QUICK CUTS

A HIGH SPEED CUTS CASSETTE INTERFACE

This circuit has been developed with three main objectives

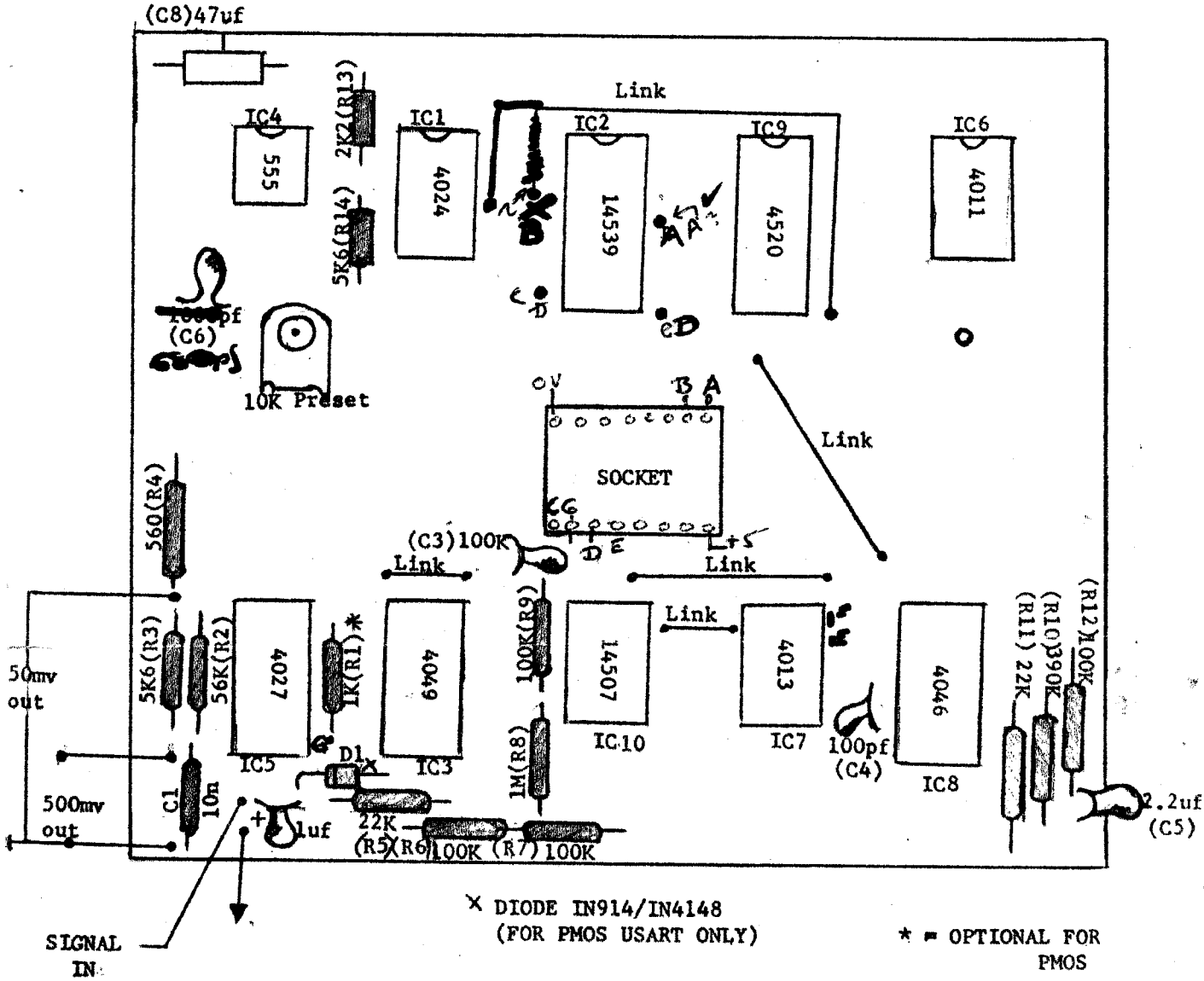
1. It should be capable of reading and writing CUTS.
2. It should have the minimum of adjustments.
3. It should be capable of operation reasonabley fast.

CUTS involves recording eight cycles of 2400Hz for a one, and four cycles of 1200Hz for a zero. This interface records and reads tapes in this way, but is also capable of using fewer cycles at each frequency, down to one cyscle of 2400Hz of half a cycle of 1200Hz, giving a data rate of 2400 bits per second. By increasing the master clock frequency it is possible to operate even faster, and prototypes have run at 5000 bits per second.

The operation of the transmitter circuit should be fairly obvious, but the receiver is a bit more complex. The recorder output is amplified (change R6 to adjust the gain) and squared by IC10a, which is wired as a schmitt trigger. IC10b & c serve to generate a negative going pulse on each zero crossing of the input signal. IC9a operates as a digital monostable, which times out when a 1200Hz input signal is being received. IC7a & b serve to latch the time-out signal, and to give equal length 0s and 1s. The zero crossing pulses are combined with the eight to twelve counts of the monostable to give a steady 4800Hz (nominal), which is used as the input signal for the phase-locked loop IC8. The appropriate UART 16 times clock frequency is selected from the feedback divider IC9b by the multiplexer IC2b.

The only adjustment required is the setting of the master oscillator frequency to 76.8KHz, or this can be derived form a crystal oscillator.

TOP



× DIODE IN914/IN4148
(FOR PMOS USART ONLY)

* = OPTIONAL FOR PMOS

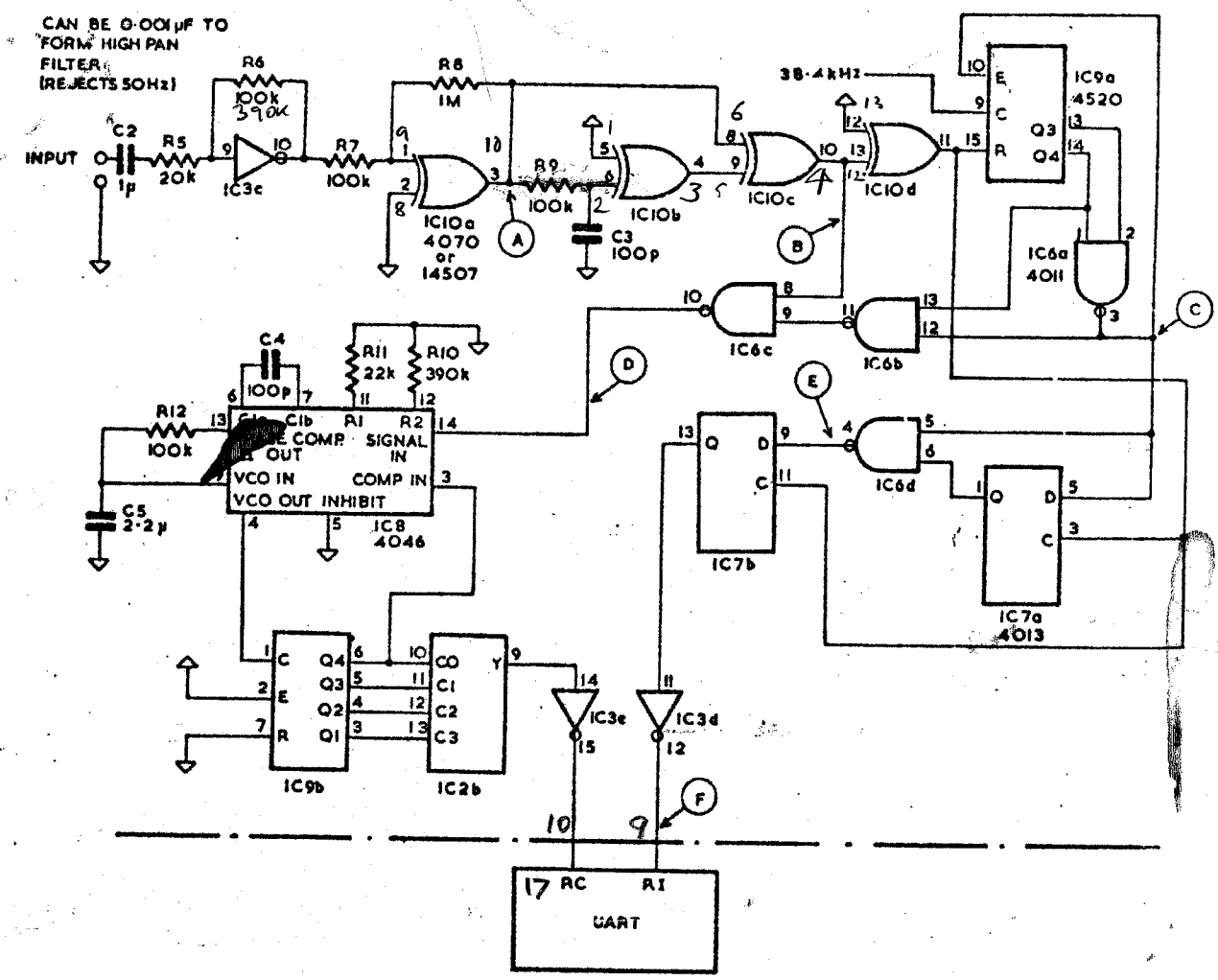
A — SPEED SELECT — Brown purple
B — SPEED SELECT — blue

C — TX CLOCK — brown
D — RX CLOCK — yellow
(OPTIONAL BUFFER)
E — Q
F — Q — TO RX DATA Green
G — TX DATA Orange

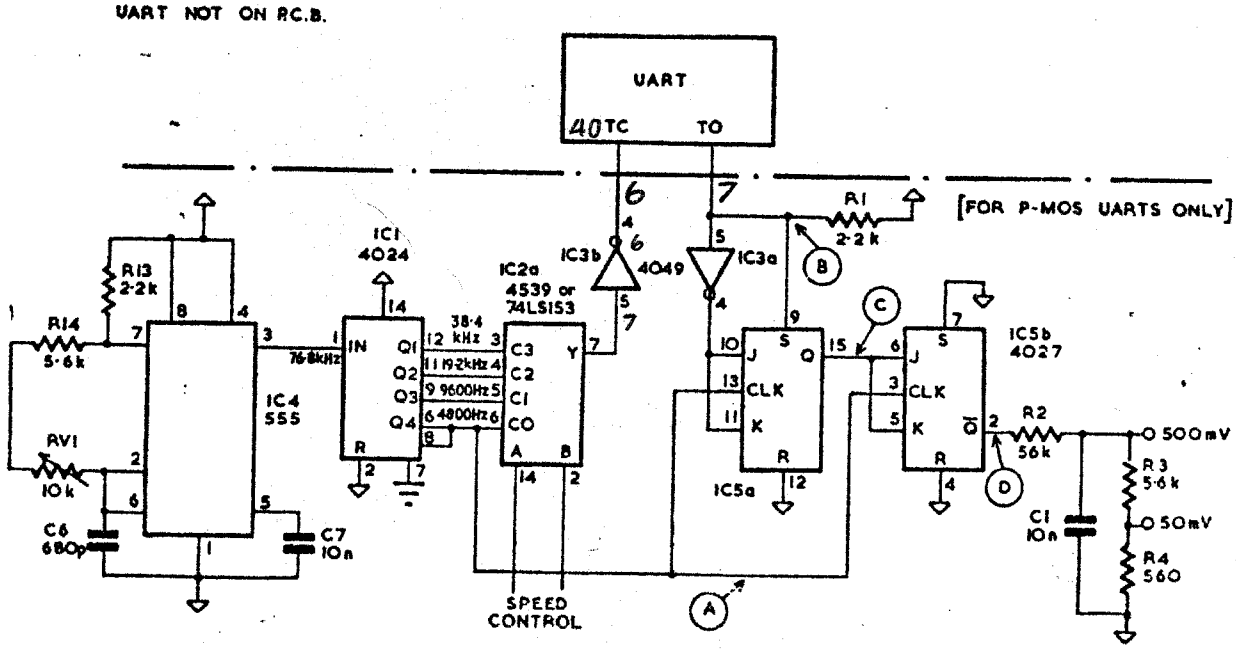
A	B	SPEED
0	0	300
0	1	600
1.	0	1200
1	1	2400

+5 is red
0V is black

ISSUE II



RECEIVER CIRCUIT



TRANSMITTER CIRCUIT

NewBear Computing Store Ltd

HEAD OFFICE: 40 BARTHOLOMEW STREET NEWBURY BERKSHIRE RG14 5LL NEWBURY (0635) 30505

HIGH SPEED CASSETTE INTERFACE:- PARTS LIST

Motorola

- IC 1 4024
- IC 2 4539
- IC 3 4049
- IC 4 555
- IC 5 4027
- IC 6 4011
- IC 7 4013
- IC 8 4046
- IC 9 4520
- IC 10 14507

- RV1 10K Variable Resisitor

- C1 10nf Ceramic
- C2 1uf Tant
- C3 100pf Ceramic
- C4 100pf Ceramic
- C5 2.2uf Tant
- C6 680pf Polystyrene
- C7 10nf Ceramic
- C8 47uf

- R1 1K
- R2 56K
- R3 5.6K
- R4 560 ohms
- R5 22K
- R6 100K
- R7 100K
- R8 1M
- R9 100K
- R10 390K
- R11 22K
- R12 100K
- R13 2.2K
- R14 5.6K

All Resisitors are one-quarter watt.

- P. C. B.

- 1 off 16 Pin Socket
- 1 off 16 Pin Plug

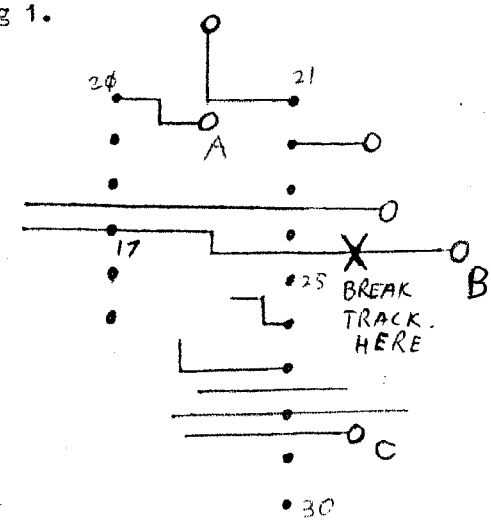
Handbook = 1 off Layout sheet
1 off Quick Cuts
1 off Circuit diagrams

Instructions for connecting a Blandford-Cottis cassette interface to a Nascom.

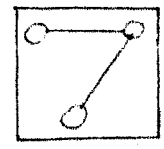
These instructions are to convert completely to the new interface without allowing you to read old tapes.

1. Remove link 3 and link 4 completely.
2. Cut the track on the P.C.B. near the UART as indicated in Fig 1.
3. Locate the 16 pin DIL socket for serial I/O SK2 This already has some pin used but pins 6,7,9 and pin 10 are not used (amongest others) and are recommended for this application.
4. Connect a wire from pin 6 of this socket to the plated thru hole, marked B in Fig 1, near the UART. This is the TRANSMIT CLOCK connection.
5. Connect a wire from pin 7 of the socket to the p.t.h. labelled C in fig 1. This is the TRANSMIT DATA connection.
6. Connect a wire from pin 10 to the 'pole' of link 4. This is the hole to which the three options all go. This is RECEIVE CLOCK.
7. Connect a wire from pin 9 to the pole of link 3. This is RECEIVE DATA.
8. This completes all the modifications to the Nascom board.
9. Make up a lead connecting two 16 pin DIL headers together so that the corresponding pins 6,7,8,9,10, and 16 are connected.
   NOTE PIN 16 IS +5v AND PIN 8 IS GROUND.
   TAKE CARE THAT YOU DO NOT PLUG EITHER HEADER IN THE WRONG WAY ROUND OR YOU WILL CONNECT THE POWER SUPPLY TO THE INTERFACE THE WRONG WAY.
10. Connect the pins 6,7,9, and 10 on the interface board socket to the corresponding connections on the board.
    pin 6 Transmit clock
    pin 7 Transmit data
    pin 9 Receive data
    pin 10 Receive clock.
    Note pins 16 and 8 are already connected to the power supply rails on the board.
11. This completes the connection. Although this does not allow you to read your old tapes some suitable use of switches in the four wires added to the Nascom board will enable you to read them. However the best way to achieve this may well be to connect the Nascom's cassette demodulated output into one bit of the PIO and write a short program to pretend that the CPU is a UART. If you can use two tape recorders(i.e. borrow one for a short time) then you can simply transfer the contents of a tape recorded in the 'old' way onto a new tape by simply reading a byte using the above mentioned program from the 'old' tape and writting it out to the UART and hence to the new tape in the new format. Since the Nascom runs at 250 baud and the new interface runs at a minimum of 300 baud this should be no problem. It is recommended that after this process you read in the new tape and then resave the program at a faster speed, since this is surely the main object of using the new circuit, at the same time you will remove the unwanted gaps between bytes saved due to the original difference in speed. Remember that you can only read a tape at the same speed that you wrote it.

UART connections, solder side view
Fig 1.



Link 3, component side view
Fig 2.



Link 4, component side view.
Fig 3.