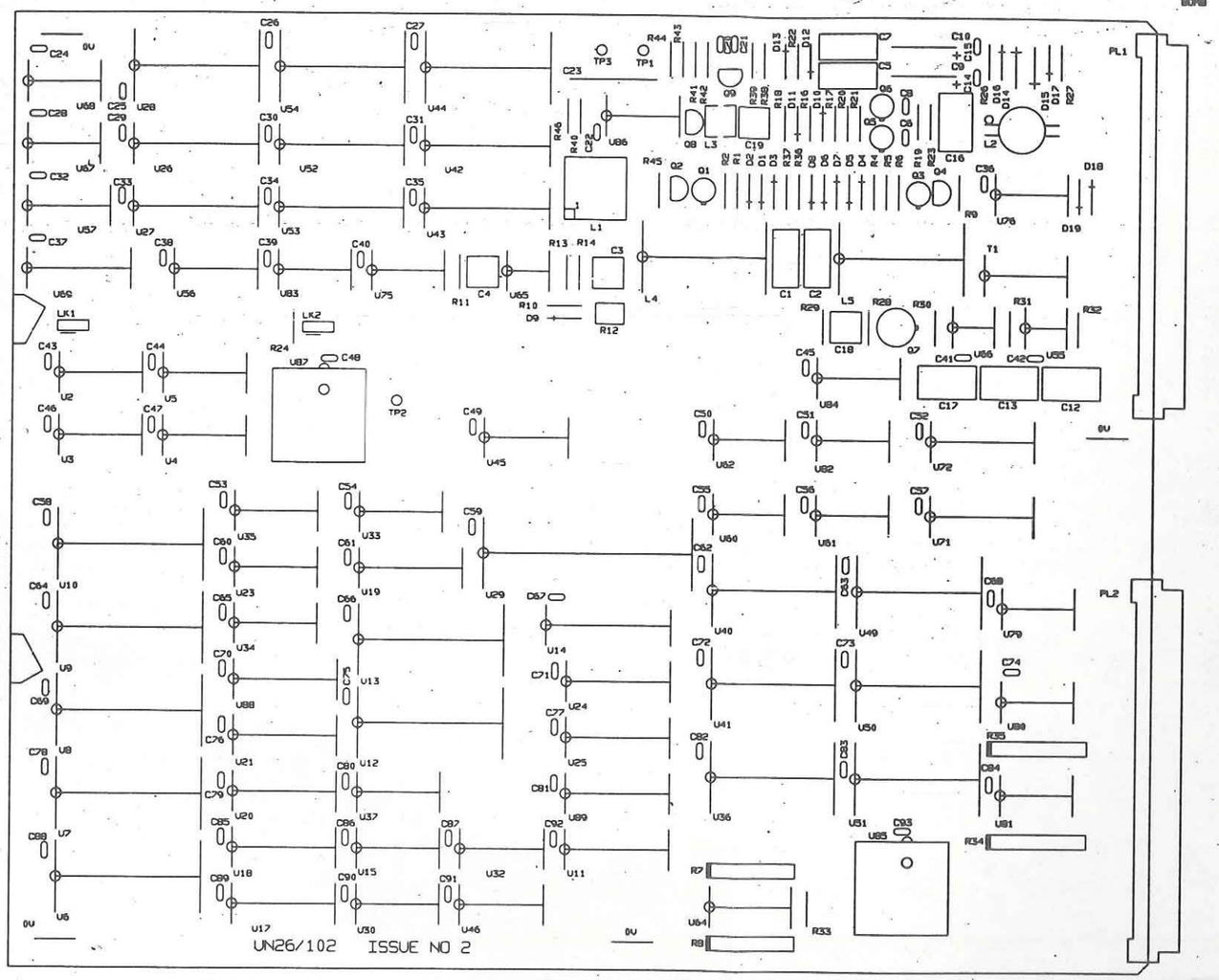
CODE UN26/102

PARTS LIST CHANGE RECORD, ISSUE :- 1

D 64034 A4

SHEET 9

UN26/102
ISSUE NO 2
PTH BOARD



SCALE :- 0

THIRD ANGLE PROJECTION

ORIGINAL FRAME SIZE 400mm x 574mm

DS/A2/1

ISS 2 CHANGE 17th Jan. 1990

Issue no. of this drawing must be the same as the photo-master issue.

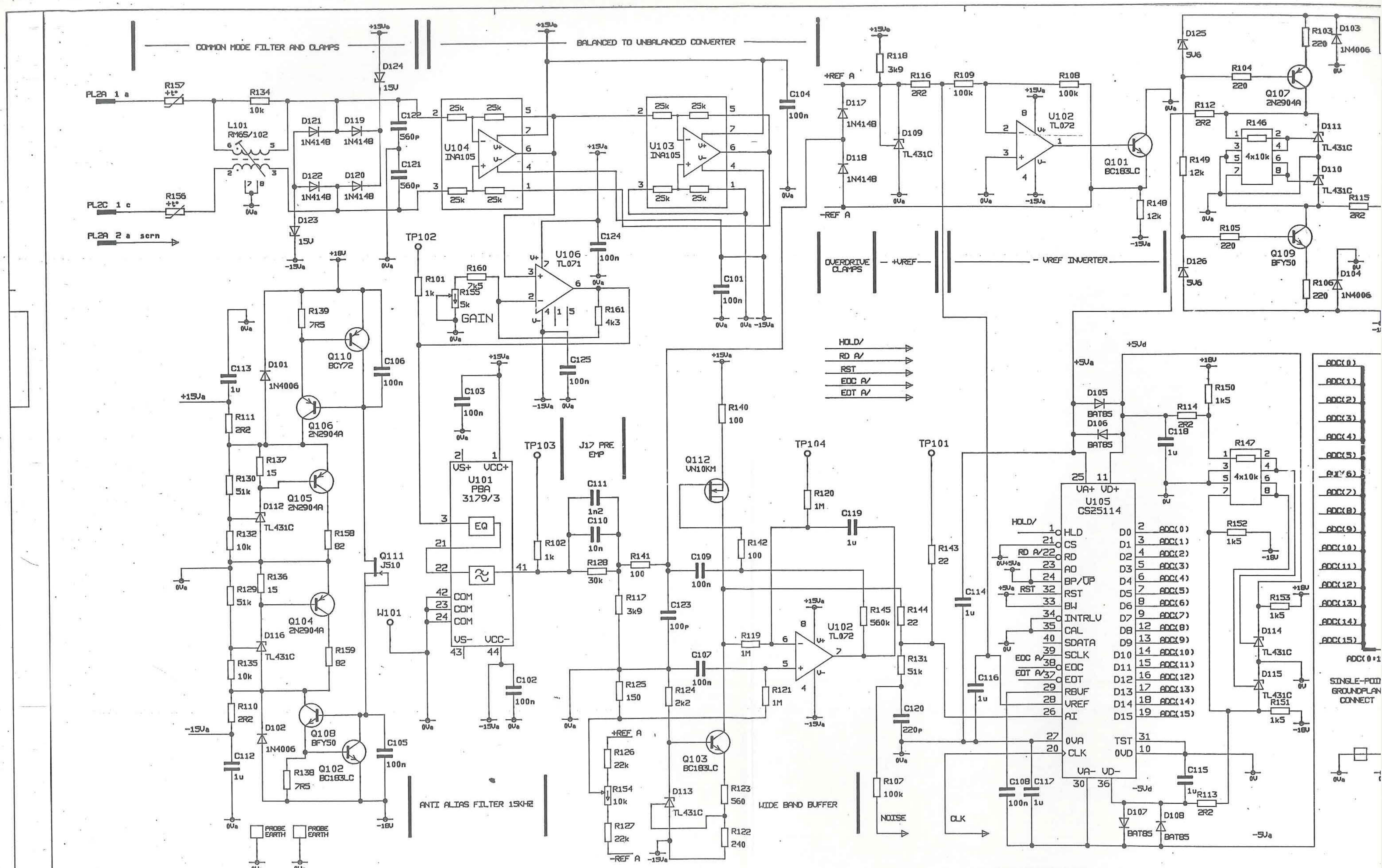
COPY OF COMP. LOCATION PHOTO PLOT UN26/102

All dimensions in millimetres unless otherwise stated
Normal tolerances
no decimal place — ± 1 mm unless
one decimal place — ± 0.3 mm otherwise
two decimal places — ± 0.1 mm stated

DRN. b.w.m.
TCD.
CKD.
APPD.

Design and Equipment Department

DSK 27565 A2



6 CHANNEL NICAM 2 ADC
SHEET 1 OF 4

C08/1

ISS	DATE
A	11.1.90

PLOTTED
CKD
APPD

DESIGN & EQUIPMENT DEPAR

D63937A2

COMMON MODE FILTER AND CLAMPS

BALANCED TO UNBALANCED CONVERTER

OVERDRIVE CLAMPS

+VREF

- VREF INVERTER

ANTI ALIAS FILTER 15KHZ

WIDE BAND BUFFER

SINGLE-POINT GROUNDPLANE CONNECT

PL2A 1 a

PL2C 1 c

PL2A 2 a scrn

R157 +t°

R156 +t°

R134 10k

L101 RM6S/102

D121 1N4148

D119 1N4148

D122 1N4148

D120 1N4148

D123 15V

D124 15V

C122 560p

C121 560p

U104 INA105

U103 INA105

C104 100n

C101 100n

TP102

R101 1k

R160 7k5

R155 5k GAIN

U106 TL071

C124 100n

C125 100n

R161 4k3

R118 3k9

R116 2R2

R109 100k

R108 100k

D117 1N4148

D118 1N4148

D109 TL431C

U102 TL072

Q101 BC183LC

R148 12k

D125 5V6

D126 5V6

R103 220

D103 1N4006

R104 220

Q107 2N2904A

R112 2R2

R146 4x10k

D111 TL431C

D110 TL431C

R149 12k

R115 2R2

R105 220

Q109 BFY50

R106 220

D104 1N4006

HOLD/

RD A/

RST

EDC A/

EDT A/

+5Vd

+5Va

D105 BAT85

D106 BAT85

R114 2R2

C118 1u

R150 1k5

R147 4x10k

U105 CSZ5114

VA+ VD+

VA- VD-

HLD CS RD AD BP/UP RST BW INTRLV CAL SDATA SCLK EOC EDT RBUF VREF AI 0VA CLK

D0 D1 D2 D3 D4 D5 D6 D7 D8 D9 D10 D11 D12 D13 D14 D15 TST 0VD

ADC(0) ADC(1) ADC(2) ADC(3) ADC(4) ADC(5) ADC(6) ADC(7) ADC(8) ADC(9) ADC(10) ADC(11) ADC(12) ADC(13) ADC(14) ADC(15)

ADC(0:15)

R152 1k5

R153 1k5

D114 TL431C

D115 TL431C

R151 1k5

C113 1u

D101 1N4006

Q110 BCY72

C106 100n

R111 2R2

Q106 2N2904A

R137 15

R130 51k

Q105 2N2904A

D112 TL431C

R132 10k

R158 82

R136 15

R129 51k

Q104 2N2904A

D116 TL431C

R135 10k

R159 82

R110 2R2

D102 1N4006

Q108 BFY50

Q102 BC183LC

R138 7R5

C112 1u

C105 100n

PROBE EARTH

PROBE EARTH

Q111 J510

W101

C103 100n

U101 PBA 3179/3

EQ

COM COM COM

VS+ VCC+ VS- VCC-

C102 100n

TP103

J17 PRE EMP

C111 1n2

C110 10n

R102 1k

R128 30k

R141 100

R117 3k9

C123 100p

C107 100n

R125 150

R124 2k2

R121 1M

R119 1M

U102 TL072

R145 560k

R144 22

R131 51k

C120 220p

R107 100k NOISE

R140 100

Q112 VN10KM

R120 1M

C119 1u

R142 100

C109 100n

R143 22

C114 1u

C116 1u

C108 100n

C117 1u

C115 1u

R113 2R2

D107 BAT85

D108 BAT85

-5Vd

CLK

R126 22k

R154 10k

R127 22k

Q103 BC183LC

D113 TL431C

R123 560

R122 240

TP104

TP101

6 CHANNEL NICAM 2 ADC
SHEET 1 OF 4

C08/19

ISS	DATE
A	11.1.90

PLOTTED	DESIGN & EQUIPMENT DEPARTMENT
CKD	
APPD	A.B.P.

D63937A2.

COMMON MODE FILTER AND CLAMPS

BALANCED TO UNBALANCED CONVERTER

OVERDRIVE CLAMPS

+VREF

- VREF INVERTER

ANALOGUE INPUT

PL2A 5 a

PL2C 5 c

PL2A 6 a scrn

L201 RM6S/102

U204 INA105

U203 INA105

U206 TL071

U202 TL072

GAIN

U201 PBA 3179/3

EQ

U205 CS25114

Q201 BC183LC

Q202 BC183LC

Q203 BC183LC

Q204 2N2904A

Q205 2N2904A

Q206 2N2904A

Q207 2N2904A

Q208 BFY50

Q209 BFY50

Q210 BCY72

Q211 J510

Q212 VN10KM

TP201

TP202

TP203

TP204

J17 PRE EMP

W201

HOLD/

RD B/

RST

EDC B/

EDT B/

ANTI ALIAS FILTER 15KHZ

WIDE BAND BUFFER

NOISE

CLK

SINGLE-POINT GROUNDPLANE CONNECT

PROBE EARTH

PROBE EARTH

ADC(0:15)

ISS	DATE
A	11·1·90

6 CHANNEL NICAM 2 ADC

SHEET 2 OF 4

C08/19

PLOTTED	DESIGN & EQUIPMENT DEPARTMENT
CKD	
APPD	D63937A2.

COMMON MODE FILTER AND CLAMPS

BALANCED TO UNBALANCED CONVERTER

OVERDRIVE CLAMPS

+VREF

VREF INVERTER

ANTI ALIAS FILTER 15KHZ

WIDE BAND BUFFER

SINGLE-POINT GROUNDPLANE CONNECT

ANALOGUE INPUT

PL2A 5 a

PL2C 5 c

PL2A 6 a scrn

L201 RM6S/102

U204 INA105

U203 INA105

U206 TL071

U202 TL072

U201 PBA 3179/3

U205 CS25114

Q201 BC183LC

Q202 BC183LC

Q203 BC183LC

Q204 2N2904A

Q205 2N2904A

Q206 2N2904A

Q207 2N2904A

Q208 BFY50

Q209 BFY50

Q210 BCY72

Q212 VN10KM

GAIN

+REF B

-REF B

HOLD/

RD B/

RST

EOC B/

EDT B/

CLK

NOISE

TP201

TP202

TP203

TP204

W201

J17 PRE EMP

PROBE EARTH

PROBE EARTH

ADC(0:15)

6 CHANNEL NICAM 2 ADC

SHEET 2 OF 4

C08/19

ISS	DATE
A	11·1·90

PLOTTED

CKD

APPD R.C.D.

DESIGN & EQUIPMENT DEPARTMENT

D63937A2.

COMMON MODE FILTER AND CLAMPS

BALANCED TO UNBALANCED CONVERTER

OVERDRIVE CLAMPS

+VREF

-VREF INVERTER

ANTI ALIAS FILTER 15KHZ

WIDE BAND BUFFER

ANALOGUE INPUT

PL2A 9 a

PL2C 9 c

PL2A 10a scrn

GAIN

HOLD/
RD C/
RST
EOC C/
EOT C/

ADC(0)
ADC(1)
ADC(2)
ADC(3)
ADC(4)
ADC(5)
ADC(6)
ADC(7)
ADC(8)
ADC(9)
ADC(10)
ADC(11)
ADC(12)
ADC(13)
ADC(14)
ADC(15)
ADC(0:15)

SINGLE-POINT GROUNDPLANE CONNECT

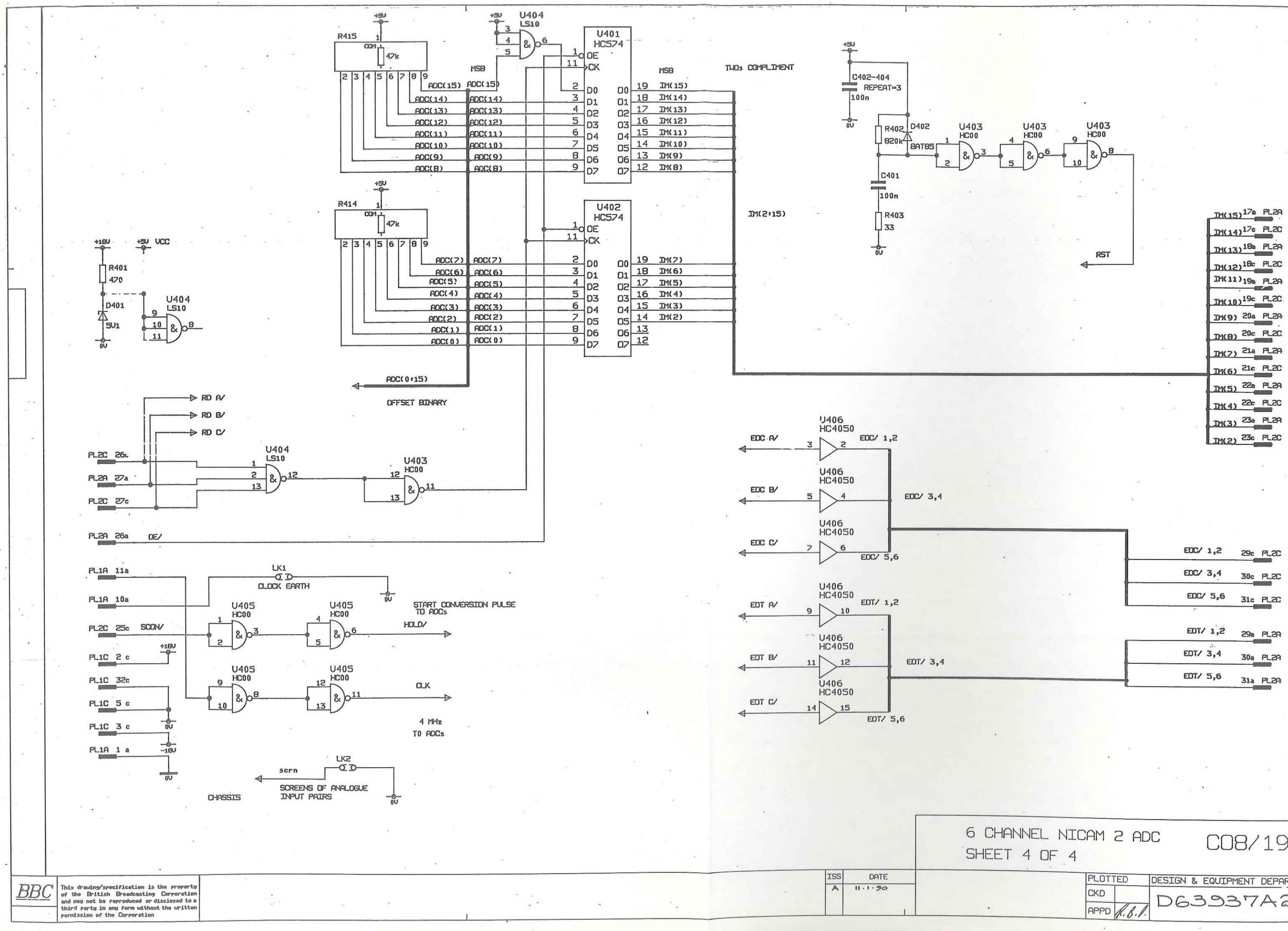
6 CHANNEL NICAM 2 ADC

SHEET 3 OF 4

C08/19

ISS	DATE
A	11.1.90

PLOTTED	DESIGN & EQUIPMENT DEPARTMENT
CKD	
APPD	D63937A2.



6 CHANNEL NICAM 2 ADC
SHEET 4 OF 4

C08/19

ISS	DATE
A	11·1·90

PLOTTED
CKD
APPD K.B.I.

DESIGN & EQUIPMENT DEPARTMENT

D63937A2.

ISS.	CHANGE
4	11.1.90

ITEM No.	No. OFF	DESCRIPTION	C'C'T REF.	BBC REF. OR DRG. No.
		CIRCUIT.		D63937A2.
		PARTS LIST.		D63938A4.
		ASSEMBLY.		D63939A2.
		P.C.BOARD.		D63940A3s.
		HANDLE ENGRAVING.		D63941A4.
		P.C.B. DRILLING.		D63942A2.
		FURTHER INFO REQD FOR MAUFACTURE.		
		UNIT ASSY NOTES EA 10484		
		UNIT WIRING NOTES EA 10140		
1	1	P.C.B. TO SPEC: C08/19/P.B/M.L. MANUFACTURED TO:-		0637393
2				
3				
4				
5	1	HANDLE (BLACK)		S53922 038819
6				
7				
8				

BBC

DS / PLA4

PARTS LIST.
C08/19.

DRN.	M.C.L	DESIGN & EQUIP DEPT.
TPD.		D63938A4
CKD.		
APPD.	R.C.L.	SHEET 1 OF 14 SHEET

ISS.	CHANGE
4	11.1.90

ITEM No.	No. OFF	DESCRIPTION	C'C'T REF.	BBC REF. OR DRG. No.
		CIRCUIT.		D63937A2.
		PARTS LIST.		D63938A4.
		ASSEMBLY.		D63939A2.
		P.C.BOARD.		D63940A3s.
		HANDLE ENGRAVING.		D63941A4.
		P.C.B. DRILLING.		D63942A2.
		FURTHER INFO REQD FOR MAUFACTURE.		
		UNIT ASSY NOTES EA 10484		
		UNIT WIRING NOTES EA 10140		
1	1	P.C.B. TO SPEC: C08/19/P.B/M.L. MANUFACTURED TO:-		0637393
2				
3				
4				
5	1	HANDLE (BLACK)		S53922 038819
6				
7				
8				

BBC

DS / PLA4

PARTS LIST.
C08/19.

DRN.	M.C.L	DESIGN & EQUIP DEPT.
TPD.		D63938A4
CKD.		
APPD.		SHEET 1 OF 14 SHEET

ISS.	CHANGE
A	11-1-90

ITEM No.	No. OFF		DESCRIPTION	C'C'T REF.	BBC REF. OR DRG. No.
9					
10					
11					
12					
13					
14					
15	2		20 WAY, SINGLE ROW SOCKET.		0633465
16	3		4 WAY, SINGLE ROW SOCKET. 3 off item 16 can be made from 1 off item 15.		
17	3		3 WAY, SINGLE ROW SOCKET. 3 off item 17 can be made from 1 off item 15.		
18	6		2 WAY, SINGLE ROW SOCKET. 6 off item 18 can be made from 1 off item 15.		
19					
20					
21	18		HEAT SINK R.S. TYPE Nº. 401-419.		0637413
22	18		TRANSISTOR PAD. R.S. TYPE Nº 402-175.		0637405
23					
24					
25.					

BBC

DS / PLA4

PARTS LIST.
CO8/19.

DRN.	M.C.L.	DESIGN & EQUIP. DEPT.
TPD.		D63938A4.
CKD.		
APPD.	M.B.P.	SHEET 2 OF 14 SHEET

ISS.	CHANGE
A	11·1·90

ITEM No.	No. OFF	DESCRIPTION	C'C'T REF.	BBC REF. OR DRG. No.
		RESISTORS.		
25	21	2·2Ω RESISTOR, 2%, 0·4W, MR25.		S26877 0478913
		(7) R110, R111, R112, R113, R114, R115, R116.		
		(7) R210, R211, R212, R213, R214, R215, R216.		
		(7) R310, R311, R312, R313, R314, R315, R316.		
26	6	7·5Ω RESISTOR, 2%, 0·4W, MR25.		S26877 0227701
		(2) R138, R139.		
		(2) R238, R239.		
		(2) R338, R339.		
27	6	15Ω RESISTOR, 2%, 0·4W, MR25.		S26877 0227760
		(2) R136, R137.		
		(2) R236, R237.		
		(2) R336, R337.		
28	6	22Ω RESISTOR, 2%, 0·4W, MR25.		S26877 0098976
		(2) R143, R144.		
		(2) R243, R244.		
		(2) R343, R344.		
29	1	33Ω RESISTOR, 2%, 0·4W, MR25.		S26877 0099441
		(1) R403.		
30	6	82Ω RESISTOR, 2%, 0·4W, MR25.		S26877 0099303
		(2) R158, R159.		
		(2) R258, R259.		
		(2) R358, R359.		
31	9	100Ω RESISTOR, 2%, 0·4W, MR25.		S26877 0099007
		(3) R140, R141, R142.		
		(3) R240, R241, R242.		
		(3) R340, R341, R342.		
32	3	150Ω RESISTOR, 2%, 0·4W, MR25.		S26877 0099468
		(1) R125		
		(1) R225		
		(1) R335		
33	12	220Ω RESISTOR, 2%, 0·4W, MR25.		S26877 0099023
		(4) R103, R104, R105, R106.		
		(4) R203, R204, R205, R206.		
		(4) R303, R304, R305, R306.		
34	3	240Ω RESISTOR, 2%, 0·4W, MR25.		S26877 0099327
		(1) R122.		
		(1) R222.		
		(1) R322.		

ISS.	CHANGE
A	11·1·90

ITEM No.	No. OFF		DESCRIPTION	C'C'T REF.	BBC REF. OR DRG. No.
35	3		560Ω RESISTOR, 2%, 0·4W, MR25.		S26877 0227953
			(1) R123.		
			(1) R223.		
			(1) R323.		
36	1		470Ω RESISTOR, 2%, 0·4W, MR25.		S26877 0099047
			(1) R401.		
37					
38					
39					
40	6		1KΩ RESISTOR, 2%, 0·4W, MR25		S26877 009908
			(2) R101, R102.		
			(2) R201, R202.		
			(2) R301, R302.		
41	12		1·5KΩ RESISTOR, 2%, 0·4W, MR25.		S26877 0099110
			(4) R150, R151, R152, R153.		
			(4) R250, R251, R252, R253.		
			(4) R350, R351, R352, R353.		
42	3		2·2KΩ RESISTOR, 2%, 0·4W, MR25.		S26877 0099145
			(1) R124.		
			(1) R224.		
			(1) R324.		
43	6		3·9KΩ RESISTOR, 2%, 0·4W, MR25.		S26877 0099177
			(2) R117, R118.		
			(2) R217, R218.		
			(2) R317, R318.		
44	9		10KΩ RESISTOR, 2%, 0·4W, MR25.		S26877 0099224
			(4) R132, R134, R135.		
			(4) R232, R234, R235.		
			(4) R332, R334, R335.		
45	6		12KΩ RESISTOR, 2%, 0·4W, MR25.		S26877 0228043
			(2) R148, R149.		
			(2) R248, R249.		
			(2) R348, R349.		

BBC

DS/PLA4

PARTS LIST.
CO8/19.

DRN.	M.C.L.	DESIGN & EQUIP. DEPT
TPD.		D63938A4.
CKD.		
APPD.	A.B.L.	SHEET 4 OF 14 SHEETS

ISS.	CHANGE
A	11.1.90

ITEM No.	No. OFF	DESCRIPTION	C'C'T REF.	BBC REF. OR DRG. No.
46	6	22KΩ RESISTOR, 2%, 0·4W, MR 25.		S26877 0228078
		(2) R126, R127,		
		(2) R226, R227.		
		(2) R326, R327.		
47	3	30KΩ RESISTOR, 2%, 0·4W, MR25.		S26877 0228094
		(1) R128.		
		(1) R228.		
		(1) R328.		
48	9	51KΩ RESISTOR, 2%, 0·4W, MR25.		S26877 0228122
		(3) R129, R130, R131.		
		(3) R229, R230, R231.		
		(3) R329, R330, R331.		
49	9	100KΩ RESISTOR, 2%, 0·4W, MR25.		S26877 0228181.
		(3) R107, R108, R109.		
		(3) R207, R208, R209.		
		(3) R307, R308, R309.		
50	3	560KΩ RESISTOR, 2%, 0·4W, MR25.		S26877 022834
		(1) R145.		
		(1) R245.		
		(1) R345.		
51	1	820KΩ. RESISTOR, 2%, 0·4W, MR25.		S26877 022838
		(1) R402.		
52	3	4·3KΩ RESISTOR, 2%, 0·4W, MR25.		S26877 009918
		(1) R161,		
		(1) R261.		
		(1) R361.		
53	3	7·5KΩ RESISTOR, 2%, 0·4, MR25.		S26877 0228027
		(1) R160.		
		(1) R260.		
		(1) R360		
54				
55				
56				
57				
58	9	1MΩ RESISTOR, 2%, 0·4W, MR25.		S26877 009928
		(3) R119, R120, R121.		
		(3) R219, R220, R221.		
		(3) R319, R320, R321.		

BBC

DS / PLA4

PARTS LIST.

C08/19.

DRN.	M.C.L.	DESIGN & EQUIP. DEPT.
TPD.		D63938A4.
CKD.		
APPD.	M.C.L.	SHEET 5 OF 14 SHEET

ISS.	CHANGE
A	11.1.90

ITEM No.	No. OFF		DESCRIPTION	C'C'T REF.	BBC REF. OR DRG. No.
59	6		10 KΩ, SIL RESISTOR, 8-PIN.		S27076 0428220.
			(2) R146, R147.		
			(2) R246, R247.		
			(2) R346, R347.		
60	2		47 KΩ, SIL RESISTOR, 9-PIN		S27075 0428054
			(2) R414, R415.		
61					
62	3		5KΩ. VAR. RESISTOR, TOP-ADJ.		S27243 0307662
			(1) R155.		
			(1) R255.		
			(1) R355.		
63	3		10KΩ. VAR. RESISTOR, TOP-ADJ.		S27243 0307670
			(1) R154.		
			(1) R254.		
			(1) R354.		
64					
65					
66					
67					
68					
69					
70	6		THERMISTOR, PTC, RAYCHEM 21091.		0629472
			(2) R156, R157,		
			(2) R256, R257.		
			(2) R356, R357.		
71					
72.					

BBC

DS/PLA4

PARTS LIST.
C08/19.

DRN.	M.C.L.	DESIGN & EQUIP. DEPT
TPD.		D63938A4.
CKD.		
APPD.	R.B.D.	SHEET 6 OF 14 SHEETS

ISS.	CHANGE
A	11·1·90

ITEM No.	No. OFF	DESCRIPTION	C'C'T REF.	BBC REF. OR DRG. No.
		CAPACITORS.		
73	3	100pf CAPACITOR, 63V, RECT, POLY.		S21005 0449968
		(1) C123.		
		(1) C223.		
		(1) C323.		
74	3	220pf CAPACITOR, 63V, RECT, POLY.		S21005 0450041
		(1) C120.		
		(1) C220.		
		(1) C320.		
75	6	560pf CAPACITOR, 63V, RECT, POLY.		S21005 0450147
		(2) C121, C122.		
		(2) C221, C222.		
		(2) C321, C322.		
76				
77				
78				
79	3	1·2nf CAPACITOR, 63V, RECT, POLY.		S21005 0450226
		(1) C111.		
		(1) C211.		
		(1) C311.		
80	3	10nf CAPACITOR, 63V, RECT, POLY.		S21005 060614(
		(1) C110.		
		(1) C210.		
		(1) C310.		
81	28	100nf CAPACITOR, 50V, MULTILAYER.		S20648 0204648
		(8) C101, C102, C103, C104, C105, C106, C124, C125		
		(8) C201, C202, C203, C204, C205, C206, C224, C225		
		(8) C301, C302, C303, C304, C305, C306, C324, C325		
		(4) C401, C402, C403, C404.		
82	9	100nf CAPACITOR, 63V, POLYESTER, RECT.		S21035 0466153
		(3) C107, C108, C109.		
		(3) C207, C208, C209.		
		(3) C307, C308, C309.		
83				

BBC

DS / PLA4

PARTS LIST.
CO 8/19.

DRN.	M.C.L.	DESIGN & EQUIP. DEPT
TPD.		D63938A4.
CKD.		
APPD.	R.B.D.	SHEET 7 OF 14 SHEETS

RAPIDOS 2770/87

ISS.	CHANGE
A	11·1·90

ITEM No.	No. OFF	DESCRIPTION	C'C'T REF.	BBC REF. OR DRG. No.
84				
85	21	1μF CAPACITOR, 50V, MULTILAYER.		520648 0389813.
		(7) C112, C113, C114, C115, C116, C117, C118.		
		(7) C212, C213, C214, C215, C216, C217, C218.		
		(7) C312, C313, C314, C315, C316, C317, C318.		
86				
87				
88				
89	3	1μF CAPACITOR, 100V, R.S. TYPE 114-430.		0627601
		(1) C119.		
		(1) C219.		
		(1) C319.		
90				
91				
93				
94				
		DIODES		
95	13	BAT 35, DIODE, SCHOTTKY.		0534754
		(4) D105, D106, D107, D108.		
		(4) D205, D206, D207, D208.		
		(4) D305, D306, D307, D308.		
		(1) D402.		
96	6	1N4006, DIODE.		0102592
		(2) D101, D102.		
		(2) D201, D202.		
		(2) D301, D302.		
97				

BBC

DS / PLA4

PARTS LIST.
CO8/19.

DRN.	M.C.L.
TPD.	
CKD.	
APPD.	

DESIGN & EQUIP. DEPT.
D63938A4.
SHEET 8 OF 14 SHEET

ISS. A

CHANGE 11.1.90

ITEM No.	No. OFF	DESCRIPTION	C'C'T REF.	BBC REF. OR DRG. No.
98	18	1N4148 DIODE.		0102612.
		(6) D117, D118, D119, D120, D121, D122.		
		(6) D217, D218, D219, D220, D221, D222.		
		(6) D317, D318, D319, D320, D321, D322.		
99	6	VZ 15M4. DIODE, ZENER.		0147345
		(2) D123, D124.		
		(2) D223, D224.		
		(2) D323, D324.		
100	1	VZ 5.1 M4, DIODE, ZENER.		0147877
		(1) D401.		
101	6	VZ 5.6 M4, DIODE, ZENER.		0147893
		(2) D125, D126.		
		(2) D225, D226.		
		(2) D325, D326.		
102	24	TL431. DIODE, REGULATOR.		0534746
		(8) D109, D110, D111, D112, D113, D114, D115, D116.		
		(8) D209, D210, D211, D212, D213, D214, D215, D216.		
		(8) D309, D310, D311, D312, D313, D314, D315, D316.		
103				
104				
105				
106				
107				
		INTEGRATED CIRCUITS. I/C's.		
108	1	DIC 74 HC 405ON.		N10285
		(1) U406.		
109	3	CSZ 5114.		0534785
		(1) U105.		
		(1) U205.		
		(1) U305.		0534738
110	3	PBA 3179/3.		
		(1) U101.		
		(1) U201.		
		(1) U301.		

BBC

DS/PLA4

PARTS LIST.
C08/19.

DRN.	M.C.L	DESIGN & EQUIP. DEPT.
TPD.		D63938A4.
CKD.		
APPD.	R.B.C.	SHEET 9 OF 14 SHEET

ISS.	CHANGE
A	11·1·90

ITEM No.	No. OFF	DESCRIPTION	C'C'T REF.	BBC REF. OR DRG. No.
111	1	DIC 74 LS 10N.		018792X.
		(1) U404.		
112	3	TL 072 CP		0194800
		(1) U102.		
		(1) U202.		
		(1) U302.		
113	2	DIC 74 HC 574N.		0523902
		(2) U401, U402.		
114	2	DIC 74 HC 00N.		0524697
		(2) U403, U404.		
115	6	INA 105 KP.		0530231.
		(2) U103, U104.		
		(2) U203, U204.		
		(2) U303, U304.		
116	3	TL 071 CP		0194799
		(1) U106.		
		(1) U206.		
		(1) U306.		
117				
118				
119				
120	3	J 510, N-CHAN, JFET.		053477(
		(1) Q111.		
		(1) Q211.		
		(1) Q311.		
121	12	2N 2904A, TRANSISTOR, PNP.		0108222
		(4) Q104, Q105, Q106, Q107.		
		(4) Q204, Q205, Q206, Q207.		
		(4) Q304, Q305, Q306, Q307.		
122	3	BCY 72, TRANSISTOR, PNP.		011280X
		(1) Q110,		
		(1) Q210.		
		(1) Q310.		
123	6	BFY 50, TRANSISTOR. NPN.		0113779
		(2) Q108, Q109.		
		(2) Q208, Q209.		
		(2) Q308, Q309.		

BBC

DS / PLA4

PARTS LIST.
C08/19.

DRN.	M.C.L.	DESIGN & EQUIP. DEPT
TPD.		D63938A4.
CKD.		
APPD.	A.B.L.	SHEET 10 OF 14 SHEET

RAPIDOS 2770/87

ISS.	A
CHANGE	11·1·90

ITEM No.	No. OFF		DESCRIPTION	C'C'T REF.	BBC REF. OR DRG. No.
124	9		BC 183 LC, TRANSISTOR, NPN.		0190730
			(3) Q101, Q102, Q103.		
			(3) Q201, Q202, Q203.		
			(3) Q301, Q302, Q303.		
125	3		VN 10 KM, FET, N-CHANNEL		0501889.
			(1) Q112.		
			(1) Q212.		
			(1) Q312.		
126					
127					
128					
129					
130					
131					
132					
133					
134					
135					
136					
137					
138					
139					

BBC

DS / PLA4

PARTS LIST.
CO8/19.

DRN.	M.C.L.	DESIGN & EQUIP. DEPT
TPD.		D63938A4
CKD.		
APPD.	R.D.A.	SHEET 11 OF 14. SHEE

CHANGE	ISS.
11.1.90	A

ITEM No.	No. OFF	DESCRIPTION	C'C'T REF.	BBC REF. OR DRG. No.
140	9	8 POLE LOW PROFILE SOCKET.		0445453
141	3	14 POLE LOW PROFILE SOCKET.		0445461
142	1	16 POLE LOW PROFILE SOCKET.		040704X
143	2	20 POLE LOW PROFILE SOCKET.		0439423
144	3	40 POLE LOW PROFILE SOCKET.		0445488
145				
146				
147				
148				
149	3	PIN, BULLET NOSE, SEALECTRO 229-1067. (1) W101. (1) W201. (1) W301.		S28677 040574E
150				
151				
152	A/R	B.T.C. WIRE, Ø1·0.		0051768
153				
154				
155	12	TEST POINT, VERO. (4) TP101, TP102, TP103, TP104. (4) TP201, TP202, TP203, TP204. (4) TP301, TP302, TP303, TP304.		S28650 039229X
156				
157				
158	3	INDUCTOR, B.B.C. TYPE. RM6S/102. (1) L101. (1) L201. (1) L301.		0637421
159				
160				

BBC

DS / PLA4

PARTS LIST.
C08/19.

DRN.	M.C.L.	DESIGN & EQUIP. DEPT.
TPD.		D63938A4.
CKD.		
APPD.		SHEET 12 OF 14 SHEE

ISS.	A
CHANGE	11·1·90

ITEM No.	No. OFF		DESCRIPTION	C'C'T REF.	BBC REF. OR DRG. No.
161	2		FIXED PLUG . REVERSED, 3 ROW, 90° MOUNTING		S25090 0610062
			(2) PL1 , PL2		
162					
163					
164	2		LINK , 2PIN , SINGLE-ROW, 0·1 PITCH.		
			(2) LK1 , LK2.		
165					
166					
167					
					FOR FIXING ITEMS.
168	4		SCREW M2·5 x 10LG		161.
169					
170					
171	4		WASHER , PLAIN , M2·5.		161.
172					
173					
174	4		NUT , FULL , HEX , M2·5.		161.
175					
176					
177					
178					
179					
180					
181					
182.					

BBC

DS / PLA4

PARTS LIST.
C08/19.

DRN.	M.C.L.	DESIGN & EQUIP. DEPT.
TPD.		D63938A4.
CKD.		
APPD.		SHEET 13 OF 14 SHEET

SHT.	ISS.	DETAILS OF CHANGE	SHT.	ISS.	DETAILS OF CHANGE

ORIGINAL
FRAME SIZE
190mm x 277mm

ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED

BBC

VM 418/A4

DESIGNS DEPARTMENT

CODE C08/19

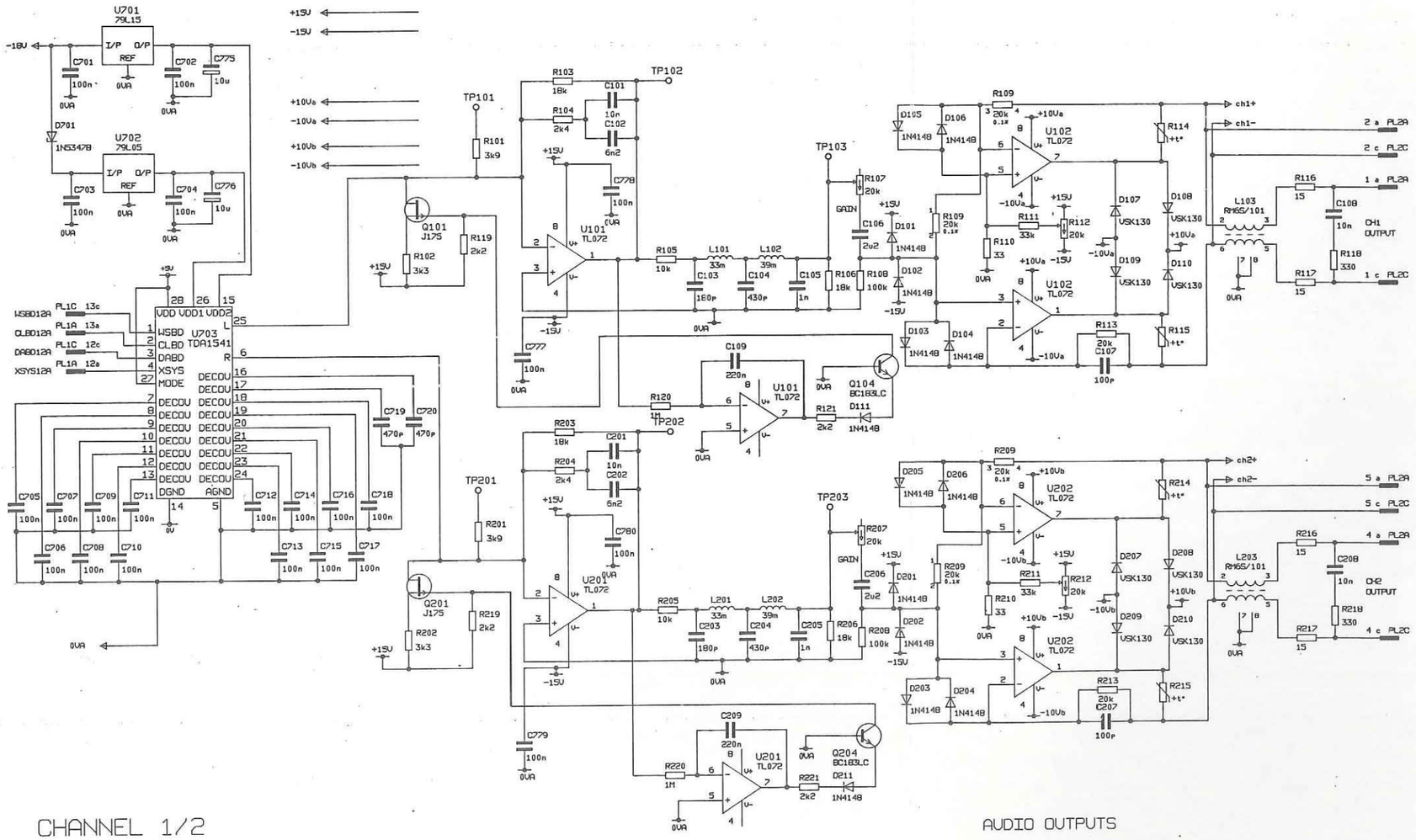
PARTS LIST CHANGE RECORD, ISSUE :- A

D63938 A4

SHEET 14

NAFC
SHEET 1 OF 7
02/05/89

H1 H2 H3 BOARD BOARD BOARD
H9 H13 ROUT ROUT



CHANNEL 1/2

AUDIO OUTPUTS

NICAM MKII CODER CHECK DAC
SHEET 1 OF 7

C09/14

SCALE:- 0

THIRD ANGLE PROJECTION

ORIGINAL FRAME SIZE 574mm x 821mm

CHANGE RECORD

BBC

DS/A1/1

R292

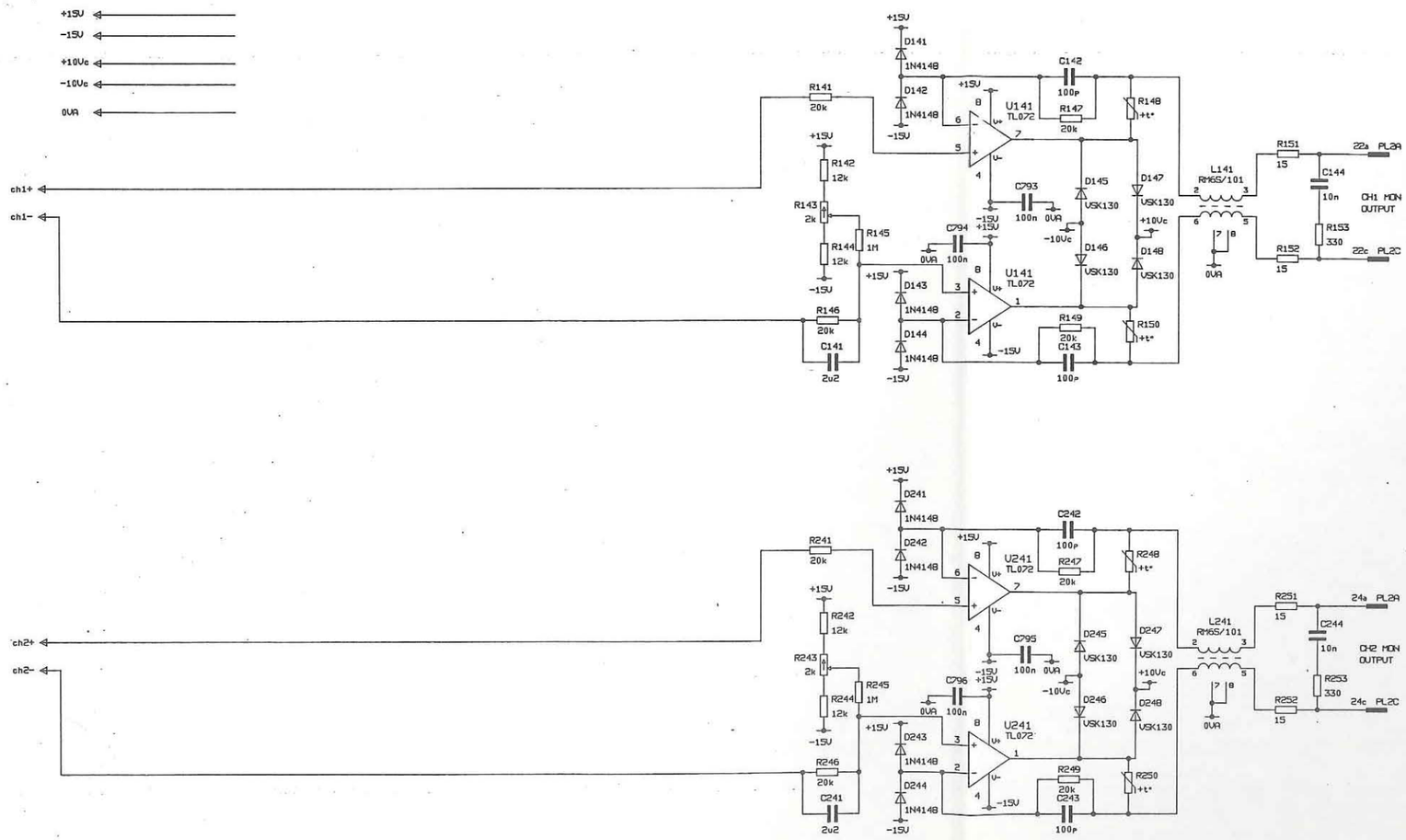
C09/14 CIRCUIT

All dimensions in millimetres unless otherwise stated. Normal tolerances:
no decimal place – ± 1 mm unless
one decimal place – ± 0.3 mm otherwise
two decimal places – ± 0.1 mm stated

DRN.
TCD.
CKD.
APPD.

DESIGN & EQUIPMENT DEPT.
D64048 A1
SHEET 1 OF 7 SHEETS

NAFC
SHEET 2 OF 7
02/05/89



CHANNEL 1/2

MONITOR OUTPUTS

NICAM MKII CODER CHECK DAC
SHEET 2 OF 7

C09/14

SCALE:- 0

THIRD ANGLE PROJECTION

ORIGINAL FRAME SIZE
574mm x 821mm

CHANGE
SS 2 11.1.90

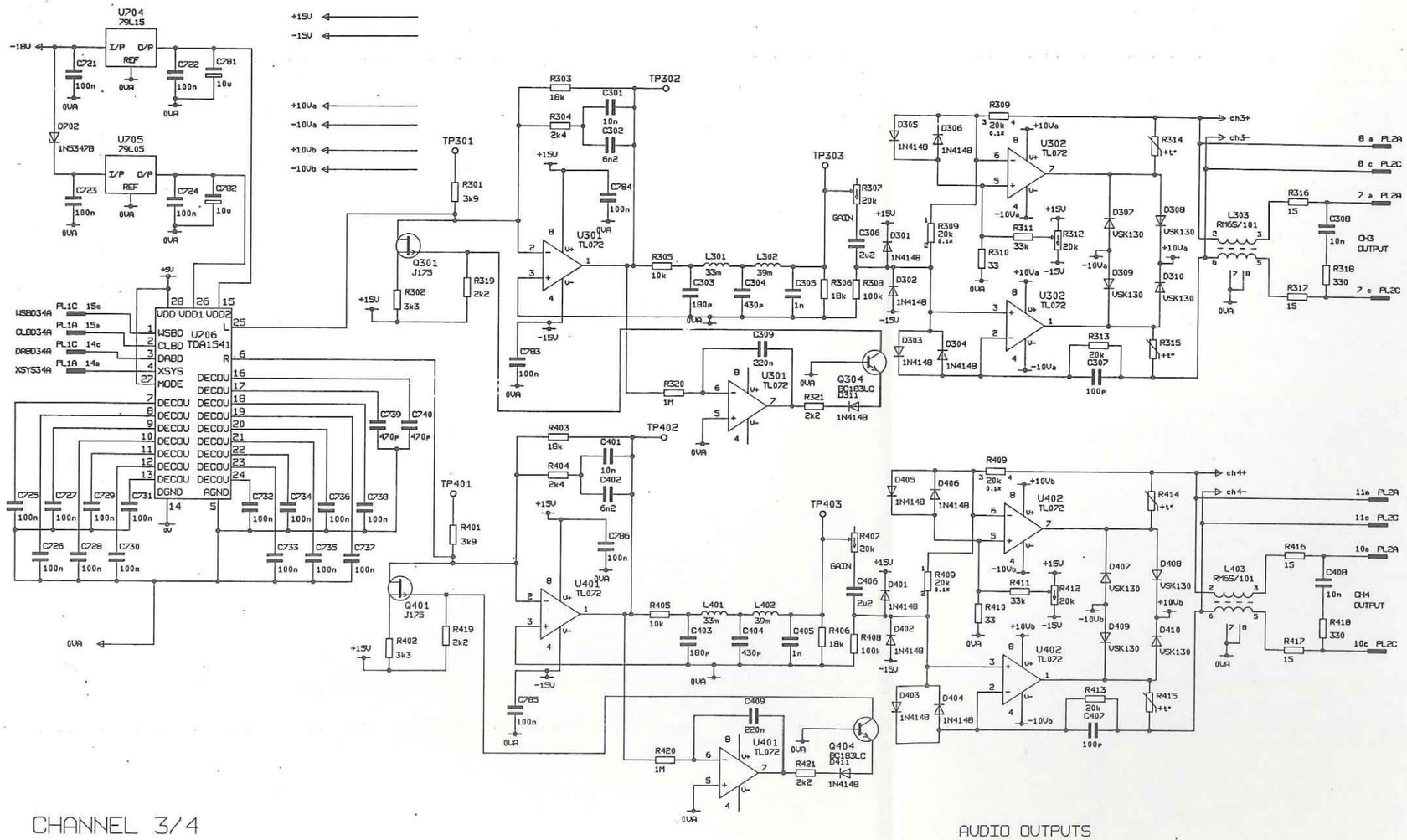
C09/14 CIRCUIT

All dimensions in millimetres unless otherwise stated: Normal tolerances:
no decimal place ± 1 mm unless
one decimal place ± 0.3 mm otherwise
two decimal places ± 0.1 mm stated

DRN.
TCD.
CKD.
APPD.

DESIGN & EQUIPMENT DEPT
D64048 A1
SHEET 2 OF 7 SHEETS

NAFC
SHEET 3 OF 7
02/05/89



CHANNEL 3/4

AUDIO OUTPUTS

NICAM MKII CODER CHECK DAC
SHEET 3 OF 7

C09/14

SCALE: - 0

THIRD ANGLE PROJECTION

ORIGINAL FRAME SIZE
574mm x 821mm

CHANGE
ISS 2

BBC
DS/A1/1

R292

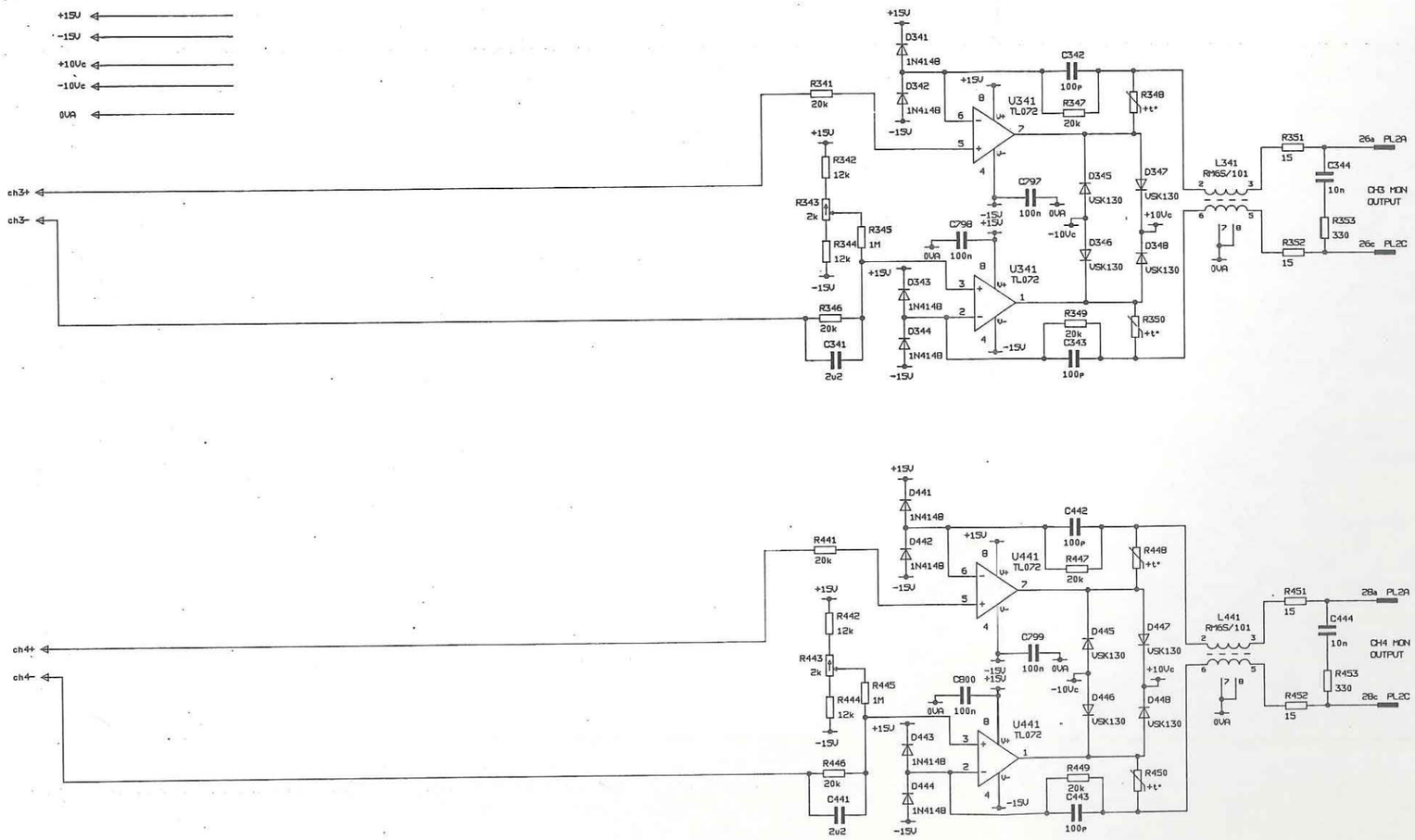
C09/14 CIRCUIT

All dimensions in millimetres unless otherwise stated. Normal tolerances:
no decimal place – ± 1 mm unless
one decimal place – ± 0.3 mm otherwise
two decimal places – ± 0.1 mm stated

DRN.
TCD.
CKD.
APPD.

DESIGN & EQUIPMENT DEPT.
D64048 A1
SHEET 3 OF 7 SHEETS

NAFC
SHEET 4 OF 7
02/05/89



CHANNEL 3/4

MONITOR OUTPUTS

NICAM MKII ANALOGUE BOARD C09/14
SHEET 4 OF 7

SCALE:- 0

THIRD ANGLE PROJECTION

ORIGINAL FRAME SIZE 574mm x 821mm

CHANGE

ISS 2

BBC DS/A1/1

R292

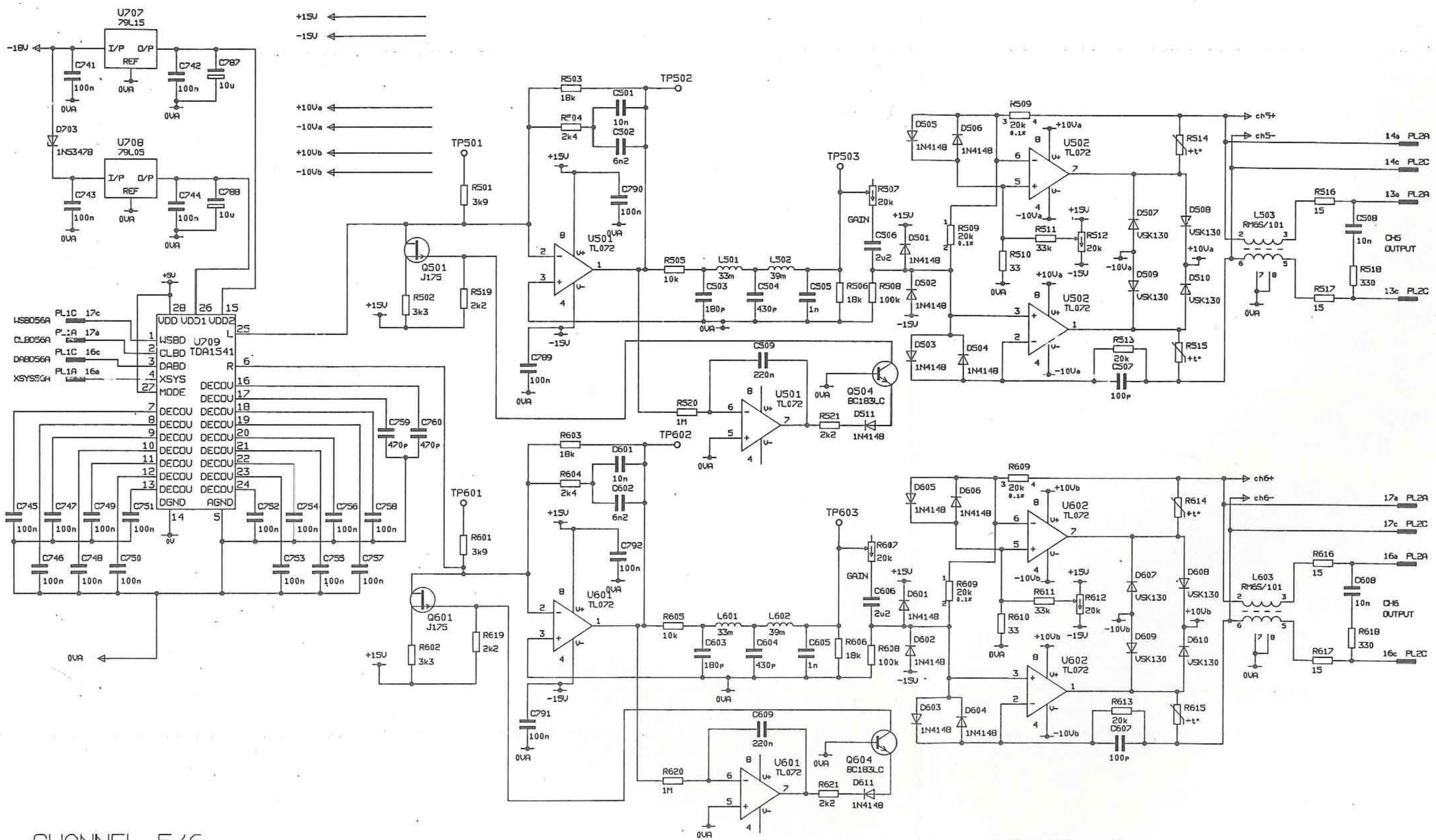
C09/14 CIRCUIT

All dimensions in millimetres unless otherwise stated. Normal tolerances:
no decimal place - ± 1 mm unless
one decimal place - ± 0.3 mm otherwise
two decimal places - ± 0.1 mm stated

DRN.
TCD.
CKD.
APPD.

DESIGN & EQUIPMENT DEPT.
D64048 A1
SHEET 4 OF 7 SHEETS

NAFC
SHEET 5 OF 7
02/05/89



CHANNEL 5/6

AUDIO OUTPUTS

NICAM MKII CODER CHECK DAC
SHEET 5 OF 7

C09/14

SCALE:- 0

THIRD ANGLE PROJECTION

ORIGINAL FRAME SIZE
574mm x 821mm

CHANGE

ISS 2

BBC

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DS/A1/1

R292

C09/14 CIRCUIT

All dimensions in millimetres unless otherwise stated: Normal tolerances:
no decimal place ± 1 mm unless
one decimal place ± 0.3 mm otherwise
two decimal places ± 0.1 mm stated

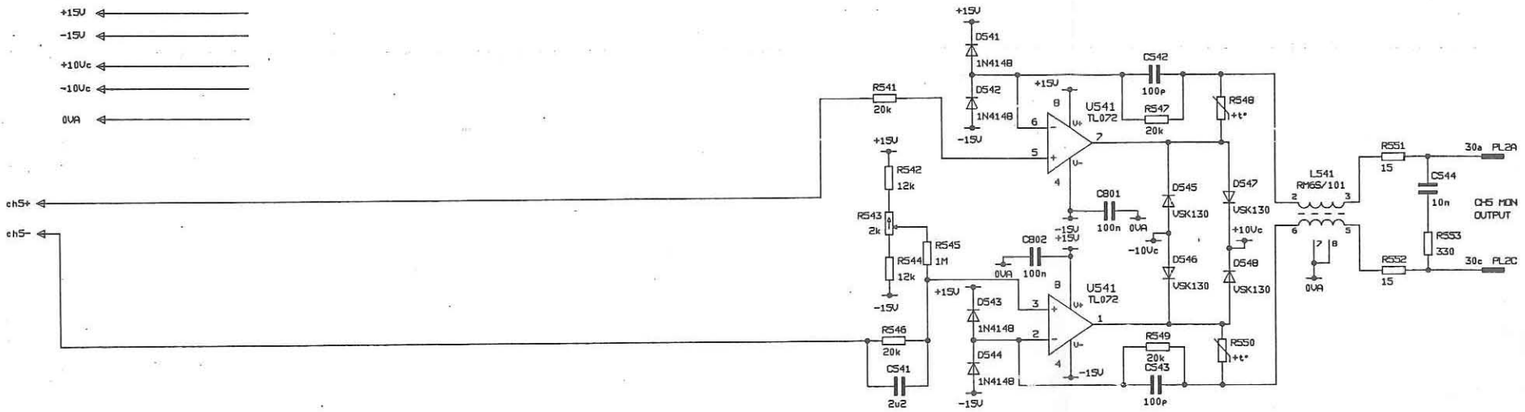
DRN.
TCD.
CKD.
APPD.

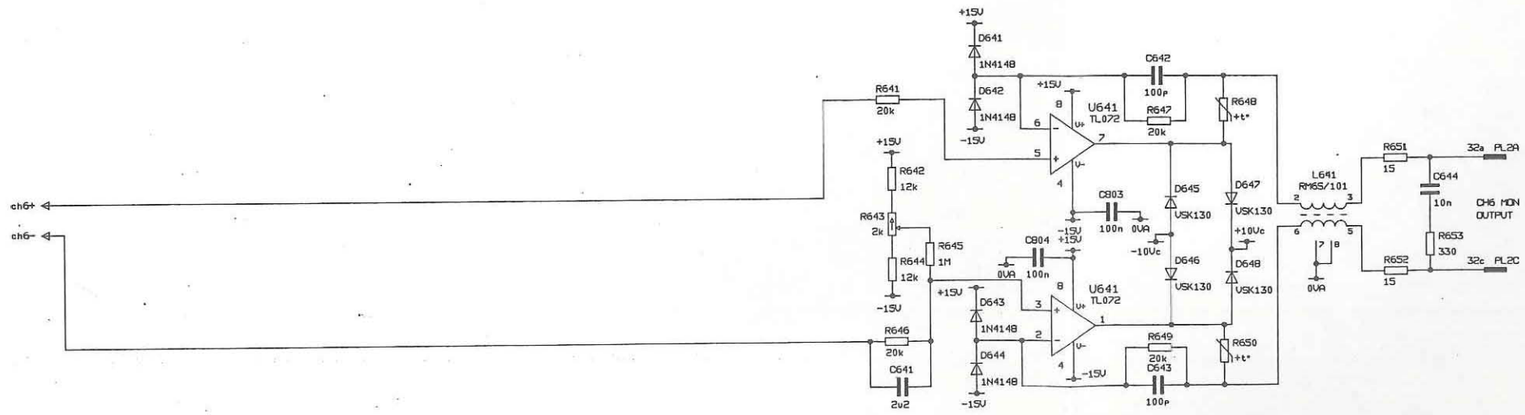
DESIGN & EQUIPMENT DEP

D64048 A1

SHEET 5 OF 7 SHEETS

NAFC
SHEET 6 OF 7
02/05/89





CHANNEL 5/6

MONITOR OUTPUTS

NICAM MKII CODER CHECK DAC C09/14
SHEET 6 OF 7

SCALE:- 0

THIRD ANGLE PROJECTION

ORIGINAL FRAME SIZE
574mm x 821mm

DS/A1/1

ISS 2 CHANGE 11.1.90

C09/14 CIRCUIT

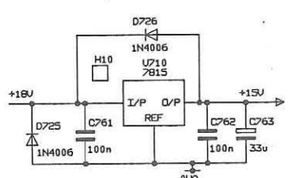
All dimensions in millimetres unless otherwise stated: Normal tolerances:
no decimal place – ± 1 mm unless
one decimal place – ± 0.3 mm otherwise
two decimal places – ± 0.1 mm stated

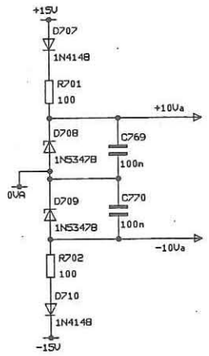
DRN. DESIGN & EQUIPMENT DEPT.
TCD.
CKD.
APPD.

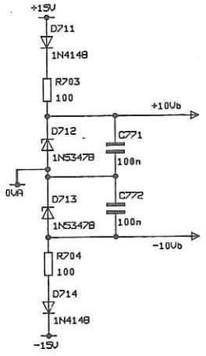
D64048 A1
SHEET 6 OF 7 SHEETS

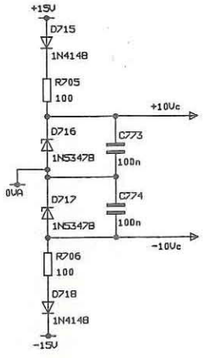
R292

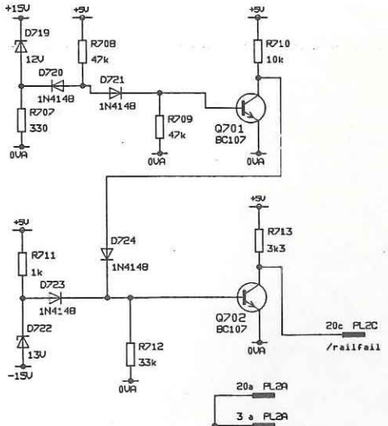
NAFC
SHEET 7 OF 7
02/05/89

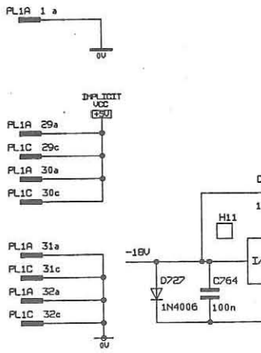


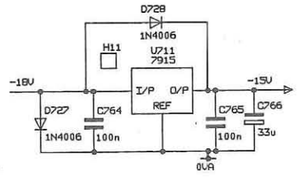


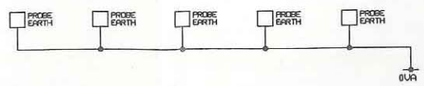


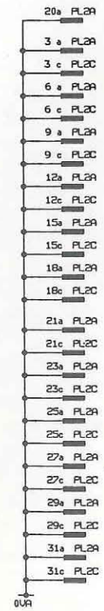












POWER SUPPLIES

NICAM MKII CODER CHECK DAC
SHEET 7 OF 7

C09/14

SCALE:- 0

THIRD ANGLE PROJECTION

ORIGINAL FRAME SIZE
574mm x 821mm

CHANGE
ISS

DS/A1/1

R292

C09/14 CIRCUIT

All dimensions in millimetres unless otherwise stated. Normal tolerances:
no decimal place - ± 1 mm unless
one decimal place - ± 0.3 mm otherwise
two decimal places - ± 0.1 mm stated

DRN.
TCD.
CKD.
APPD.

DESIGN & EQUIPMENT DEPT.
D64048 A1
SHEET 7 OF 7 SHEETS

D64049A4

ISS.	CHANGE
1	11.1.90

C09/14 6 CHANNEL NICAM II CODER CHECK D.A.C. PARTS LIST

ITEM No.	No. OFF		DESCRIPTION	C'C'T REF.	BBC REF. OR DRG. No.
			DRAWING LIST		
			CIRCUIT (7 SHT.S) D64048A1		
			PARTS LIST D64049A4		
			ASSEMBLY D64050A2		
			DETAILS 1 & 2 D64051A2		
			P.BD. WIRING (7 SHT.S) D64052A2S		
			P.BD. PRODUCTION DATA D64053A2		
			P.BD. COMP. LOC (COPY) DSK27590A2		
			FURTHER INFO. REQ'D FOR MANUFACTURE		
			UNIT WIRING INFORMATION EA.10140		
			UNIT ASSEMBLY INFORMATION EA.10484		
			SPEC C09/14		
1	1	*	PRINTED BOARD TO SPEC ED/PB/C09/14/MULTI/PTH		0635959
			P.BD. WIRING TO:-		D64052A2S
			P.BD. PROD. DATA TO:-		D64053A2
2	1		SCREEN/CODING PLATE, 6U, 280 MM DEEP		0628483
			MODIFIED BY CONT. TO:-		D64051A2 DETAIL 1
3	1		HANDLE, P.BD. GREEN, VERO		0388177
			ENGRAVED BY CONT. TO:-		D64051A2 DETAIL 2
4					
5					
6	2		PLUG. FIXED, 64 POLE, DOUBLE SIDED	PL1, PL2	0610006
7					
8	2		HEATSINK. TO220		0446619
			(FOR USE WITH U710 & U711)		
10					
11	A/R		1.6 B.T.C. WIRE		
12					
13	1		ANTI-STATIC PLASTIC BAG		0613387
14	1		SSD CAUTION LABEL SELF-ADHESIVE		0604990
15					
16	3		I.C. TRANSMISSION SKT. 28 PIN. SOLDER TYPE		0445043
			(FOR USE WITH U703, U706 & U709)		
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					

BBC

DS/PL A4

C09/14
6 CHANNEL NICAM II CODER CHECK DAC
PARTS LIST

DRN.	GAB
TPD.	
CKD.	
APPD.	K.B.D

DESIGN & EQUIPMENT DEPT.

D64049A4

SHEET 1 OF 12 SHEETS

RAPIDOS 2770/E

ITEM No.	Qty	DESCRIPTION AND CIRCUIT REFERENCE	BBC REF. or DRG.No.
28	18	TEST POINT VERO, (1.0 HOLE) TP101, TP102, TP103, TP201, TP202, TP203, TP301, TP302, TP303, TP401, TP402, TP403, TP501, TP502, TP503, TP601, TP602, TP603.	S28650-039229X
		CAPACITORS	
29	46	100n , 50V MULTILAYER C701, C702, C703, C704, C721, C722, C723, C724, C741, C742, C743, C744, C761, C762, C764, C765, C769, C770, C771, C772, C773, C774, C777, C778, C779, C780, C783, C784, C785, C786, C789, C790, C791, C792, C793, C794, C795, C796, C797, C798, C799, C800, C801, C802, C803, C804.	S20648-0204648
30			
31	2	33u, 16V ELEC,VERT C763, C766.	S20832-0612887
32	8	10u, 50V ELEC, VERT C767, C768, C775, C776, C781, C782, C787, C788.	S20835-0616981
33			
34	18	100p, 63V, RECT. POLY C107, C142, C143, C207, C242, C243, C307, C342, C343, C407, C442, C443, C507, C542, C543, C607, C642, C643.	S21005-0449968
35			
36	6	180p, 63V, RECT. POLY C103, C203, C303, C403, C503, C603.	S21005-0450025
37	6	430p, 63V, RECT. POLY C104, C204, C304, C404, C504, C604.	S21005-0450112

ITEM No.	Qty	DESCRIPTION AND CIRCUIT REFERENCE	BBC REF. or DRG.No.
38	6	470p, 63V, RECT. POLY C719, C720, C739, C740, C759, C760.	S21005-0450120
39			
40	6	1n, 63V, RECT. POLY C105, C205, C305, C405, C505, C605.	S21005-045020X
41			
42	6	6n2, 63V, RECT. POLY C102, C202, C302, C402, C502, C602.	S21005-0450399
43			
44	6	10n, 63V, RECT. POLY C101, C201, C301, C401, C501, C601.	S21006-0606140
45			
46	6	220n, 63V, POLYESTER, RECT C109, C209, C309, C409, C509, C609.	S21035-0466188
47			
48	12	10n, 100V, POLYESTER, RECT C108, C144, C208, C244, C308, C344, C408, C444, C508, C544, C608, C644.	S21035-0466208
49			

ITEM No.	Qty		DESCRIPTION AND CIRCUIT REFERENCE	BBC REF. or DRG.No.
			CAPACITORS CONTINUED.....	
50	42		100n, 100V, RS114-402 C705, C706, C707, C708, C709, C710, C711, C712, C713, C714, C715, C716, C717, C718, C725, C726, C727, C728, C729, C730, C731, C732, C733, C734, C735, C736, C737, C738, C745, C746, C747, C748, C749, C750, C751, C752, C753, C754, C755, C756, C757, C758.	062759x
51				
52	12		2u2, 100V, RS114-446 C106, C141, C206, C241, C306, C341, C406, C441, C506, C541, C606, C641.	062761x
53				
			RESISTORS	
54	7		100Ω 2%, 0.4W MR25 R701, R702, R703, R704, R705, R706, R714.	S26877-0099007
55	13		330Ω 2%, 0.4W MR25 R118, R153, R218, R253, R318, R353, R418, R453, R518, R553, R618, R653, R707.	S26877-0099031
56				
57	1		1K, 2%, 0.4W, MR25 R711	S26877-0099082
58	12		2K2,2%, 0.4W, MR25 R119, R121, R219, R221, R319, R321, R419, R421, R519, R521, R619, R621,	S26877-0099145
59	6		2K4,2%, 0.4W, MR25 R104, R204, R304, R404, R504, R604.	S26877-0099153

ITEM No.	Qty		DESCRIPTION AND CIRCUIT REFERENCE	BBC REF. or DRG. No.
			RESISTORS CONTINUED	
60	7		3K3, 2%, 0.4W, MR25 R102, R202, R302, R402, R502, R602, R713.	S26877-0099161
61				
62	6		3K9, 2%, 0.4W, MR25 R101, R201, R301, R401, R501, R601.	S26877-009917X
63	7		10K, 2%, 0.4W, MR25 R105, R205, R305, R405, R505, R605, R710.	S26877-0099224
64				
65	7		33K, 2%, 0.4W, MR25 R111, R211, R311, R411, R511, R611, R712.	S26877-0099259
66	2		47K, 2%, 0.4W, MR25 R708, R709.	S26877-0099267
67	12		1M, 2%, 0.4W, MR25 R120, R145, R220, R245, R320, R345, R420, R445, R520, R545, R620, R645.	S26877-0099283
68				
69	12		18K, 2%, 0.4W, MR25 R103, R106, R203, R206, R303, R306, R403, R406, R503, R506, R603, R606.	S26877-0099389
70	6		33Ω, 2%, 0.4W, MR25 R110, R210, R310, R410, R510, R610.	S26877-0099441

ITEM No.	Qty		DESCRIPTION AND CIRCUIT REFERENCE	BBC REF. or DRG.No.
			RESISTORS CONTINUED	
71	24		15Ω, 2%, 0.4W, MR25 R116, R117, R151, R152, R216, R217, R251, R252, R316, R317, R351, R352, R416, R417, R451, R452, R516, R517, R551, R552, R616, R617, R651, R652.	S26877-0223760
72				
73	12		12K, 2%, 0.4W, MR25 R142, R144, R242, R244, R342, R344, R442, R444, R542, R544, R642, R644.	S26877-0228043
74	30		20K, 2%, 0.4W, MR25 R113, R141, R146, R147, R149, R213, R241, R246, R247, R249, R313, R341, R346, R347, R349, R413, R441, R446, R447, R449, R513, R541, R546, R547, R549, R613, R641, R646, R647, R649.	S26877-022806X
75				
76	6		100K, 2%, 0.4W, MR25 R108, R208, R308, R408, R508, R608.	S26877-0228181
77	6		2K, VAR, TOP-ADJ, R143, R243, R343, R443, R543, R643.	S27243-0306003
78				
79	12		20K, VAR, TOP-ADJ, R107, R112, R207, R212, R307, R312, R407, R412, R507, R512, R607, R612,	S27243-0365177
80				

ITEM No.	Qty	DESCRIPTION AND CIRCUIT REFERENCE	BBC REF. or DRG.No.
		RESISTORS CONTINUED.....	
81	6	SIL,20K, 4-PIN T912-20K-100-10 R109, R209, R309, R409, R509, R609.	0627991
82	24	THERMISTOR, 110mA. PTC . R.S. 151-300 R114, R115, R148, R150, R214, R215, R248, R250, R314, R315, R348, R350, R414, R415, R448, R450, R514, R515, R548, R550, R614, R615, R648, R650.	0629464
83		DIODES	
84	48	VSK130, SCHOTTKY DIODE D107, D108, D109, D110, D145, D146, D147, D148, D207, D208, D209, D210, D245, D246, D247, D248, D307, D308, D309, D310, D345, D346, D347, D348, D407, D408, D409, D410, D445, D446, D447, D448, D507, D508, D509, D510, D545, D546, D547, D548, D607, D608, D609, D610, D645, D646, D647, D648.	0531681
85			
86	9	1N5347B, DIODE, ZENER D701, D702, D703, D708, D709, D712, D713, D716, D717.	0531728
87			
88	4	1N4006, DIODE D725, D726, D727, D728.	0102592
89			

ITEM No.	Qty		DESCRIPTION AND CIRCUIT REFERENCE	BBC REF. or DRG.No.
			DIODES CONTINUED	
90	76		1N4148, DIODES D101, D102, D103, D104, D105, D106, D141, D142, D143, D144, D201, D203, D204, D205, D206, D211, D241, D242, D243, D244, D301, D302, D303, D304, D305, D306, D311, D341, D342, D343, D344, D401, D402, D403, D404, D405, D406, D411, D441, D442, D443, D444, D501, D502, D503, D504, D505, D506, D511, D541, D542, D543, D544, D601, D602, D603, D604, D605, D606, D611, D641, D642, D643, D644, D707, D710, D711, D714, D715, D718, D720, D721, D723, D724, D111, D202	0102592
91				
92	1		VZ12M4, DIODE, ZENER, 12V D719	0147282
93	1		VZ13M4, DIODE, ZENER, 13V D722	0147329
94				
			<u>TRANSISTORS</u>	
95	2		BC107, TRANSISTOR, NPN Q701, Q702.	0112266
96				
97	6		BC183LC, TRANSISTOR, NPN Q104, Q204, Q304, Q404, Q504, Q604.	0190730
98				
99	6		J175, TRANSISTOR P-CHAN FET Q101, Q201, Q301, Q401, Q501, Q601.	0195702

ITEM No.	Qty	DESCRIPTION AND CIRCUIT REFERENCE	BBC REF. or DRG.No.
		INTEGRATED CIRCUITS	
100	1	LIC7815T, REGULATOR , +15V U710	0174931
101	1	LIC7915T, REGULATOR , -15V U711	0192613
102			
103	18	TL072CP U101, U102, U141, U201, U202, U241, U301, U302, U341, U401, U402, U441, U501, U502, U541, U601, U602, U641.	0194800
104			
105	3	LM79L15ACZ. REGULATOR , -15V U701, U704, U707.	0198850
106	3	LM79L05ACZ, REGULATOR, -5V U702, U705, U708.	0506597
107	3	TDA1541A/N2 U703, U706, U709.	0530258
108		CAUTION TO AVOID DAMAGE FROM STATIC CHARGES, GREAT CARE SHOULD BE TAKEN WHEN HANDLING THESE DEVICES.	
109			

ITEM No.	Qty		DESCRIPTION AND CIRCUIT REFERENCE	BBC REF. or DRG.No.
			INDUCTORS	
110	12		INDUCTOR , BBC TYPE RM6S/101 L103, L141, L203, L241, L303, L341, L403, L441, L503, L541, L603, L641,	0627628
111	6		INDUCTOR, 39mH, TOKO 181LY-393J L102, L202, L302, L402, L502, L602.	0627636
112	6		INDUCTOR, 33mH, TOKO 181LY-333J L101, L201, L301, L401, L501, L601.	0614928
113				
114				
115				
116				
117				

ITEM No.	QTY		DESCRIPTION AND CIRCUIT REFERENCE	BBC REF. OR DRG. No.
			FASTENERS	
			SCREWS	FOR FIXING ITEMS
118	4		M2.5 x 10MM LG. PAN HD. M.S.Zn.P.	6
119	9		M2.5 x 8MM LG. PAN HD. M.S.Zn.P.	2
120	2		M3 x 6MM LG. PAN HD. M.S.Zn.P.	8
121				
122				
			NUTS	
123	4		M2.5 HEX. FULL, M.S.Zn.P.	6
124	2		M3 HEX, FULL, M.S.Zn.P.	8
125				
126				
127				
			WASHERS	
128	9		M2.5 FIBRE	2
129	2		M3, PLAIN, M.S.Zn.P.	8
130				
131				
132				
133				
134				
135	1		CARTON CARDBOARD TO:-	SPEC ED/C09/14
	1		Notes	
	*		Denotes items supplied to the contractor on embodiment loan	

SHT.	ISS.	DETAILS OF CHANGE	SHT.	ISS.	DETAILS OF CHANGE

ORIGINAL FRAME SIZE 190mm x 277 mm

ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED

BBC

VM418/A4

DESIGNS DEPARTMENT

CODE:- C09/14

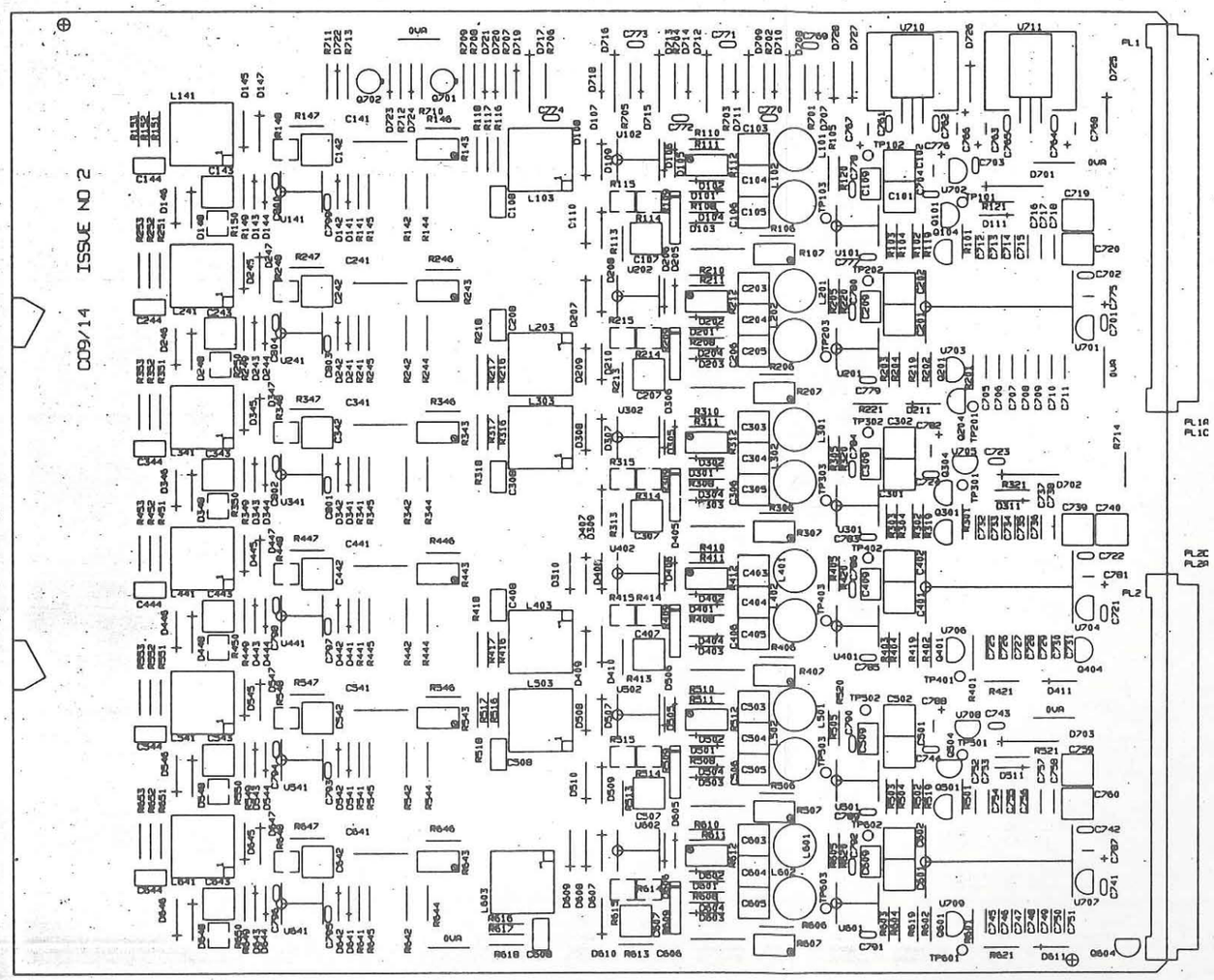
PARTS LIST CHANGE RECORD, ISSUE:- 1 11.1.90

D64049 A4

SHEET 12

C09/14

ISSUE NO 2
PTH BOARD



SCALE:- 0

THIRD ANGLE PROJECTION

ORIGINAL FRAME SIZE
400mm x 574mm

CHANGE
11.1.90

ISS N

Issue no. of this drawing must be the same as the photo-master issue.

C09/14

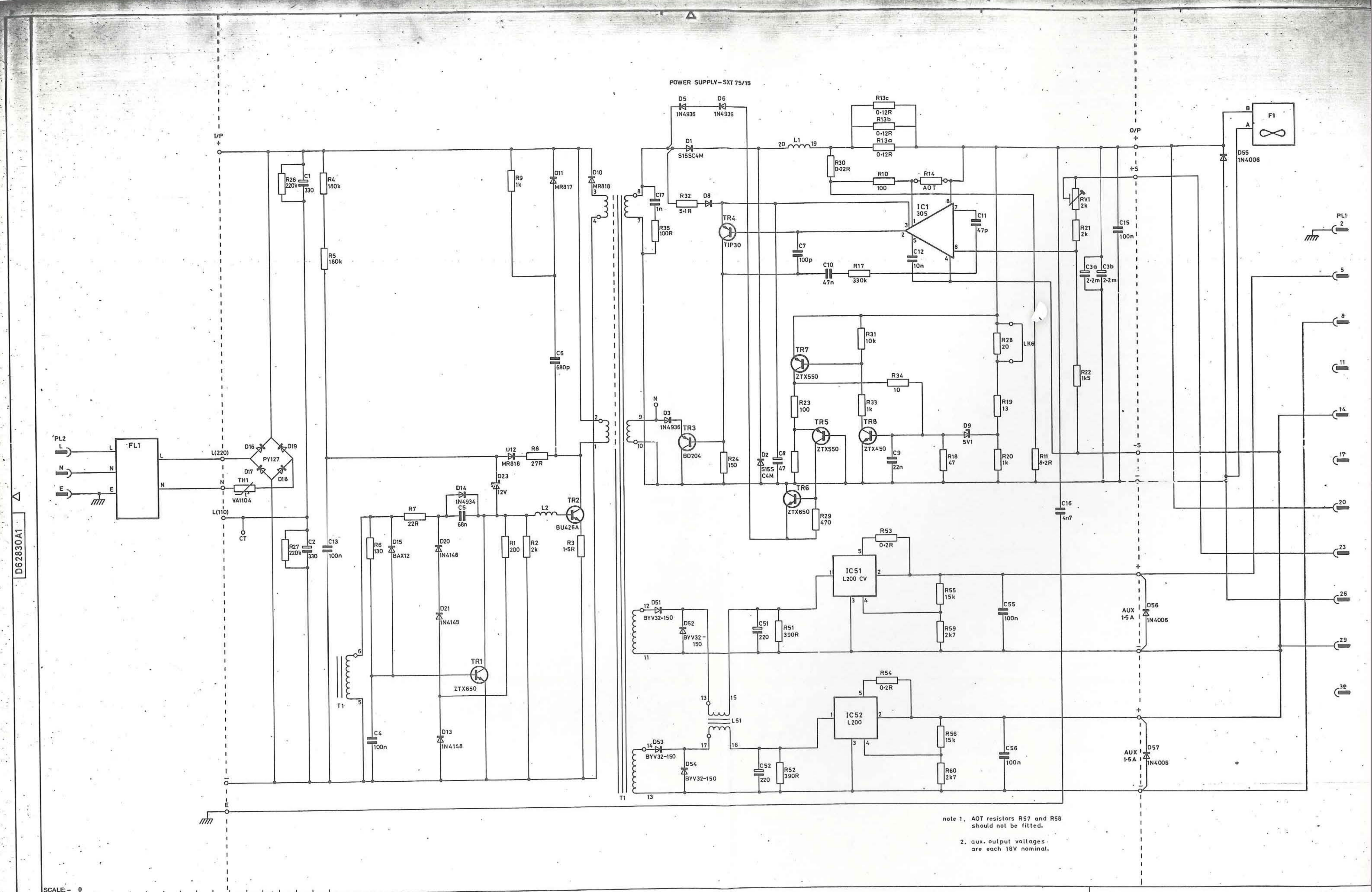
COPY OF COMP. LOCATION PHOTO PLOT ISSUE 2

All dimensions in millimetres unless otherwise stated :
Normal tolerances :
no decimal place — ± 1 mm unless
one decimal place — ± 0·3 mm otherwise
two decimal places — ± 0·1 mm stated

DRN. GAB
TCD.
CKD.
APPD A.B.L.

DESIGN & EQUIPMENT DEPT.

DSK27590A2



POWER SUPPLY - SXT 75/15
I/P
O/P
+S
-S
PL1
PL2
FL1
F1
T1
L1
L2
L51
D5 1N4936
D6 1N4936
D1 S15SC4M
D3 1N4936
D2 S15SC4M
D9 5V1
D10 MR818
D11 MR817
U12 MR818
D14 1N4934
D15 BAX12
D16
D17
D18
D19
PY127
D20 1N4148
D21 1N4148
D13 1N4148
D23 12V
D51 BYV32-150
D52 BYV32-150
D53 BYV32-150
D54 BYV32-150
D55 1N4006
D56 1N4006
D57 1N4006
TH1 VA1104
TR1 ZTX650
TR2 BU426A
TR3 BD204
TR4 TIP30
TR5 ZTX550
TR6 ZTX650
TR7 ZTX550
TR8 ZTX450
IC1 305
IC51 L200 CV
IC52 L200
R13c 0·12R
R13b 0·12R
R13a 0·12R
R30 0·22R
R10 100
R14 AOT
RV1 2k
R21 2k
R22 1k5
R32 5·1R
R35 100R
R17 330k
R31 10k
R28 20
LK6
R34 10
R23 100
R33 1k
R19 13
R18 47
R20 1k
R11 8·2R
R24 150
R29 470
R53 0·2R
R54 0·2R
R55 15k
R59 2k7
R56 15k
R60 2k7
R51 390R
R52 390R
R26 220k
R27 220k
R4 180k
R5 180k
R9 1k
R8 27R
R7 22R
R6 130
R1 200
R2 2k
R3 1·5R
C1 330
C2 330
C13 100n
C6 680p
C5 68n
C4 100n
C17 1n
C7 100p
C10 47n
C12 10n
C11 47p
C15 100n
C3a 2·2m
C3b 2·2m
C8 47
C9 22n
C16 4n7
C51 220
C52 220
C55 100n
C56 100n
AUX 1·5A
L(220)
L(110)
CT
N
E
L

note 1. AOT resistors R57 and R58 should not be fitted.

2. aux. output voltages are each 18V nominal.

THIRD ANGLE PROJECTION	ORIGINAL FRAME SIZE 574mm x 821mm	CHANGE	ISS
		31/1/89	1
		27-4-89	2
		23/5/89	3

SCALE:- 0

This drawing/specification is the property of the ... and may not be reproduced or disclosed to a third party in any form without the written permission of the ...

DS/A1/1

R292

SWITCHED MODE POWER SUPPLIER

PS4/51

CIRCUIT

All dimensions in millimetres unless otherwise stated: Normal tolerances:
no decimal place − ± 1 mm unless
one decimal place − ± 0.3 mm otherwise
two decimal places − ± 0.1 mm stated

DRN. CMD
TCD.
CKD.
APPD. CCC

DESIGN & EQUIPMENT DEPARTMENT

D62830A1

D62831A4

ISS.	3	4
CHANGE	1/2/89	25/4/89

ITEM No.	No. OFF	DESCRIPTION	C'C'T REF.	BBC REF. OR DRG. No.
		DRAWING LIST		
		CIRCUIT D62830A1		
		PARTS LIST D62831A4		
		ASSEMBLY & WIRING D62832A1		
		DETAIL 1 D62833A2		
		DETAIL 2 D62834A1		
		DETAIL 3 D62835A3		
		DETAIL 4 D62836A3		
		DETAIL 5 D62837A3		
		DETAIL 6 D62838A2		
		FRONT PANEL LEGEND D62840A1		
		FURTHER INFORMATION REQUIRED FOR MANUFACTURE		
		EA10484 - GENERAL ASSEMBLY.		
		UNIT SPEC - ED/PS4/51		
1	1	FRONT PANEL, 6U, EUROCARD BRICK CHASSIS		
		MODIFIED BY CONTRACTOR TO :-		DETAIL 4 - D62836
2	1	SIDE PANEL (FIXED), 6U, EUROCARD, BRICKCHASSIS		
		MODIFIED BY CONTRACTOR TO :-		DETAIL 1 - D62833
3	1	SIDE PANEL (HINGED), 6U, EUROCARD, BRICKCHASSIS		
		MODIFIED BY CONTRACTOR TO :-		DETAIL 6 - D6283
4	2	SUPPORT PILLARS, 6U, EUROCARD, BRICKCHASSIS		
5	1	CODING PLATE, 6U, EUROCARD, BRICKCHASSIS		
		MODIFIED BY CONTRACTOR TO :-		DETAIL 3 - D62835A
6	1	HINGE ASSEMBLY KIT, BRICKCHASSIS		- 0630376
7	1	PERFORATED POWER SUPPLY CAGE		
		MADE BY CONTRACTOR TO :-		DETAIL 2 - D62834
8	2	MOUNTING BRACKET, PLASTIC, BRICKCHASSIS		- 06286C
9	2	PLASTIC HANDLES & FIXING, BRICKCHASSIS		- 062807
10	2	HANDLE CAP, PLASTIC, YELLOW		- 04668
11	1	LABEL, WARNING, MAINS, SELF ADHESIVE		- 06283C

BBC

DS / PLA4

PS4/51
POWER SUPPLY
PARTS LIST

DRN.	DSI
TPD.	
CKD.	
APPD.	ecc

D & ED

D62831A4

SHT 1 OF 5

D62831A4

ISS.	4	5
CHANGE	1/2/89	25/4/89

ITEM No.	No. OFF		DESCRIPTION	C'C'T REF.	BBC REF. OR DRG. No.
12	1		LABEL, MAINS WARNING, 5 POLE CONNECTOR		
13	1		HEATSINK, REDPOINT TYPE Y211-1 ANODISED BK		-0628692
			MODIFIED BY CONTRACTOR TO :-		D62837A3 - DET 5
14	1		LABEL, SELF ADHESIVE VINYL, PSU WARNING		—
			MANUFACTURED TO DSK 27280A4		
15	1		POWER SUPPLY, ADVANCE POWER SUPPLIES SXT 75/15		-062858
16	1		FAN, 5V D.C., ULTRASLIM 62mm, RS 505-505		-063321
17					
			CONNECTORS		
20	1		ERNIE, 11 POLE, FIXED PLUG		S25092 - 038331
			(PL1)		
21	1		ERNIE, 11 POLE, FIXED PLUG, MAINS		-0628152
			(PL2)		
22	11		SOCKET TERMINAL, CRIMP, FREE, RS 532-800		
23	13		SPADE TERMINAL, CRIMP, FREE. RS 532-765		
24	4		SOCKET TERMINAL - EARTHING.		-062919
25	3		SOCKET TERMINAL, SHROUDED, RS 533-006		
			DIODES		
26	3		1N4006		-010259
			(3) D1, D2, D3		
27					
28					
29					

BBC
DS / PLA4

PS4/51
PARTS LIST

DRN.	DSI
TPD.	
CKD.	
APPD.	CCC

D & ED
D62831A4
SHT 2 OF 5

D62831A4

ISS.	CHANGE
2	1/2/89

ITEM No.	No. OFF		DESCRIPTION	C'C'T REF.	BBC REF. OR DRG. No.
30	1		FILTER, MAINS (FL1)		- 0476509
31					
			WIRES & CABLES		
35	0.5m		PUF1/5M - BLACK		S14739 -0202477
36	0.5m		PUF1/5M - BLUE		S14739 -020253X
37	0.5m		PUF1/5M - GREEN/YELLOW		S14739 -021678[illegible]
38	0.5m		PUF1/5M - RED		S14739 -0202493
39	0.5m		PUF1/5M - ORANGE		S14739 -020250[illegible]
40	0.5m		PUF1/5M - BROWN		S14739 -020248[illegible]
41					
42					
43	0.5m		PUN1/1M - BLACK		S14626 - 021656
44					
45					
			FIXINGS & FASTNERS		
50	6		SCREW, M2.5 x 10 LG, INST HD, MS, CHR.PL.		FOR FIXING ITEMS 1,8,6
51	4		SCREW, M2.5 x 10 LG, PAN HD, MS, Zn.PL.		3,20,21
52	10		SCREW, M2.5 x 8 LG, PAN HD, MS, Zn.PL.		3,8,6,4
53	3		SCREW, M2.5 x 6 LG, CSK HD, MS, Zn.PL.		2,5
54	1		SCREW, SELF TAPPING, TYPE B, 9.5 LG, Zn. PL.		- 043015[illegible]
55	1		SCREW, M3 x 8 LG, CSK HD, MS. Zn PL		71
56	9		SCREW, M3 x 6 LG, CSK HD, MS, Zn. PL.		2,7,15,30,72
57	2		SCREW, M3 x 10 LG, PAN HD, M.S., Zn PL		13
58	12		NUT, M2.5		

BBC
DS / PLA4

PS4/51
PARTS LIST

DRN.	DSI
TPD.	
CKD.	
APPD.	CCC

D & ED
D62831A4
SHT 3 OF 5

D62831A4

ISS.	CHANGE
3	1/2/89

ITEM No.	No. OFF		DESCRIPTION	C'C'T REF.	BBC REF. OR DRG. No.
59	1		NUT, M3		
60	3		NUT, M3, LOCKING BINX Bx213		
61	4		WASHER, M2·5, SHAKEPROOF		
62	1		WASHER, M6, PLAIN		
63	1		SOLDER TAG, S/E, M3		
64					
65	2		ANCHOR RIVET BUSH, M3		
66					
67					
68	1		HEATSINK COMPOUND, DOW CORING 340		
69					-049808
70	1		CARTON CARDBOARD TO SPEC ED/PS4/51		
71	1		DOUBLE ENDED EARTH TAG, M3		
72	2		SINGLE ENDED EARTH TAG, M3		-062917
					-062918

		Notes.
*		Denotes items supplied to the contractor on embodiment loan
*+		Denotes items supplied to the contractor on embodiment loan, requiring special costing or supply action by B.B.C.
θ*		Denotes components supplied and fitted by B.B.C. on test
θ+		Denotes coded plug in units supplied and fitted by B.B.C. on test.
ø		Denotes items supplied and fitted by B.B.C. on installation

BBC

DS/PLA4

PS4/51 PARTS LIST

DRN.	DSI
TPD.	
CKD.	
APPD	

D&ED

D62831A4

D62831A4

ISS.	CHANGE
3	1/2/89

ITEM No.	No. OFF		DESCRIPTION	C'C'T REF.	BBC REF. OR DRG. No.
59	1		NUT, M3		
60	3		NUT, M3, LOCKING BINX Bx213		
61	4		WASHER, M2·5, SHAKEPROOF		
62	1		WASHER, M6, PLAIN		
63	1		SOLDER TAG, S/E, M3		
64					
65	2		ANCHOR RIVET BUSH, M3		
66					
67					
68	1		HEATSINK COMPOUND, DOW CORING 340		-049808(
69					
70	1		CARTON CARDBOARD TO SPEC ED/PS4/51		
71	1		DOUBLE ENDED EARTH TAG, M3		-062917
72	2		SINGLE ENDED EARTH TAG, M3		-062918

Notes.

*	Denotes items supplied to the contractor on embodiment loan
* +	Denotes items supplied to the contractor on embodiment loan, requiring special costing or supply action by B.B.C.
θ *	Denotes components supplied and fitted by B.B.C. on test
θ +	Denotes coded plug in units supplied and fitted by B.B.C. on test.
ø	Denotes items supplied and fitted by B.B.C. on installation

BBC

DS/PLA4

PS4/51 PARTS LIST

DRN.	DSI
TPD.	
CKD.	
APPD.	CCC

D&ED

D62831A4

SHT 4 OF 5

SHT.	ISS.	DETAILS OF CHANGE	SHT.	ISS.	DETAILS OF CHANGE
1	4	CIRCUIT WAS A3.			
2	5	ITEM 16 ADDED.			

ORIGINAL FRAME SIZE 190mm x 277 mm

ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED

BBC

VM418/A4

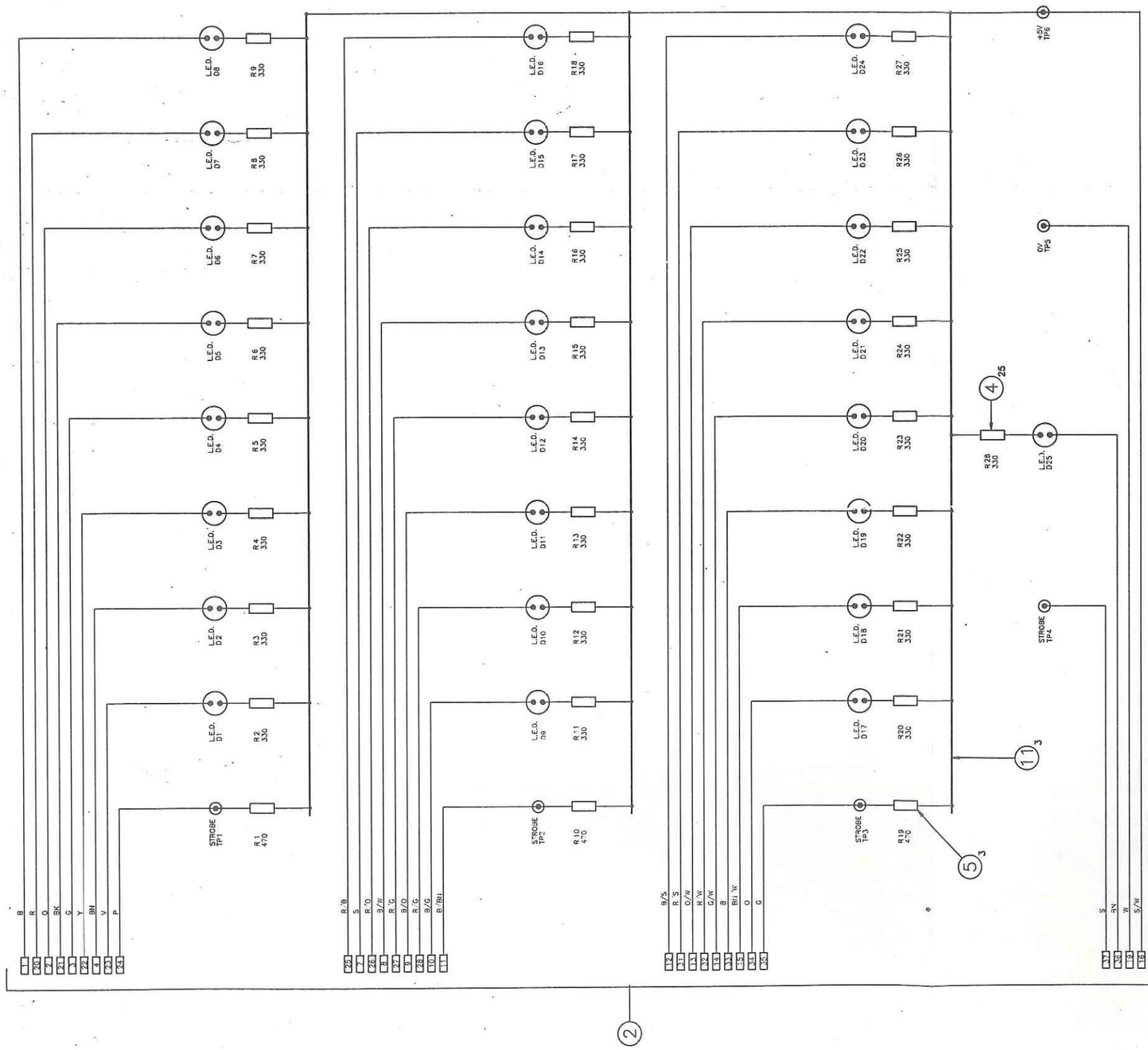
DESIGNS DEPARTMENT

CODE:- PS4/51 25/4/89

PARTS LIST CHANGE RECORD, ISSUE:- 2

D62831 A4

SHEET 5



SCALE – 0

THIRD ANGLE PROJECTION

ORIGINAL FRAME SIZE 574mm X 821mm

DAE/ACAD/A1/1

ISS	CHANGE
1	23–11–89

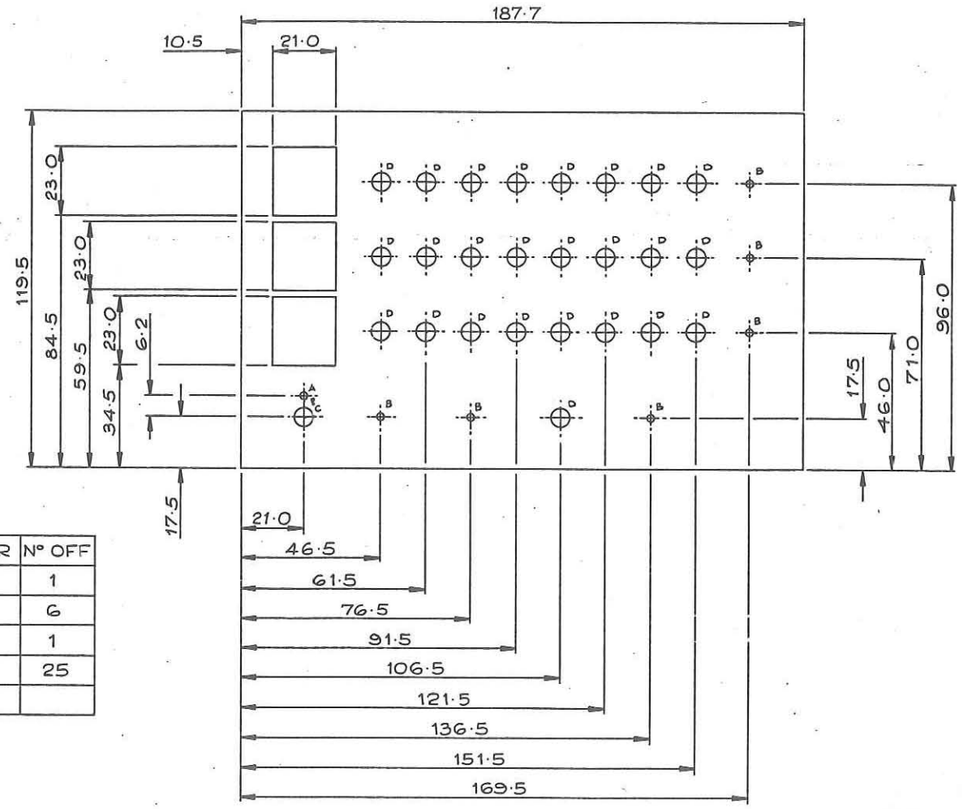
WIRING/ASSEMBLY. TE1/64

All dimensions in millimetres unless otherwise stated. Normal tolerances: no decimal place – ± 1 mm Unless; one decimal place – ± 0.3 mm otherwise; two decimal places – ± 0.1 mm stated

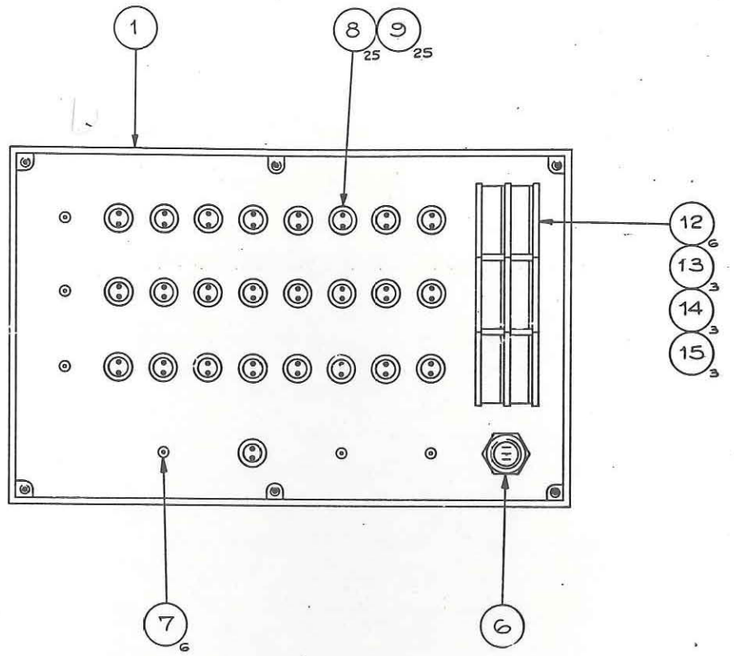
PLTD.	M.C.L.
TCD.	
CKD.	
APPD.	

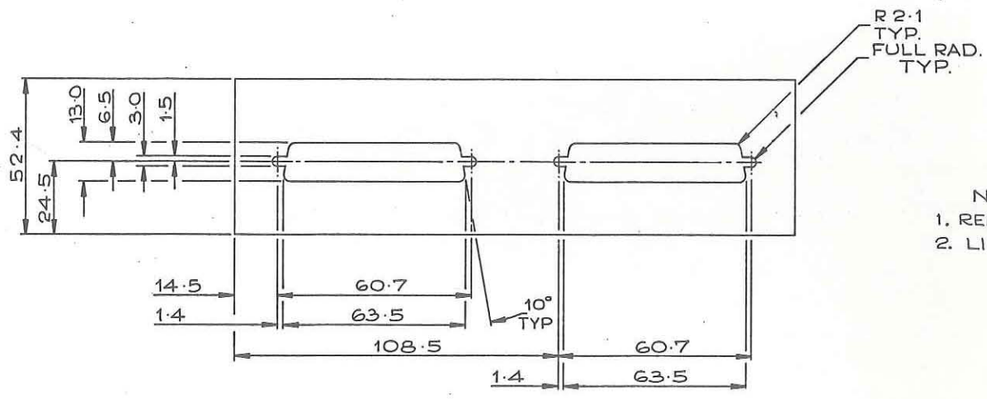
DESIGN AND EQUIPMENT DEPARTMENT

D64002A1



LETTER	DIAMETER	N° OFF
A	ϕ2·2	1
B	ϕ5·4	6
C	ϕ6·2	1
D	ϕ6·4	25





NOTES.
1. REMOVE ALL SHARP EDGES AND BURRS.
2. LID REMOVED FOR CLARITY.

SCALE: – 0

THIRD ANGLE PROJECTION

ORIGINAL FRAME SIZE
574mm x 821mm

ISS	CHANGE
1	25 – 11 – 87

DETAIL 1 /ASSEMBLY.

TE 1/64.

All dimensions in millimetres unless otherwise stated: Normal tolerances:
no decimal place – ± 1 mm unless
one decimal place – ± 0.3 mm otherwise
two decimal places – ± 0.1 mm stated

DRN.	M.C.L.	DESIGN & EQUIP. DEPT.
TCD.		D64003A1.
CKD.		
APPD		

R292

CHANGE	ISS.
23-11-89	1

ITEM No.	No. OFF	DESCRIPTION	C'C'T REF.	BBC REF. OR DRG. No.
		WIRING / ASSEMBLY.		D64002A1
		DETAIL 1 / ASSEMBLY.		D64003A1
		PARTS LIST.		D64004A4
		LEGEND TOP.		D64005A2
		LEGEND SIDE.		D64006A2
1	1	ALUMINIUM ALLOY BOX.		0027437
2	2	'D' CONNECTOR, PLUG FIXED, 37 WAY.		0454600
3	1	JACK POST ASSEMBLY.		0377384
4	25	RESISTOR, 330Ω, METAL FILM 0·4W. R2-R9, R11-R18, R20-R28.		0099301
5	3	RESISTOR, 470Ω, METAL FILM 0·4W. R1, R10, R19.		009904X
6	1	SWITCH.		0098925
7	6	TEST POINT. BALL TYPE. TP1-TP6.		0378294
8	25	LED. GREEN. D1-D25.		0465653
9	25	LED MOUNTING CLIPS.		046278
10	A/R	LACING TWINE (MEDIUM)		003916
11	A/R	B.T.C. WIRE. Ø0·6.		005179
12	6	SWITCH, BCD HEXIDECIMAL, 0-9, A-F. FARNELL TYPE No. PEHA 3000.		
13	3	SWITCH END CHEEK L.H. FARNELL TYPE No. 6090754.		
14	3	SWITCH END CHEEK R.H. FARNELL TYPE No. 6090756.		
15	3	SWITCH SPACER. FARNELL TYPE No. 6090760.		
16				
17				
18				
19				
20				
21				

BBC - DS / PLA4

TE1/64.
NICAM SIGNALLING TESTER.
PARTS LIST.

DRN.	M.C.L.
TPD.	
CKD.	
APPD.	R.E.D.

DESIGN & EQUIP. DEPT.

D64004A4.

SHEET 1 OF 3 SHEET

ISS.	CHANGE
1	23—11—89

ITEM No.	No. OFF		DESCRIPTION	C'C'T REF.	BBC REF. OR DRG. No.
22	A/R		CABLE. PUF 1/3M. BLUE.		0201477
23	A/R		CABLE. PUF 1/3M. ORANGE.		0201488
24	A/R		CABLE. PUF 1/3M. GREEN.		0201496
25	A/R		CABLE. PUF 1/3M. BROWN.		0201508
26	A/R		CABLE. PUF 1/3M. SLATE.		0201516
27	A/R		CABLE. PUF 1/3M. BLUE/WHITE.		0406048
28	A/R		CABLE. PUF 1/3M. BLUE/ORANGE.		040605C
29	A/R		CABLE. PUF 1/3M. BLUE/GREEN.		0406069
30	A/R		CABLE. PUF 1/3M. BLUE/BROWN.		0406077
31	A/R		CABLE. PUF 1/3M. BLUE/SLATE.		0406085
32	A/R		CABLE. PUF 1/3M. ORANGE/WHITE.		0406093
33	A/R		CABLE. PUF 1/3M. GREEN/WHITE.		0406105
34	A/R		CABLE. PUF 1/3M. BROWN/WHITE.		0406113
35	A/R		CABLE. PUF 1/3M. SLATE/WHITE.		0406121
36	A/R		CABLE. PUF 1/3M. WHITE.		0201524
37	A/R		CABLE. PUF 1/3M. RED.		0201532
38	A/R		CABLE. PUF 1/3M. BLACK.		0201540
39	A/R		CABLE. PUF 1/3M. YELLOW.		0201559
40	A/R		CABLE. PUF 1/3M. VIOLET.		0201567
41	A/R		CABLE. PUF 1/3M. PINK.		0375860
42	A/R		CABLE. PUF 1/3M. RED/BLUE.		040613X
43	A/R		CABLE. PUF 1/3M. RED/ORANGE.		0406148
44	A/R		CABLE. PUF 1/3M. RED/GREEN.		0406156
45	A/R		CABLE. PUF 1/3M. RED/BROWN.		040616-
46	A/R		CABLE. PUF 1/3M. RED/SLATE.		0406172
47	A/R		CABLE. PUF 1/3M. RED/WHITE.		0406180

BBC

DS/PLA4

PARTS LIST. TE1/64.

DRN.	M.C.L.	DESIGN & EQUIP. DEPT.
TPD.		D64004A4.
CKD.		
APPD.	R.B.O	SHEET 2 OF 3 SHEE

SHT.	ISS.	DETAILS OF CHANGE	SHT.	ISS.	DETAILS OF CHANGE

ORIGINAL
FRAME SIZE
190mm x 277mm

ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED

BBC

VM 418/A4

DESIGNS DEPARTMENT

CODE:- TE1/64

PARTS LIST CHANGE RECORD, ISSUE:- 1 23/11/89

D64004 A4

SHEET 3

D64005A2

NICAM 3 MKII SIGNALLING TEST BOX

MINIMUM SIZE TO CUT NEGATIVE

MSB

CHANNEL 1/2

LSB STROBE X

CHANNEL 3/4

STROBE Y

CHANNEL 5/6

STROBE Z

2048 BIT
1
0

+5V

OV

2048 DATA

2048 STROBE

TE1/64

BBC

D64005A2

SCALE 2:1

SCALE: – 0

THIRD ANGLE PROJECTION

ORIGINAL FRAME SIZE
400mm x 574mm

DS/A2/1

ISS	CHANGE	
1	29/8/89	

SIGNALLING TEST BOX

TE1/64
LEGEND

All dimensions in millimetres unless otherwise stated: Normal tolerances:
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one decimal place – ± 0.3 mm otherwise
two decimal places – ± 0.1 mm stated

DRN.	J DB
TCD.	
CKD.	
APPD.	R.B.D.

DESIGN & EQUIPMENT DEPARTMENT

D64005A2

R293

D64006A2

MINIMUM SIZE TO CUT NEGATIVE

TO CODER

TO DECODER

SCALE 2:1

SCALE: – 0

THIRD ANGLE PROJECTION

ORIGINAL FRAME SIZE
400mm x 574mm

DS/A2/1

ISS	CHANGE	
1	29/8/89	

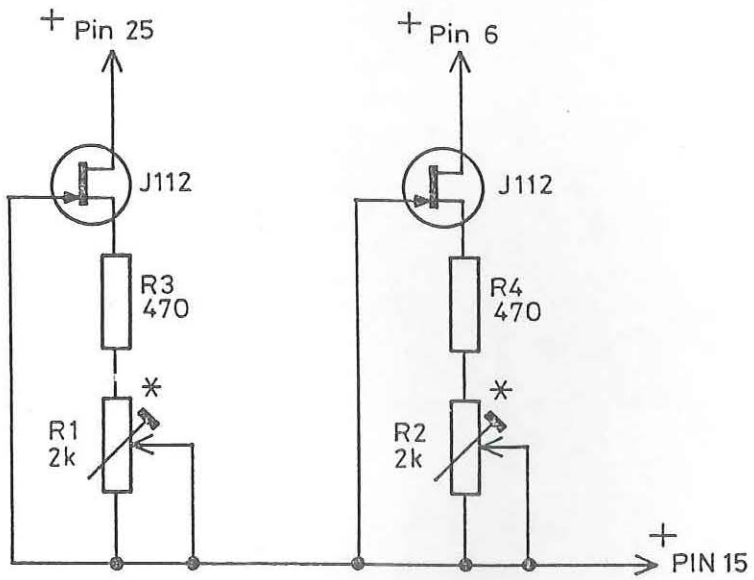
SIGNALLING TEST BOX

TE1/64
LEGEND

All dimensions in millimetres unless otherwise stated: Normal tolerances:
no decimal place – ± 1 mm unless
one decimal place – ± 0.3 mm otherwise
two decimal places – ± 0.1 mm stated

DRN.	JDB	DESIGN & EQUIPMENT DEPARTMENT
TCD.		
CKD.		D64006A2
APPD	R.B.D	

R293



NOTES

* Cemast 0306003
\+ 28 Pin header, replaces UXO3.

Setting Up

Equipment recquired :- 15V Power supplier.
Milliammeter.

Method

1. Set pots to maximum resistance.
2. Connect pin 15 to the negative pole of the 15V supply.
3. Connect pin 25 to the positive pole of the 15V supply in series with milliammeter, set R1 to give a current of 2mA.
4. Connect pin 6 in place of pin 25 to supply +. Set R2 for 2mA.

ORIGINAL FRAME SIZE 190mm x 277mm

THIRD ANGLE PROJECTION

All dimensions in millimetres unless otherwise stated:
Normal tolerances:
no decimal place – ± 1 mm unless
one decimal place – ± 0.3 mm otherwise
two decimal places – ± 0.1 mm stated

SCALE:- 0

ISS	CHANGE
1	10/11/88

C09/13
TEST HEADER

DRN.	JDB	DESIGN & EQUIPMENT DEPT.
TCD.		
CKD.		DSK27206A4
APPD.	GRB	

BBC

DS/A4

R297