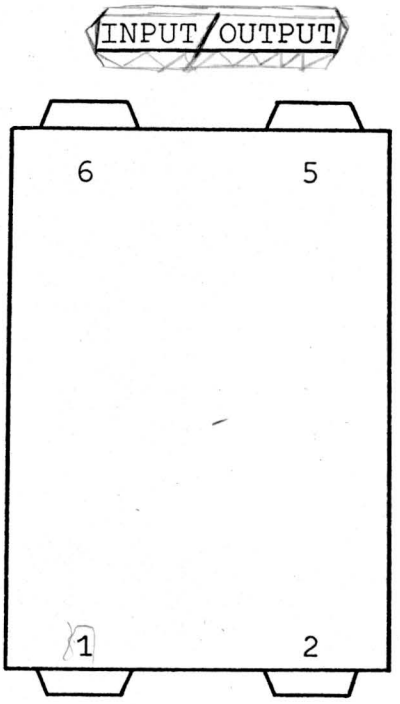
PHILIPS data systems

Digital Input/Output System.

For the first level of interfacing the DIOC system could be the answer, the following diagrams and connection lists are meant as a guide to interfacing on the basic DIOC/DIC/DOC without options (this information will follow).

Figures 1, 2 and 3 show a schematic of each unit, the cards have the following format :

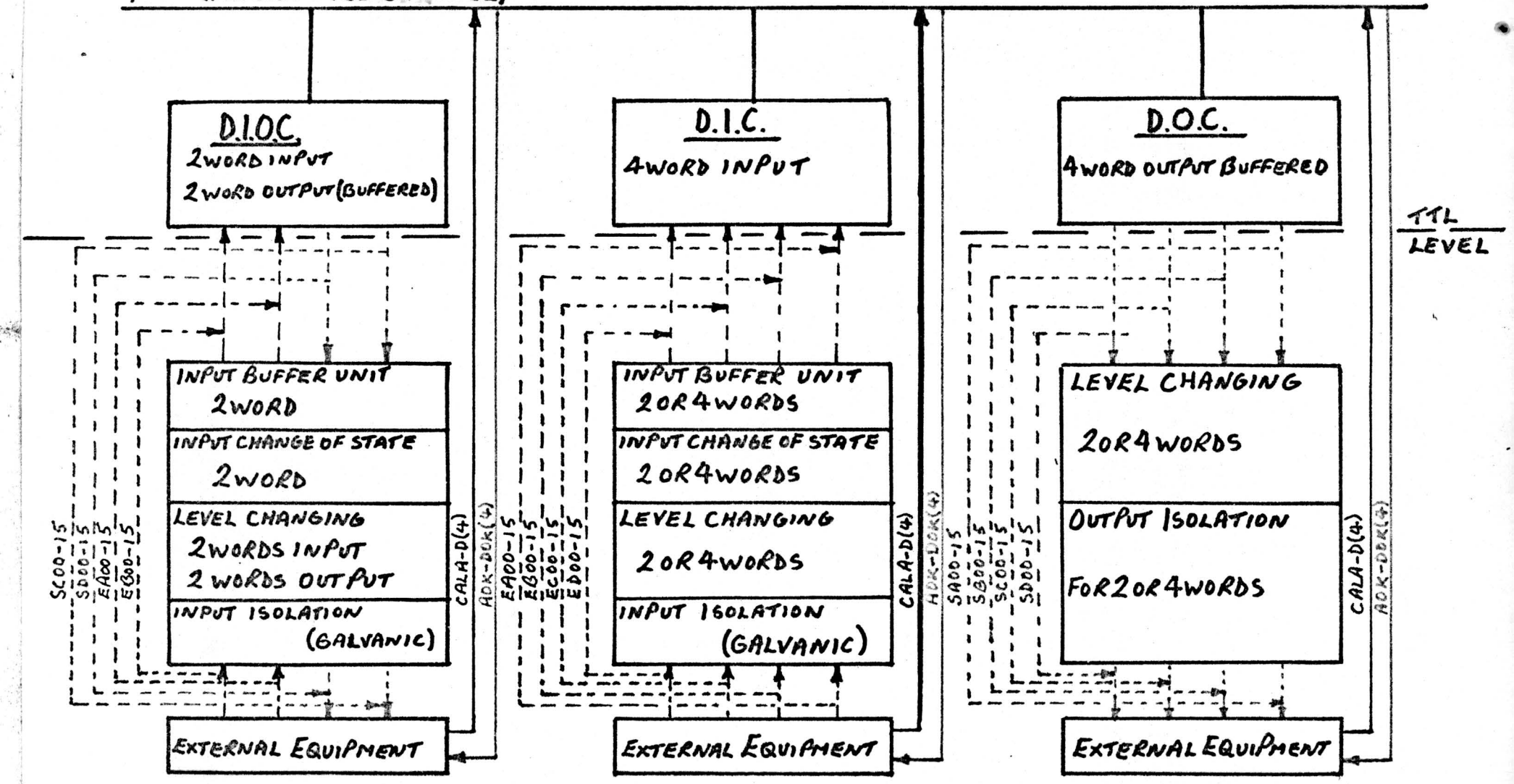


DIOC/DIC/DOC

I/O BUS

The connections to connectors 1, 2, 5 and 6 are as listed.

800 SERIES DIGITAL INPUT/OUTPUT SYSTEM (DIOS)



KEY

DIOC = DIGITAL INPUT/OUTPUT CONTROLLER
DIC = DIGITAL INPUT CONTROLLER
DOC = DIGITAL OUTPUT CONTROLLER

DESCRIPTION :

The DIOS (Digital I/O System) will allow any external digital equipment to be connected to any P 800 series C.P.U. Its main function is the control of 16 bit data words in both directions via the programmed channel. In addition options can be included which will provide extra input buffers, change of state detection, voltage level adaptation and galvanic isolation.

There are three types of basic controllers :

DIC - Controls 4 input words.
DOC - Controls 4 output words.
DIOC - Controls 2 input and 2 output words.

Output words are always buffered, the input words are gated.

These three basic controllers are connected to the standard I/O bus without any modifications. The data and signal lines are shown in the block diagram and have been described. Digital equipment operating at the correct logic levels can be connected directly to the basic controllers (i.e. the interface is TTL).

In all other cases the extended system which contains a n° of functions as options has to be used.

OPERATION :

There are two modes of operation. One by software control, the other by external control. With software control, the transfer is controlled directly by program using a single I/O instruction per word exchange.

With external control a 17th line is used to request an exchange for the corresonding group of lines. One or more of these lines becoming active causes the controller to generate an interrupt signal to the C.P.U.

OPTIONS :

The following options are available :

I.B.U. - Input Buffer Unit consists of either 2 or 4 16 bit registers and is used with DIC / DIOC controllers.

I.C.S. - Change of State Detection; can be added for each input word when external control is used. It provides a check on the state of the 16 data lines. If one or more input gates change from 0 to 1, a signal is sent to the CALL line of the basic controller.

LEVEL ADAPTATION : - Adapts external devices with the following levels to the same level as the CPU I/O Bus.

INPUT SIGNALS :

OPTION 1.	LOW LEVEL	-48 V	to	+ 0.4 V
	HIGH LEVEL	+ 2 V	to	+ 48 V
OPTION 2.	LOW LEVEL	-48 V	to	+ 4.5 V
	HIGH LEVEL	+7,5 V	to	+ 48 V

OUTPUT SIGNALS :

LOW LEVEL : 0.4 V
HIGH LEVEL : 2.4 V to 48 V

I.IS, et O.IS : - Input Isolation and Ouput Isolation (Galvanic) can be provided when the ground voltage of the external device is different to that of the C.P.U. This is better than 380 V (rms) at switching speeds of up to 10K Hz.

INPUT LINES

Signal name	Description
CALA/) CALB/) CALC/) CALD/)	External call signals requesting data exchange on the corresponding A, B, C or D group of lines.
EA00 - EA15	Set of 16 input lines for DIC and DIOC
EB00 - EB15	Set of 16 input lines for DIC and DIOC
EC00 - EC15	Set of 16 input lines for DIC
ED00 - ED15	Set of 16 input lines for DIC

OUTPUT LINES

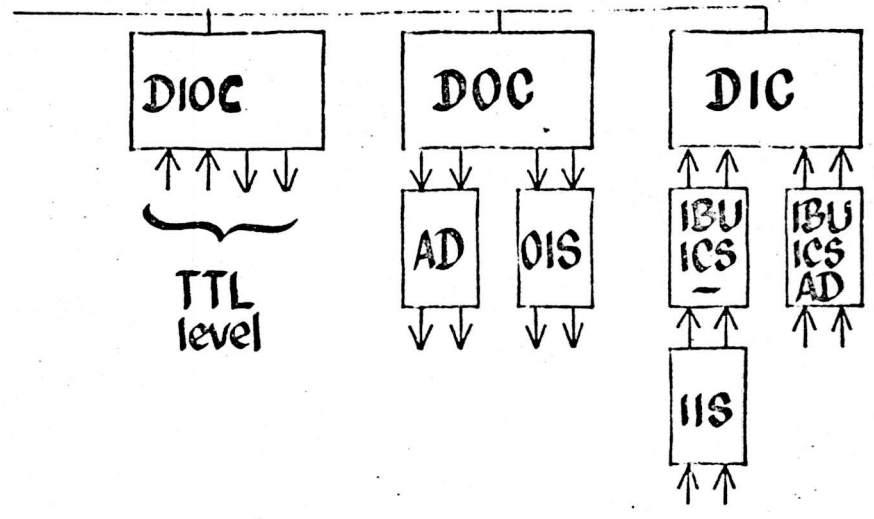
Signal name	Description
AOK) BOK) COK) DOK)	Response signals indicating that the exchange on the corresponding A, B, C or D group of line has been performed.
SA00 - SA15	Set of 16 output lines for DOC
SA00 - SB15	Set of 16 output lines for DOC
SC00 - SC15	Set of 16 output lines for DOC and DIOC
SD00 - SD15	Set of 16 output lines for DOC and DIOC

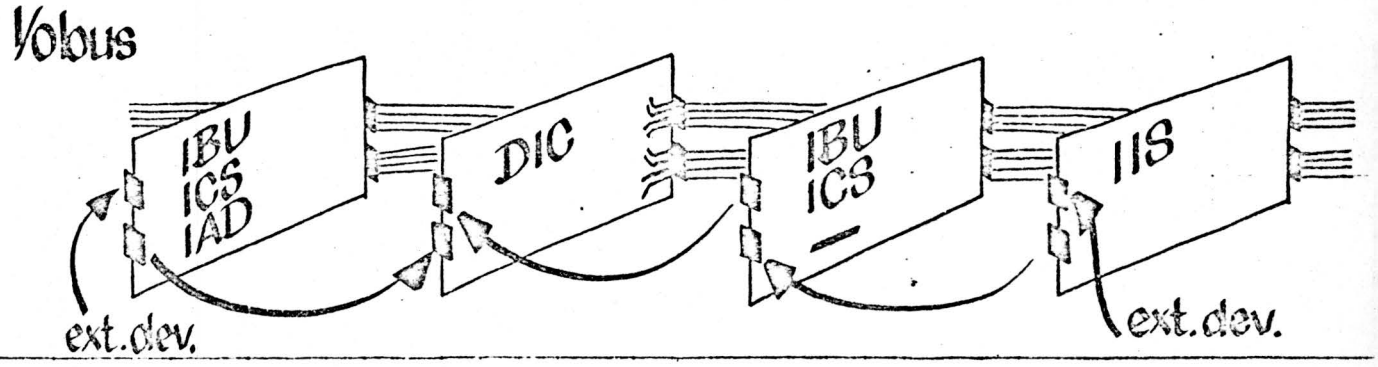
digital input output system (DIOS)

1 card:

- basis control
  - * DIC 4w. input
  - * DOC 4w. buf. outp.
  - * DIOC 2w. inp. + 2w. buf. outp
  - * IBU 2w. inp. buf.
  - * ICS 2w. change of state
  - * level adapt.
  - * galv. isolation foto diodes

2 schema:





PHILIPS data systems

I/O BUS.

Connector pining.

2AO1	BOFO2/	2BO1	
2AO2	EOR	2BO2	Reserved
2AO3	BOFO1/	2BO3	
2AO4	BOFOO/	2BO4	Reserved
2AO5	BOU14	2BO5	
2AO6	BOU13	2BO6	Reserved
2AO7	BOU12	2BO7	
2AO8	BOUO9	2BO8	Reserved
2AO9	BOU10	2BO9	
2A10	BOU11	2B10	Reserved
2A11	BOU15	2B11	
2A12	MC/	2B12	Reserved
2A13	BADO3/	2B13	
2A14	DAV/	2B14	Reserved
2A15	BADO4/	2B15	Reserved
2A16	BADO5/	2B16	Reserved
2A17	BOUO8	2B17	
2A18	BOUO7	2B18	Reserved
2A19	BOUO6	2B19	
2A20	BOUO5	2B20	Reserved
2A21	BOUO4	2B21	
2A22	BADOO/	2B22	Reserved
2A23	BOUO3	2B23	
2A24	BADO1/	2B24	Reserved
2A25	BADO2/	2B25	
2A26	BOUO2	2B26	Reserved
2A27	BOUO1	2B27	
2A28	BOUOO	2B28	Reserved
2A29	+ 24 V	2B29	
2A30	- 5 V	3B30	Reserved
2A31	+ 5 V	2B31	Ground

1A01	+ 5 V	1B01	Ground
1A02	Reserved	1B02	Reserved
1A03	BIN00/	1B03	
1A04	BIN01/	1B04	Reserved
1A05	BIN02/	1B05	
1A06	BIN03/	1B06	Reserved
1A07	BIN04/	1B07	
1A08	BIN05/	1B08	Reserved
1A09	BIN06/	1B09	
1A10	BIN07/	1B10	Reserved
1A11	GROUND	1B11	
1A12	RESERVED	1B12	Reserved
1A13	ACC/	1B13	
1A14	ARE/	1B14	Reserved
1A15	BRIR/ ≡ PIL	1B15	Reserved
1A16	BR1/ ≡ BRL	1B16	Reserved
1A17	BR2/ ≡ Reserved	1B17	
1A18	BR3/ ≡ Reserved	1B18	Reserved
1A19	BR4/ ≡ Reserved	1B19	
1A20	RESERVED	1B20	Reserved
1A21	BIN08/	1B21	
1A22	BIN14/	1B22	Reserved
1A23	+ 6 V	1B23	
1A24	- 6 V	1B24	Reserved
1A25	- 12 V	1B25	
1A26	BIN13/	1B26	Reserved
1A27	BIN15/	1B27	
1A28	BIN09/		
1A29	BIN10/	1B29	
1A30	BIN11/	1B30	Reserved
1A31	BIN12/	1B31	

PHILIPS data systems

DIOC

Signal	Input Word A	Input Word B	Output Word C	Output Word D
00	6A25	6B25	5A07	5B07
01	6A24	6B24	5A08	5B08
02	6A23	6B23	5A09	5B09
03	6A22	6B22	5A10	5B10
04	6A21	6B21	5A11	5B11
05	6A20	6B20	5A12	5B12
06	6A19	6B19	5A13	5B13
07	6A18	6B18	5A14	5B14
08	6A14	6B14	5A18	5B18
09	6A13	6B13	5A19	5B19
10	6A12	6B12	5A20	5B20
11	6A11	6B11	5A21	5B21
12	6A10	6B10	5A22	5B25
13	6A09	6B09	5A23	5B24
14	6A08	6B08	5A24	5B23
15	6A07	6B07	5A25	5B22
CAL	6A16	6A05	5A16	5A05
OK	6B16	6B05	5B16	5B05

DIC

Signal	Input Word A	Input Word B	Input Word C	Input Word D
00	6A25	6B25	5A07	5B07
01	6A24	6B24	5A08	5B08
02	6A23	6B23	5A09	5B09
03	6A22	6B22	5A10	5B10
04	6A21	6B21	5A11	5B11
05	6A20	6B20	5A12	5B12
06	6A19	6B19	5A13	5B13
07	6A18	6B18	5A14	5B14
08	6A14	6B14	5A18	5B18
09	6A13	6B13	5A19	5B19
10	6A12	6B12	5A20	5B20
11	6A11	6B11	5A21	5B21
12	6A10	6B10	5A22	5B25
13	6A09	6B09	5A23	5B24
14	6A08	6B08	5A24	5B23
15	6A07	6B07	5A25	5B22
CAL	6A16	6A05	5A16	5A05
OK	6B16	6B05	5B16	5B05

PHILIPS data systems

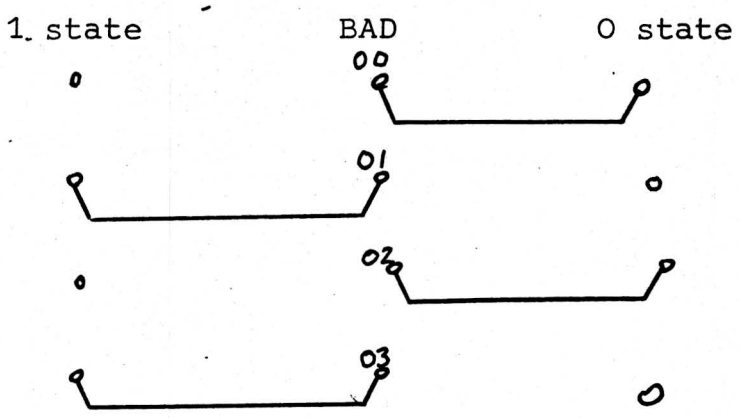
DOC

Signal	Output Word A	Output Word B	Output Word C	Output Word D
00	6A25	6B25	5A07	5B07
01	6A24	6B24	5A08	5B08
02	6A23	6B23	5A09	5B09
03	6A22	6B22	5A10	5B10
04	6A21	6B21	5A11	5B11
05	6A20	6B20	5A12	5B12
06	6A19	6B19	5A13	5B13
07	6A18	6B18	5A14	5B14
08	6A14	6B14	5A18	5B18
09	6A13	6B13	5A19	5B19
10	6A12	6B12	5A20	5B20
11	6A11	6B11	5A21	5B21
12	6A10	6B10	5A22	5B25
13	6A09	6B09	5A23	5B24
14	6A08	6B08	5A24	5B23
15	6A07	6B07	5A25	5B22
CAL	6A16	6A05	5A16	5A05
OK	6B16	6B05	5B16	5B05

PHILIPS data systems

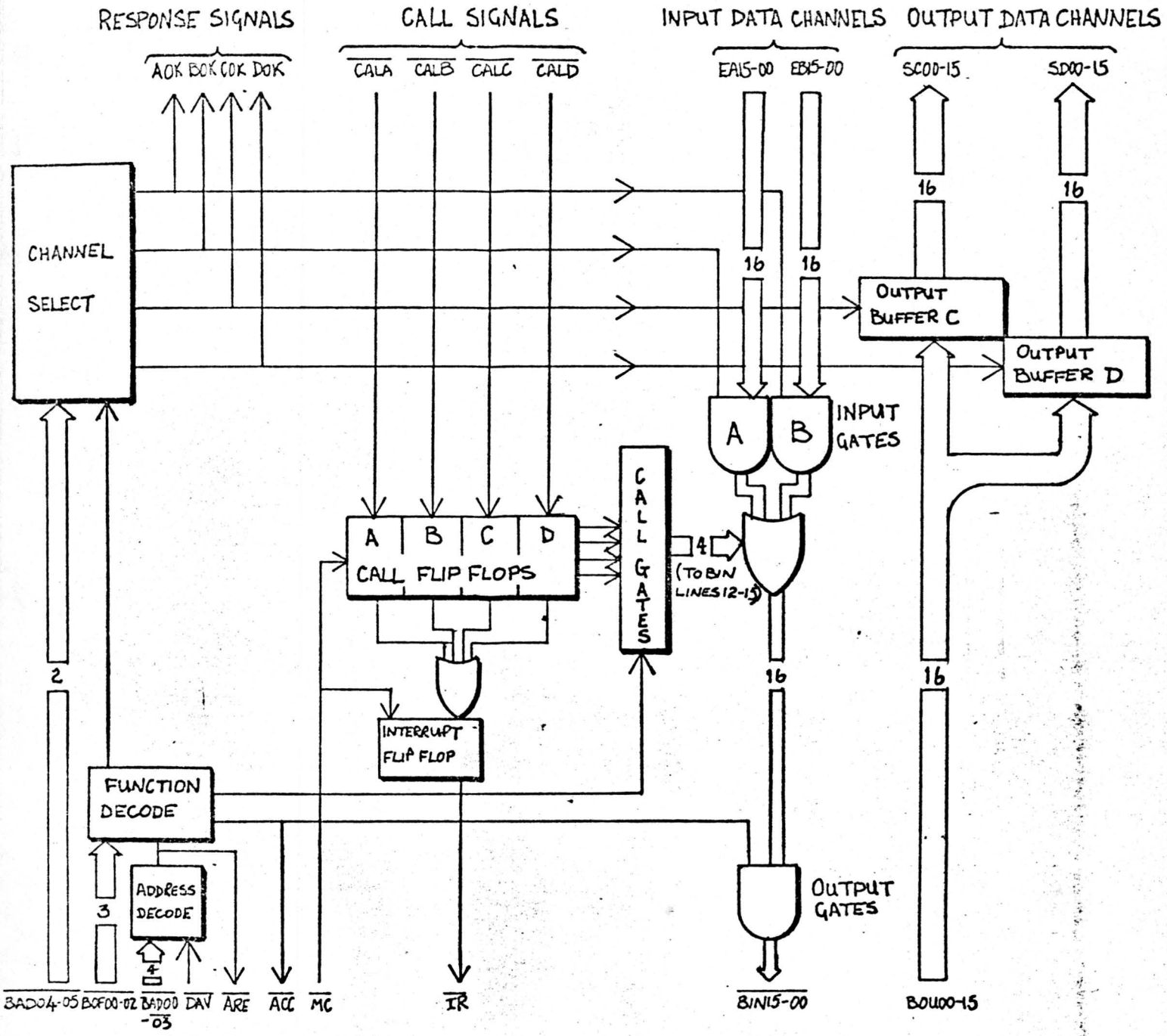
Card Address

On the cards is a group of holes which should be connected to give the BAD 00, 01, 02, 03 decode. For an address 0101 the following connections are made :



The card is in fact marked with the BAD, 1's and 0's state to avoid mistakes.

DIGITAL EQUIPMENT



I/O Bus

ADDRESS LINES

BAD 00 01 02 03 04 05

- 00 01 02 03: DIOC ADDRESS
- 04 05: CHANNEL NUMBER

FUNCTION LINES

BOF 00 01 02

1	0	0	INPUT DATA WORD
1	0	1	INPUT CHANNEL ADD
0	0	0	OUTPUT DATA WORD

INPUT TO COMPUTER

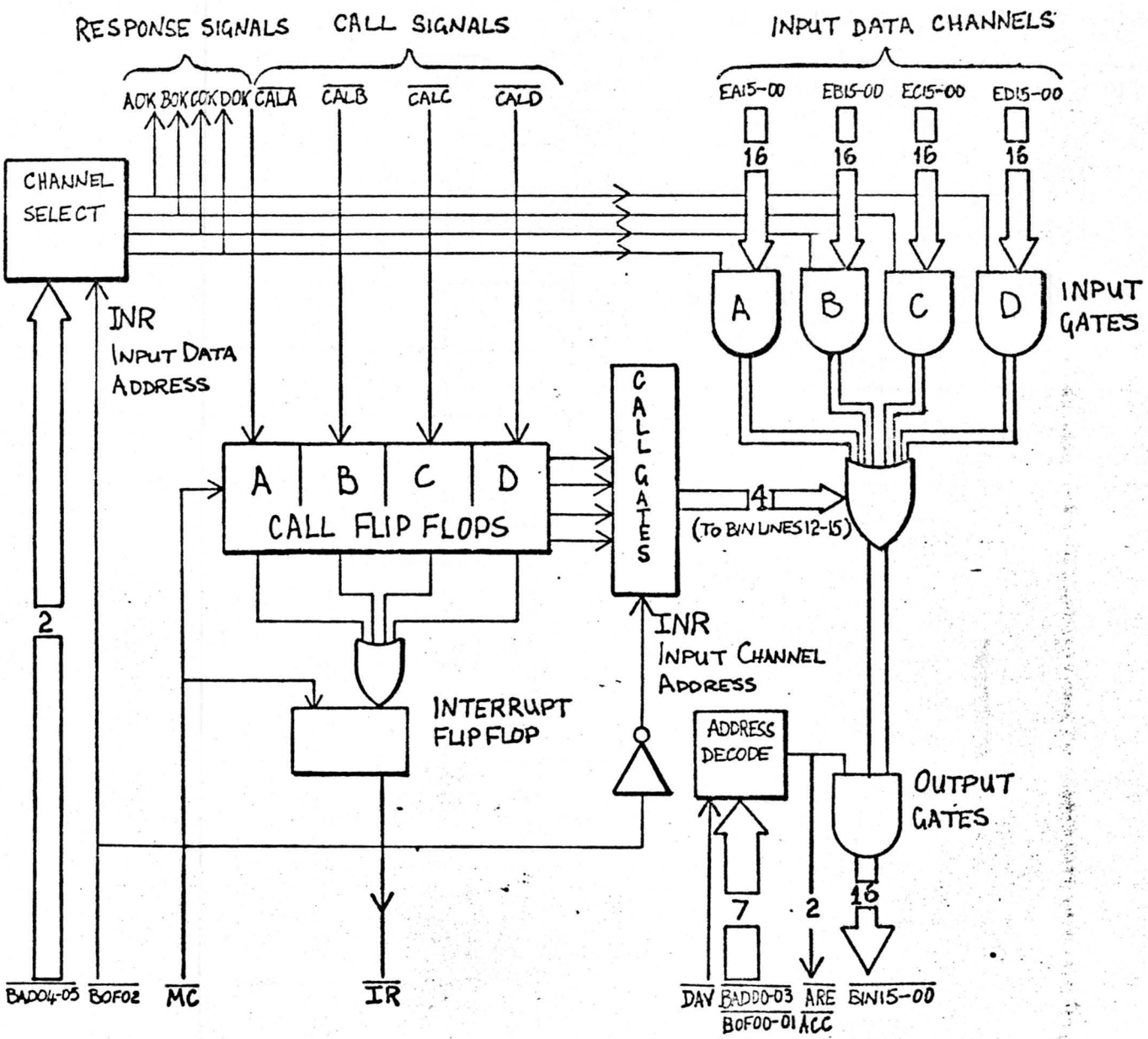
- BIN15-00 - DATA WORD
- IR - INTERRUPT REQ
- ARE - ADDRESS RECOGNISED
- ACC - COMMAND ACCEPTED

OUTPUT FROM COMPUTER

- BOU00-15 - DATA WORD
- MC - MASTER CLEAR
- DAV - ADDRESS VALIDATOR
- FUNCTION LINES
- ADDRESS LINES

FIGURE 1 DIGITAL INPUT/OUTPUT CONTROLLER

DIGITAL EQUIPMENT

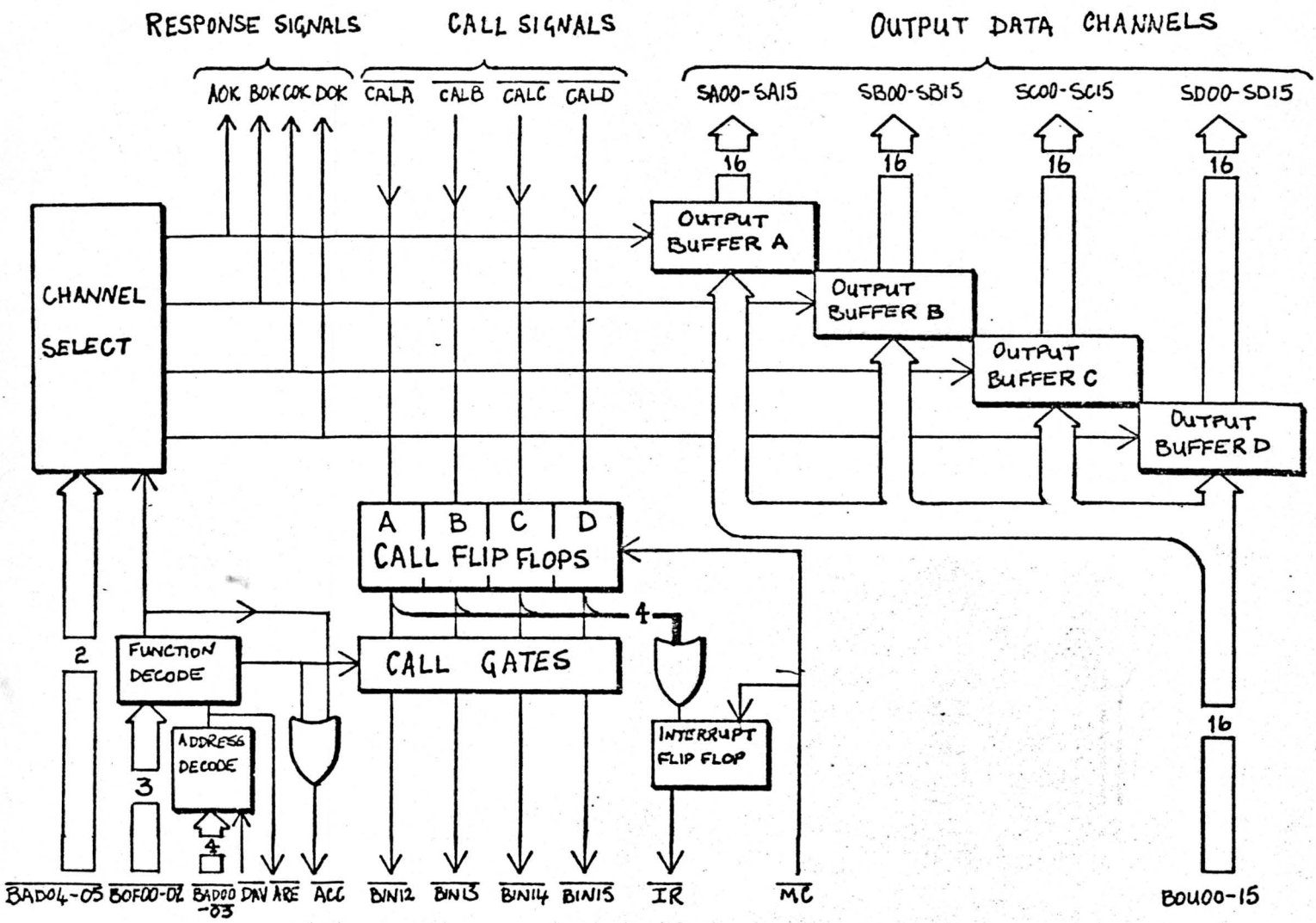


I/O BUS

ADDRESS LINES		FUNCTION LINES	INPUT TO COMPUTER	OUTPUT FROM COMPUTER
BAD 00 01 02 03 04 05		BOF 00 01 02	BIN15-00 - DATA WORD	MC - MASTER CLEAR
DIC ADDRESS	CHANNEL NUMBER	1 0 0 INPUT DATA WORD	IR - INTERRUPT REQ	DAV - ADDRESS VALIDATOR
		1 0 1 INPUT WORD ADDRESS	ARE - ADDRESS RECOGNISED	FUNCTION LINES
			ACC - COMMAND ACCEPTED	ADDRESS LINES

FIGURE 2 DIGITAL INPUT CONTROLLER

DIGITAL EQUIPMENT



I/O Bus

ADDRESS LINES — FUNCTION LINES — INPUT TO COMPUTER — OUTPUT FROM COMPUTER

BAD 00 01 02 03 04 05 — BOF000102

DOC ADDRESS — CHANNEL NUMBER

1 0 1 INPUT CHAN ADD
0 0 0 OUTPUT DATA WORD

BIN12-15 — CALL WORD
IR — INTERRUPT REQ
ARE — ADDRESS RECOGNISED
ACC — COMMAND ACCEPTED

BOU00-15 — DATA WORD
MC — MASTER CLEAR
DAV — ADDRESS VALIDATOR
FUNCTION LINES
ADDRESS LINES

FIGURE 3 DIGITAL OUTPUT CONTROLLER