

TECHNICAL DATA:

Power requirements :

Supply voltage : AC: 11 - 40V RMS (50 - 60 Hz)
: DC: 11 - 60V

Power consumption : standby without SDI: 2.5 Watts
standby with SDI : 3 Watts

When updating displays the supply current is limited to 1A DC.

Environmental conditions:

Operating temperature : 0°C - +50°C.
Storage temperature : -25°C - +70°C.

Relative humidity : 5-90%, non condensing

Dimensions:

weight : 150 grams
L x W x H without SDI: 160 x 100 x 30 mm
L x W x H with SDI: 160 x 100 x 45 mm

mounting holes are 3mm diameter on 150 x 90 mm spacing

INTRODUCTION:

The SDS/03 is the central part of the Small Information System (SIS). Equipped with a powerful micro processor and a package of dedicated software, it is capable of driving most types of electro magnetic displays. An RS232 interface allows serial input of information according to a simple protocol with various baudrates. Type of display and baudrates are selected with jumpers.

Data Input

| | |
|------------------------|--|
| SDS/03 without add-on | RS232 serial interface |
| SDS/03 with SDI/01 | Parallel input, pulse counting |
| SDS/03 with SDI/02 | Analog input |
| SDS/03 with SDI/03/DCF | Input from DCF77 time-signal transmitter in Mainflingen, West-Germany. |
| SDS/03 with SDI/03/MSF | Input from MSF60 time-signal transmitter in Rugby, England |

When an SDI/xx interfaceboard is mounted, specific functions can be created, such as force readouts, clocks and counters. System selection is done by jumper setting on the SDS/03. Both the analog and the parallel interface boards have code switches for scaling of the readout. The position of the decimal point is selectable to allow a correct blanking of leading zeros.

For all system configurations, powersupplies (SDP/xx) are available, for both 220V AC and 240V AC inputs. An SDP with built-in batterycharger is also available.

An internal switched mode powersupply on the SDS/03 provides all the necessary auxiliary supplies.

To complete the system, cabling assemblies (SCA) and connection interface boards (SCI) are available, to enable connection of all display-types supported by S.I.S.

FUNCTIONAL DESCRIPTION:

The RS232 serial interface:

An RS232 interface allows serial input of information according to a simple protocol with various baudrates. For the connection of a serial information source, SDS/03 can be used as a stand-alone unit. The baudrates that can be selected are: 300, 600, 1200, 2400, 4800 and 9600 baud.

Message format :

- | | |
|--------------|---------------|
| 1. startbyte | STX |
| 2. message | ASCII message |
| 3. stopbyte | ETX |

The ASCII characters are 8 bit, 1 stopbit and no parity.

To enable direct input from a keyboard with serial output the following control characters are implemented:

- CR (carriage return) = start of new line
- LF (line feed) = clear message and start of new line
- BS (backspace) = ignore last entry from keyboard

The RS232 signals are connected to X1 on the SDS/03:

| | |
|------|-----|
| X1:3 | GND |
| X1:4 | TxD |
| X1:5 | RxD |

System selections are made by jumper settings on the SDS jumperblocks

Jumperblock J1 : type of display and pulse characteristics
Jumperblock J2 : the system function.

A complete summary of the application of J1 and J2 is given in tables 1 (page 9 and 10) and 2 (pages 11 and 12).

In the seven-segment character generator, 5 special characters are included :

- 0AH = ' ' (blank)
- 0BH = '-' (minus)
- 0CH = '°' (degrees)
- 0DH = 'C' (Celsius)
- 0EH = 'A' (e.g. "Advantage" in tennis scores)

If a message contains more characters than the amount of displays connected, or if the message should be read-out by two or more SDS/03 driverboards, the following features are implemented :

1. The message received is (partially) retransmitted by the SDS/03.

A number of characters between 1 and 16, selectable with jumpers on Jumperblock J2, is subtracted from the beginning of the message and displayed. The remainder of the message is directly retransmitted via TxD on X1:4, followed by the displayed part of the message as shown in the example.

Example:

fig. 1

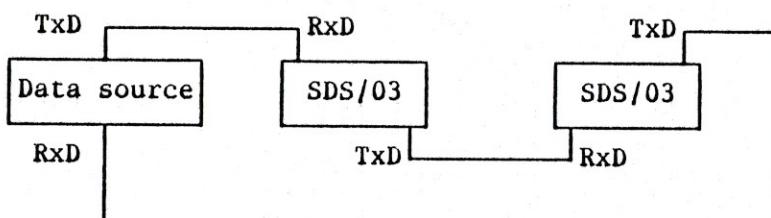
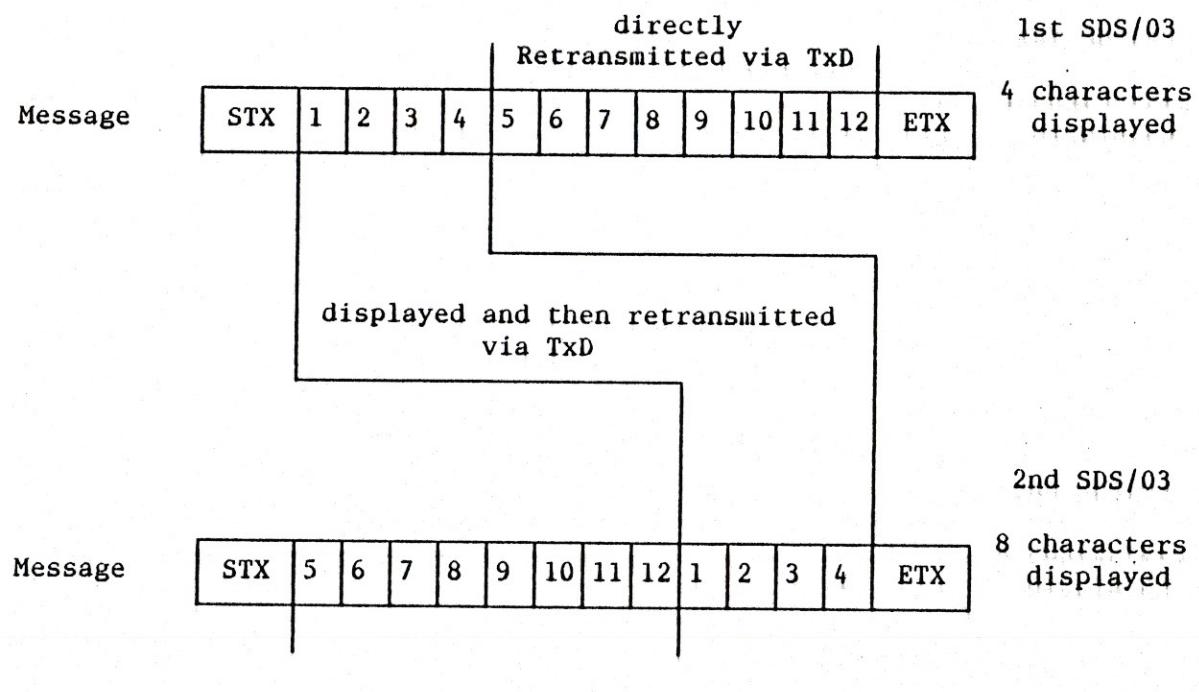


fig. 2



2. The entire message is displayed and then retransmitted via TxD to be received and displayed by a next SDS/03.

The display controller:

The SDS/03 is capable of driving most types of electro magnetic displays in the following quantities:

| | NUMERIC | | ALPHA-NUMERIC |
|--------------------------|---------------|---------------|---------------|
| | seven segment | 35 dot matrix | 35 dot matrix |
| single coil | 9 | -- | 1 (** 16) |
| dual coil | 16 | -- | 3 (** 16) |
| dual coil + common reset | 32 | -- | -- |
| pre-encoded CN or CP | -- | 16 | -- |

** The matrix for alphanumeric displays can be enlarged by installation of an SDE/01 Matrix Extension Board. One SDS/03 can then drive 16 alpha-numeric display modules.

The displays are connected on the SDS/03 to X2 and X3. How the matrices for the various types of displays are configured is shown in the matrix diagrams (pages 14 - 21)

Ready made cabling assemblies are available for all display types supported by S.I.S.

In general, pulse voltage and pulse time vary for different types of displays. The correct setting has to be selected by placing jumpers on jumperblock J1. For the various settings see jumpertable 1 (pages 9 + 10)

When SDS/03 writes information to a (set of) display(s), the information is compared with the information already displayed and only the segments that need to be changed are energized.

When the input voltage is over 40V only display settings of types marked with an asterisk (*) in Table 1 are accepted.

When the input voltage is under 10V the pulses to drive the displays are inhibited.

The Powersupply

The input voltage can be 11 to 60V AC and DC. An internal switched mode powersupply on the SDS/03 provides all the necessary auxiliary supplies.

The power should be connected to X1 : 1 and 2 on the SDS/03.

Both 220V and 240V AC input powersupplies are available, as well as a version with a battery-charger.

CUSTOMIZING YOUR SDS/03 :

To customize your SDS/03 you have to inform the system which application is chosen by means of two jumperblocks, J1 and J2.

By placing jumpers on J1 you select the type of display you use for your application. An overview of all the displays that are supported by the SDS/03 together with their corresponding settings are given in Table 1 (page 8).

J1: 1,2,3 and 4 determine the type of matrix in which a display is connected.

J1: 5,6,7 and 8 determine the pulseduration.

All outputs on the SDS/03 are short-circuit proof. The current at which the pulse is switched off is set to 6Amps.

To set the "switch off" current to 12A resistor R10 should be soldered in ($R10 = 100 \text{ Ohms.}$).

Testing

- A select the displaytype with jumpers on Jumperblock J1, as listed on page 9 and 10.
- B select the TESTMODE by placing jumpers on J2: 1,2,3 and 4.
- C connect all display-cabling to X2 and X3 of the SDS/03.
- D make sure that your powersupply has an output within the limits as given in Technical Data and connect it to X1:1 and 2 of the SDS/03.
- E make sure the right setting is chosen. A wrong setting on J1 in combination with certain display types could damage the system.
- F switch on the power to the SDS/03.
A red LED starts blinking at regular intervals to tell you that the program is running.
After power up the displays will blank and then show a continuous set of numeric or alpha-numeric characters.
- G If your displays show the correct information, switch off the power, remove the jumpers from J2 and select the correct setting for the system configuration you need. (page 10)

By placing jumpers on J2 you select the transfer function of the system. The functions available on the SDS/03 are listed in table 2 together with their jumpersettings. For a description of the transfer functions performed in combination with an SDI see the SDI/xx manual.

J2: 1,2,3 and 4 tell the SDS which SDI-function is selected.
J2: 5,6,7 and 8 denote which subfunction has been chosen.

Note: The settings on J1 and J2 are taken over at power-up only.

Table 1 : J1 settings SIS 3.03**JUMPERSETTINGS JUMPERBLOCK 1 (J1)**

| mode | Display type | Nr. of Displays | matrix | J1:1234.5678 |
|------|-------------------------|-----------------|--------|--------------|
| A | Bodet H710,H715 | 16 | D2 | 0100.1000 |
| B | Bodet H725 | 16 | D2 | 0100.1001 |
| C | Bodet H730,H745 | 16 | D2 | 0100.1010 |
| D | Bodet H758 | 16 | D2 | 0100.1011 |
| E | Ferranti 270XY5-35SC | 1 | A1 | 0000.0000 |
| | Ferranti 410XY5-35SC | 1 | A1 | 0000.0000 |
| F | Ferranti 270XY5-35SC | 16 ** | A3 | 1001.0000 |
| | Ferranti 410XY5-35SC | 16 ** | A3 | 1001.0000 |
| G | Ferranti 840XY2-35SC | 1 | A2 | 0001.0000 |
| | Ferranti 1200XY2-35SC | 1 | A2 | 0001.0000 |
| | Ferranti 1800XY2-35SC | 1 | A2 | 0001.0000 |
| H | Ferranti 840XY2-35SC | 16 ** | A4 | 1010.0000 |
| | Ferranti 1200XY2-35SC | 16 ** | A4 | 1010.0000 |
| | Ferranti 1800XY2-35SC | 16 ** | A4 | 1010.0000 |
| I | Ferranti 104SS4-07SC | 9 | C1 | * 0011.0000 |
| J | Ferranti 105SS5-07SC | 9 | C1 | * 0011.0001 |
| K | Ferranti 901SS1-07SC | 9 | C1 | * 0011.0010 |
| | Ferranti 1201SS1-07SC | 9 | C1 | * 0011.0010 |
| | Ferranti 1801SS1-07SC | 9 | C1 | * 0011.0010 |
| L | Ferranti 100SS3 com pos | 32 | E1 | * 0101.0000 |
| M | Ferranti 100SS3 com neg | 32 | E2 | * 0110.0000 |
| N | Ferranti 270PE-DCP | 16 | F1 | * 0111.0000 |
| O | Ferranti 270PE-DCN | 16 | F2 | * 1000.0000 |
| P | Hedon HE635DC | 3 | B3 | 1011.0000 |
| | Hedon HE935DC | 3 | B3 | 1011.0000 |
| | Hedon HE1235DC | 3 | B3 | 1011.0000 |
| | Hedon HE1835DC | 3 | B3 | 1011.0000 |
| | Hedon HE640DC | 3 | B3 | 1011.0000 |
| | Hedon HE940DC | 3 | B3 | 1011.0000 |
| | Hedon HE1240DC | 3 | B3 | 1011.0000 |
| | Hedon HE1840DC | 3 | B3 | 1011.0000 |
| | Hedon HE635DC | 16 ** | B3 | 1011.0000 |
| | Hedon HE935DC | 16 ** | B3 | 1011.0000 |
| | Hedon HE1235DC | 16 ** | B3 | 1011.0000 |
| | Hedon HE1835DC | 16 ** | B3 | 1011.0000 |
| | Hedon HE640DC | 16 ** | B3 | 1011.0000 |
| | Hedon HE940DC | 16 ** | B3 | 1011.0000 |
| | Hedon HE1240DC | 16 ** | B3 | 1011.0000 |
| | Hedon HE1840DC | 16 ** | B3 | 1011.0000 |

0=No Jumper

1=Jumper ** = Only with SDE/01 installed

* = When the input voltage is over 40V only display settings of types marked with an asterisk (*) in Table 1 are accepted.

Jumper voorbeeld pag 15

Continued page 10
SDS/03 user manual

Table 1 : J1 settings rev.01-1989**JUMPERSETTINGS JUMPERBLOCK 1 (J1)**

| mode | Display type | Nr. of Displays | matrix | J1:1234.5678 |
|------|-----------------------|-----------------|--------|--------------|
| Q | Signalex 670RFR-35BC | 3 | B2 | 0010.0000 |
| | Signalex 972RFR-35BC6 | 3 | B2 | 0010.0000 |
| | Signalex 1272RFR-35BC | 3 | B2 | 0010.0000 |
| | Signalex 1672RFR-35BC | 3 | B2 | 0010.0000 |
| | Signalex 1872RFR-35BC | 3 | B2 | 0010.0000 |
| | Signalex 670RFR-35BC | 16 ** | B2 | 0010.0000 |
| | Signalex 972RFR-35BC6 | 16 ** | B2 | 0010.0000 |
| | Signalex 1272RFR-35BC | 16 ** | B2 | 0010.0000 |
| | Signalex 1672RFR-35BC | 16 ** | B2 | 0010.0000 |
| | Signalex 1872RFR-35BC | 16 ** | B2 | 0010.0000 |
| S | Signalex 152L | 16 | D2 | 0100.0000 |
| T | Signalex 402L | 16 | D2 | 0100.0001 |
| U | Signalex 602L | 16 | D2 | 0100.0010 |
| V | Signalex 900L | 16 | D2 | 0100.0011 |
| W | Signalex 1200L | 16 | D2 | 0100.0100 |
| X | Signalex 1800L | 16 | D2 | 0100.0101 |
| Y | Signalex 2410L | 16 | D2 | 0100.0110 |
| Z | Westerstrand 190 | 9 | C1 | * 0011.1000 |
| | Westerstrand 280 | 9 | C1 | * 0011.1000 |

0=No Jumper 1=Jumper

* = When the input voltage is over 40V only display settings of types marked with an asterisk (*) in Table 1 are accepted.

**= Amount of displays can be driven, but only with an SDE/01 installed.

An SDE/01 is a matrix extension board used for driving several (16) alpha-numeric displays with one SDS/03.

*Note that most display types are designed for use in vertical position. Some types will not operate properly lying horizontally.

TABLE 2: J2 settings rev. 01-1989

JUMPERSETTINGS JUMPERBLOCK 2 (J2)

| mode | function | Stand-alone SDS/03 subfunction | J2:1234.5678 |
|------|----------|---|--------------|
| 1 | serial | | 0xxx.xxxx |
| 2 | serial | 300 baud | 0000.xxxx |
| 3 | serial | 600 baud | 0001.xxxx |
| 4 | serial | 1200 baud | 0010.xxxx |
| 5 | serial | 2400 baud <i>Het meest gesdill voor seriel aansturen.</i> | 0011.xxxx |
| 6 | serial | 4800 baud <i>vannit de computer</i> | 0100.xxxx |
| 7 | serial | 9600 baud | 0101.xxxx |
| 20 | serial | xxx baud, 1 character displayed | 0xxx.0001 |
| 21 | serial | xxx baud, 2 characters displayed | 0xxx.0010 |
| 22 | serial | xxx baud, 3 characters displayed | 0xxx.0011 |
| 23 | serial | xxx baud, 4 characters displayed | 0xxx.0100 |
| 24 | serial | xxx baud, 5 characters displayed | 0xxx.0101 |
| 25 | serial | xxx baud, 6 characters displayed | 0xxx.0110 |
| 26 | serial | xxx baud, 7 characters displayed | 0xxx.0111 |
| 27 | serial | xxx baud, 8 characters displayed | 0xxx.1000 |
| 28 | serial | xxx baud, 9 characters displayed | 0xxx.1001 |
| 29 | serial | xxx baud, 10 characters displayed | 0xxx.1010 |
| 30 | serial | xxx baud, 11 characters displayed | 0xxx.1011 |
| 31 | serial | xxx baud, 12 characters displayed | 0xxx.1100 |
| 32 | serial | xxx baud, 13 characters displayed | 0xxx.1101 |
| 33 | serial | xxx baud, 14 characters displayed | 0xxx.1110 |
| 34 | serial | xxx baud, 15 characters displayed | 0xxx.1111 |
| 35 | serial | xxx baud, 16 characters displayed | 0xxx.0000 |
| 36 | serial | xxx baud, retransmit message | 0110.0xxx |
| 100 | | TESTMODE, increment display | 1111.0000 |

0=No Jumper

1=Jumper x=Either 0 or 1

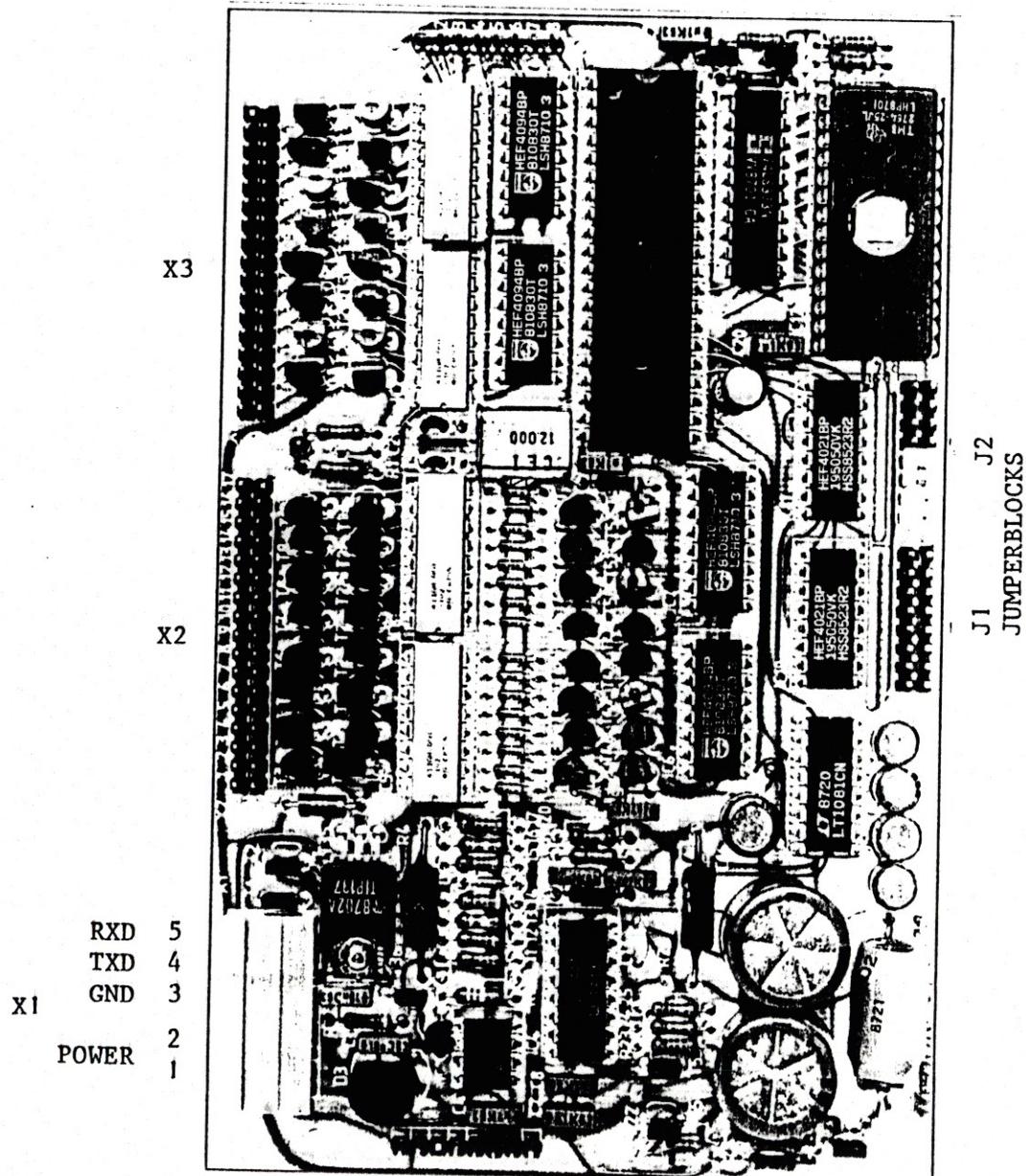
JUMPERSETTINGS JUMPERBLOCK 2 (J2)

| SDS/03 + SDI/01 | | |
|------------------------|--|--------------|
| mode | function | J2:1234.5678 |
| 40 | 4 x BCD parallel via SDI/01 | 1000.0000 |
| 41 | BCD data, binairy digit select and strobe | 1000.0001 |
| 42 | 6 digit clock (12 hours) + DDS input | 1001.0010 |
| 43 | 6 digit clock (24 hours) + DDS input | 1001.0011 |
| 44 | 4 digit clock (minutes, seconds) + DDS input | 1001.0100 |
| 50 | single input pulse counter, multiply with scalingsfactor | 1010.00xx |
| 51 | single input pulse counter, divide by scalingsfactor | 1010.01xx |
| 52 | phase sensitive pulse counter, multiply scalingsfactor | 1010.10xx |
| 53 | phase sensitive pulse counter, divide by scalingsfactor | 1010.11xx |
| 54 | phase sensitive pulse counter decimal point position 1 | 1010.xx00 |
| 55 | phase sensitive pulse counter decimal point position 2 | 1010.xx01 |
| 56 | phase sensitive pulse counter decimal point position 3 | 1010.xx10 |
| 57 | phase sensitive pulse counter decimal point position 4 | 1010.xx11 |
| 100 | TESTMODE, increment display | 1111.0000 |

| FUNCTIONS FOR SDS/03 + SDI/02 | | |
|--------------------------------------|--|--------------|
| mode | function | J2:1234.5678 |
| 60 | analog in via SDI/02, decimal point position 1 | 1011.0000 |
| 61 | analog in via SDI/02, decimal point position 2 | 1011.0001 |
| 62 | analog in via SDI/02, decimal point position 3 | 1011.0010 |
| 63 | analog in via SDI/02, decimal point position 4 | 1011.0011 |
| 100 | TESTMODE, increment display | 1111.0000 |

0=No Jumper 1=Jumper x=Either 0 or 1

Connectors and Jumpers



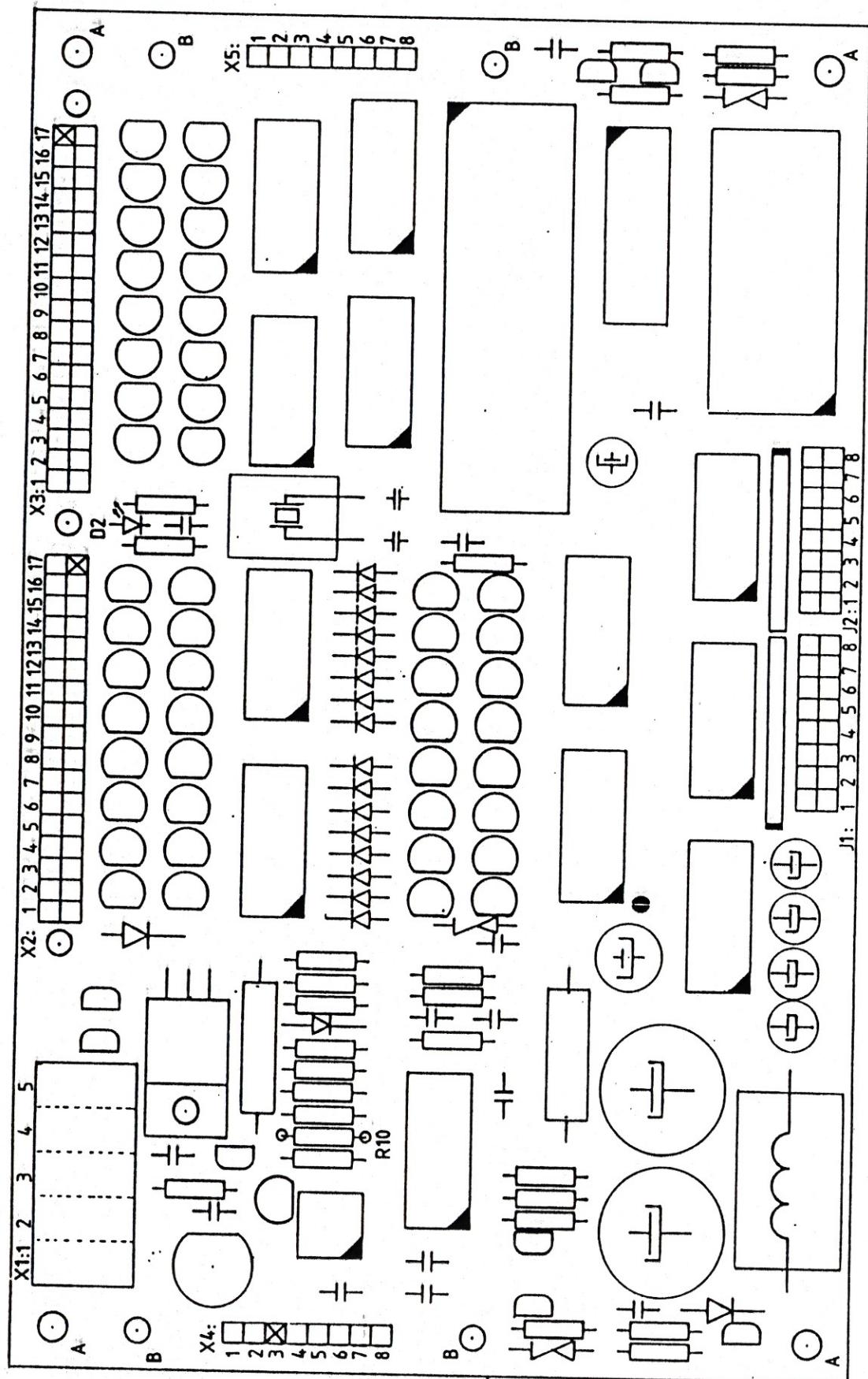
X1
RXD 5
TXD 4
GND 3
POWER 2
1

X3

X2

J1 J2
JUMPERBLOCKS

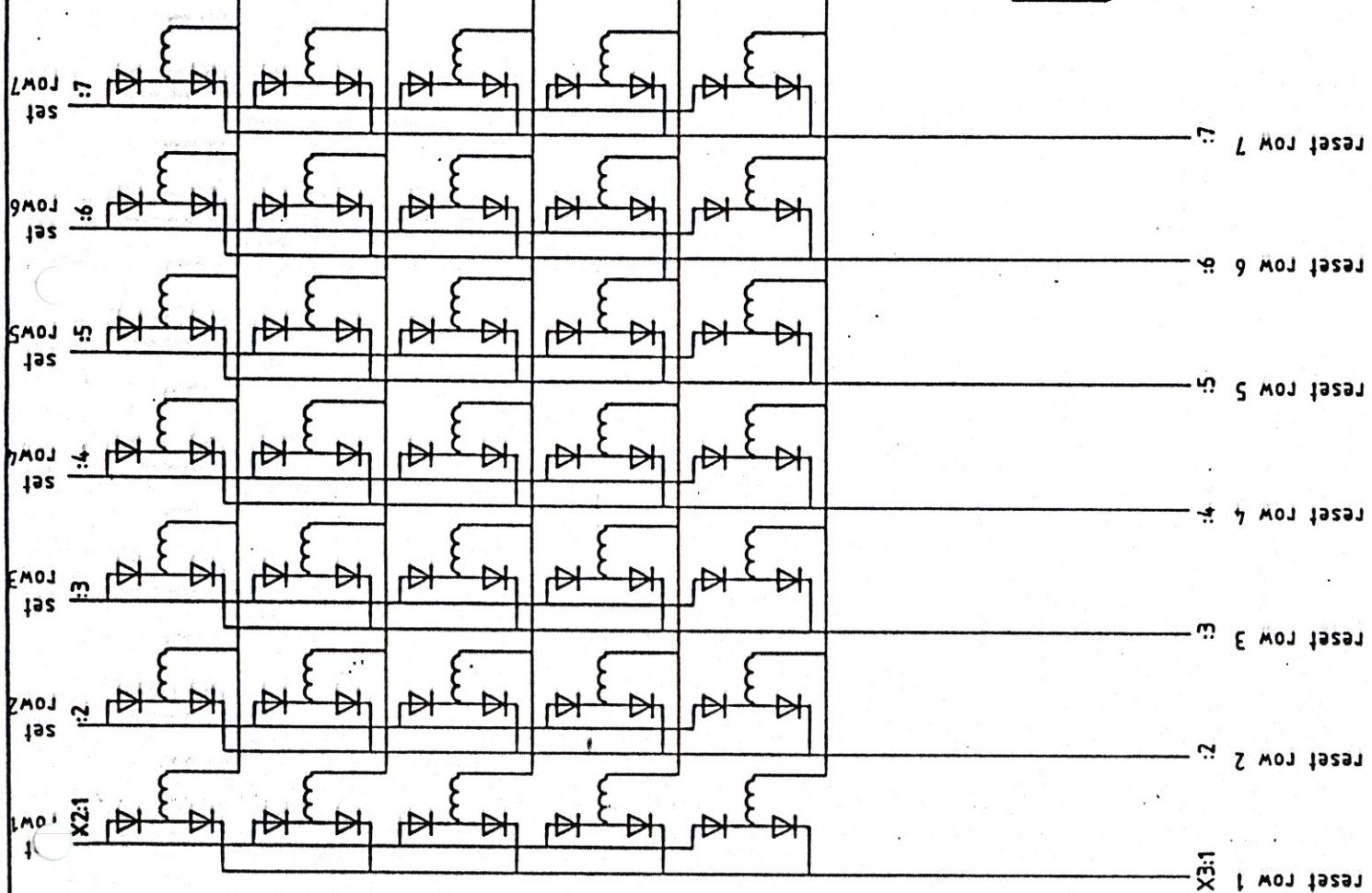
Notes



| | | |
|---|--------------------|----------|
| file SDS/03 COMPONENT LAYOUT | date 15-07-87 | scale |
| Hedon electronic developments | project number 149 | page 1.5 |

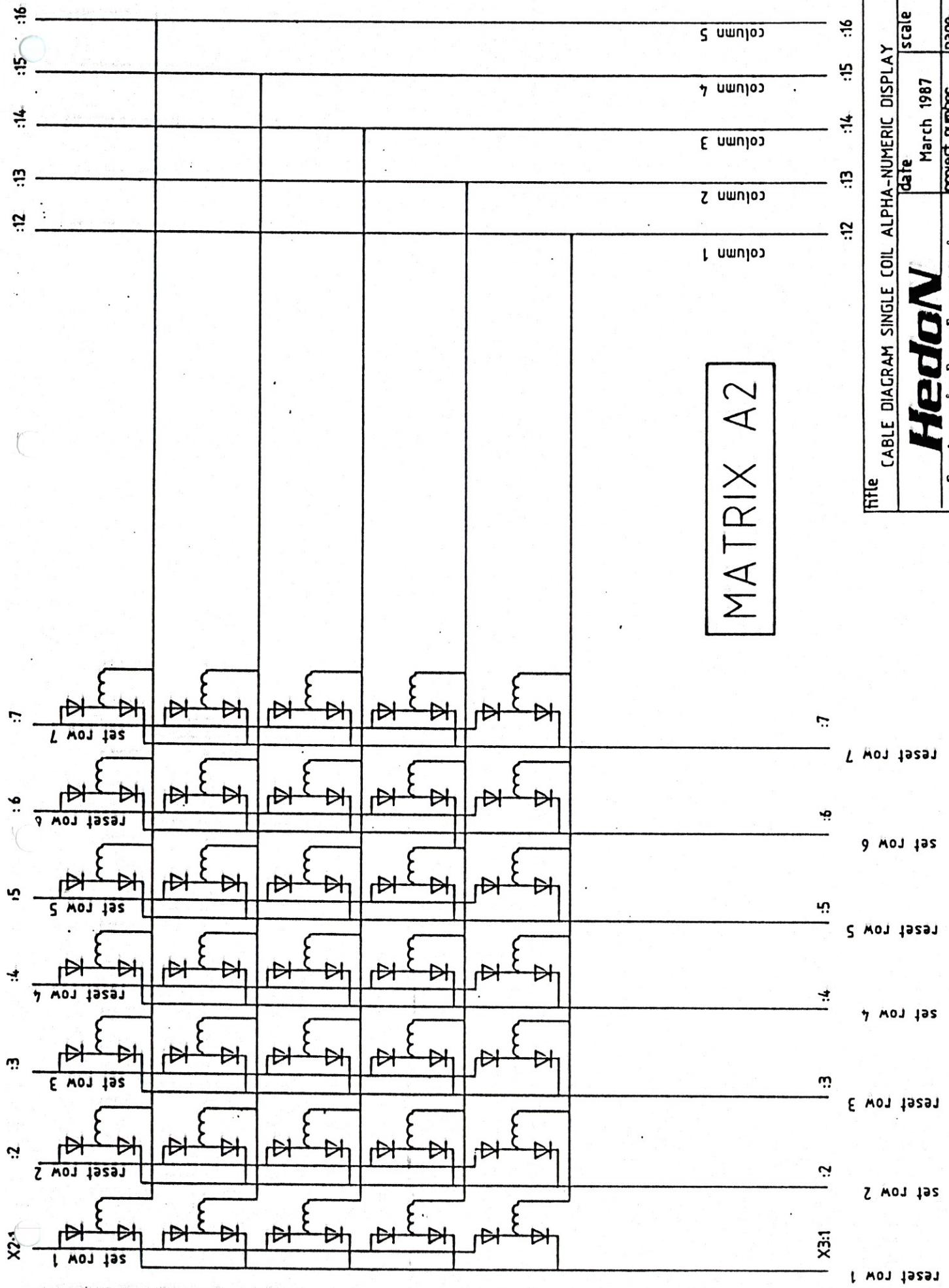
File CABLE DIAGRAM ALPHA-NUMERIC SINGLE COIL DISPLAY
Hedon
 Electronic Developments
 Date March 1987
 project number 149
 page 16

MATRIX A1

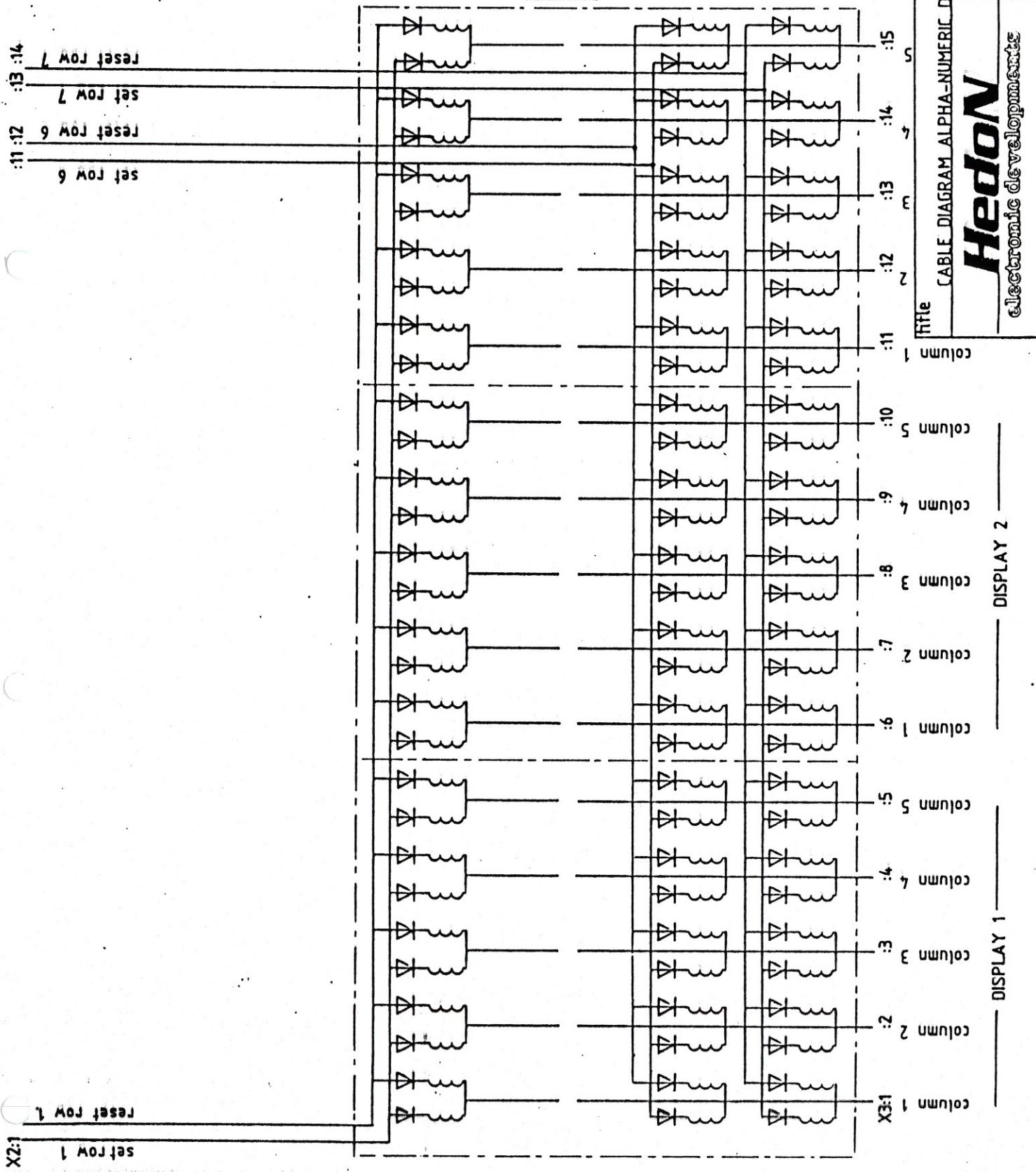


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| file | CABLE DIAGRAM SINGLE COIL ALPHA-NUMERIC DISPLAY | date | March 1987 | scale |
| Hedon | electronic developments | project number | 149 | page |

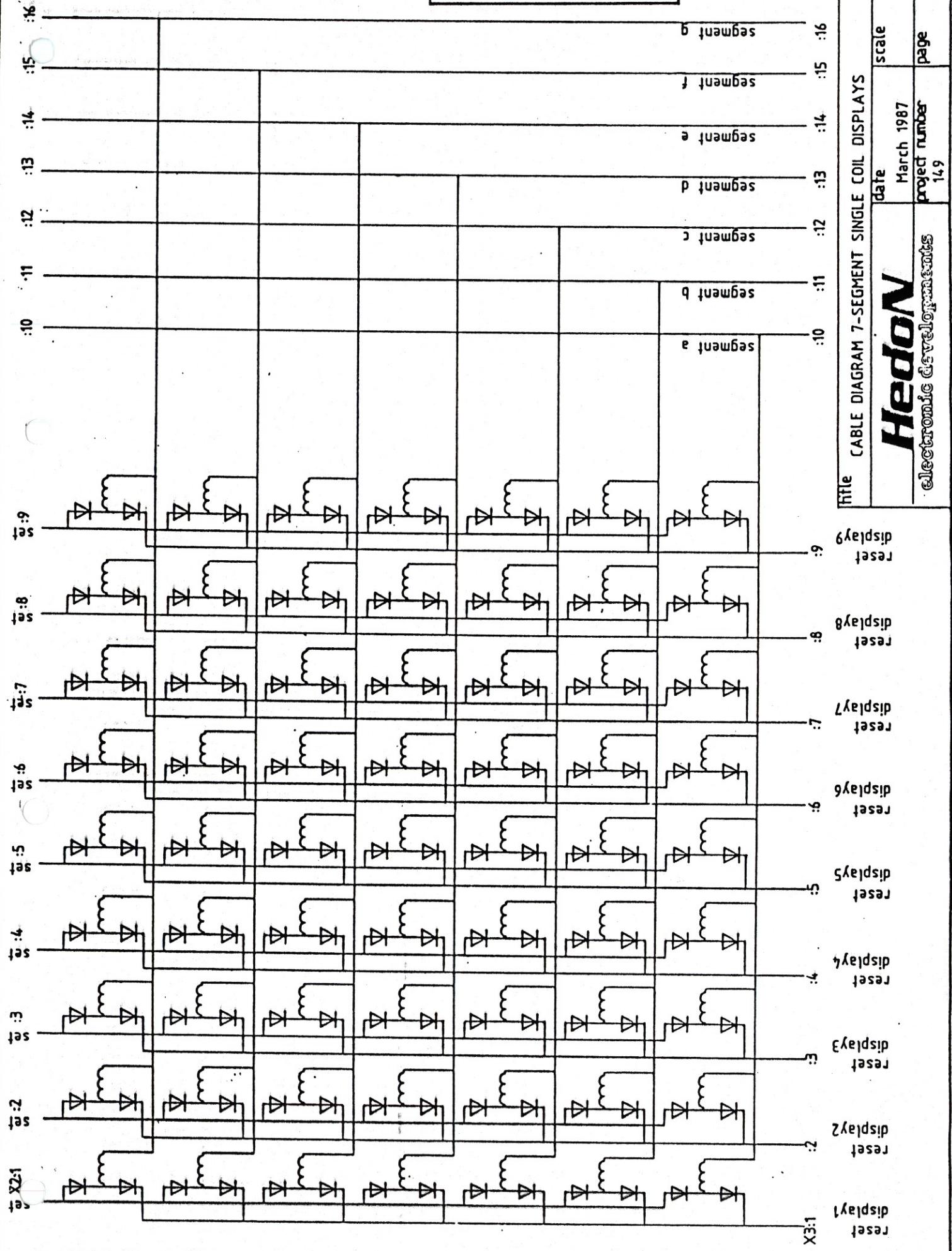
MATRIX A2

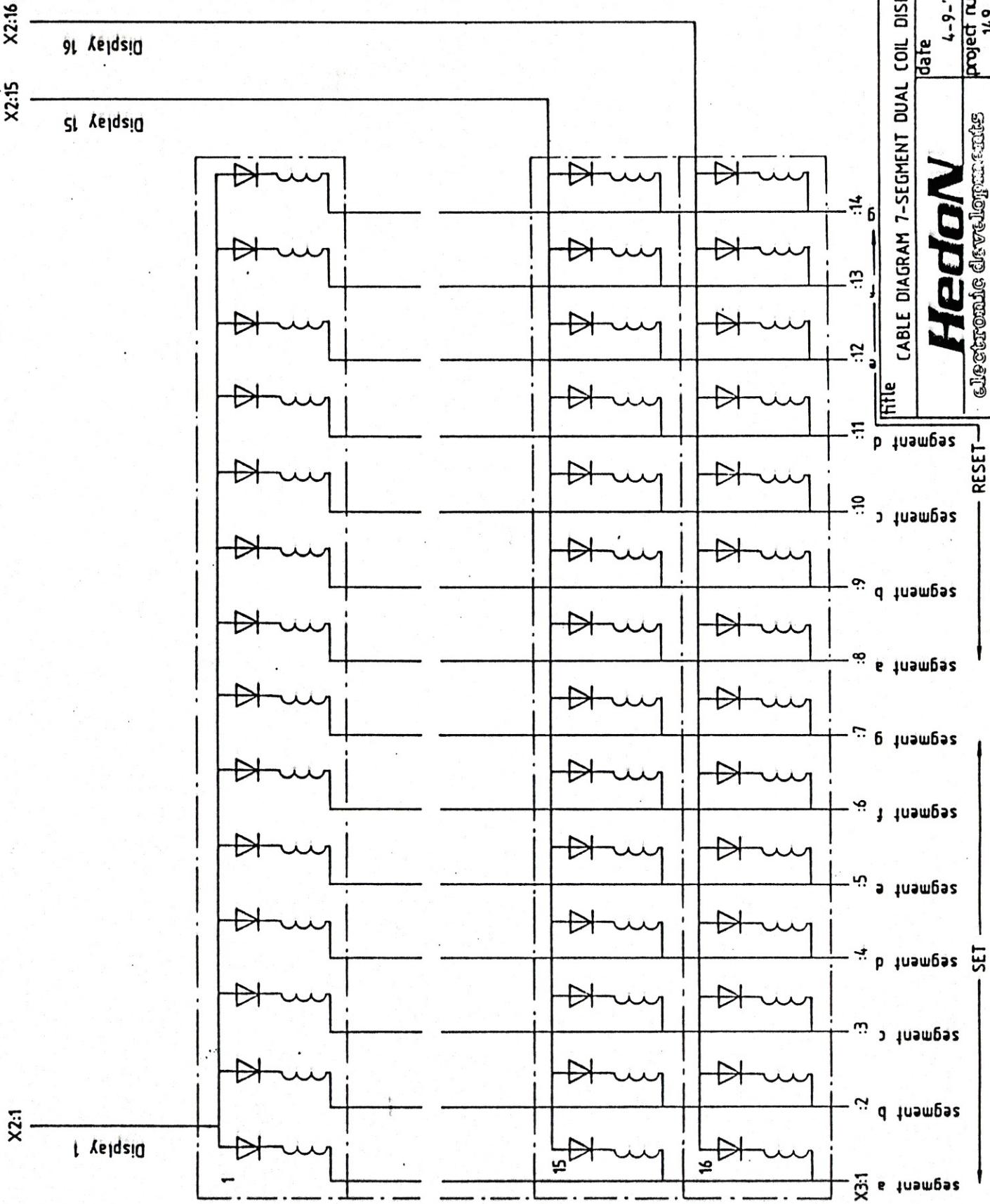


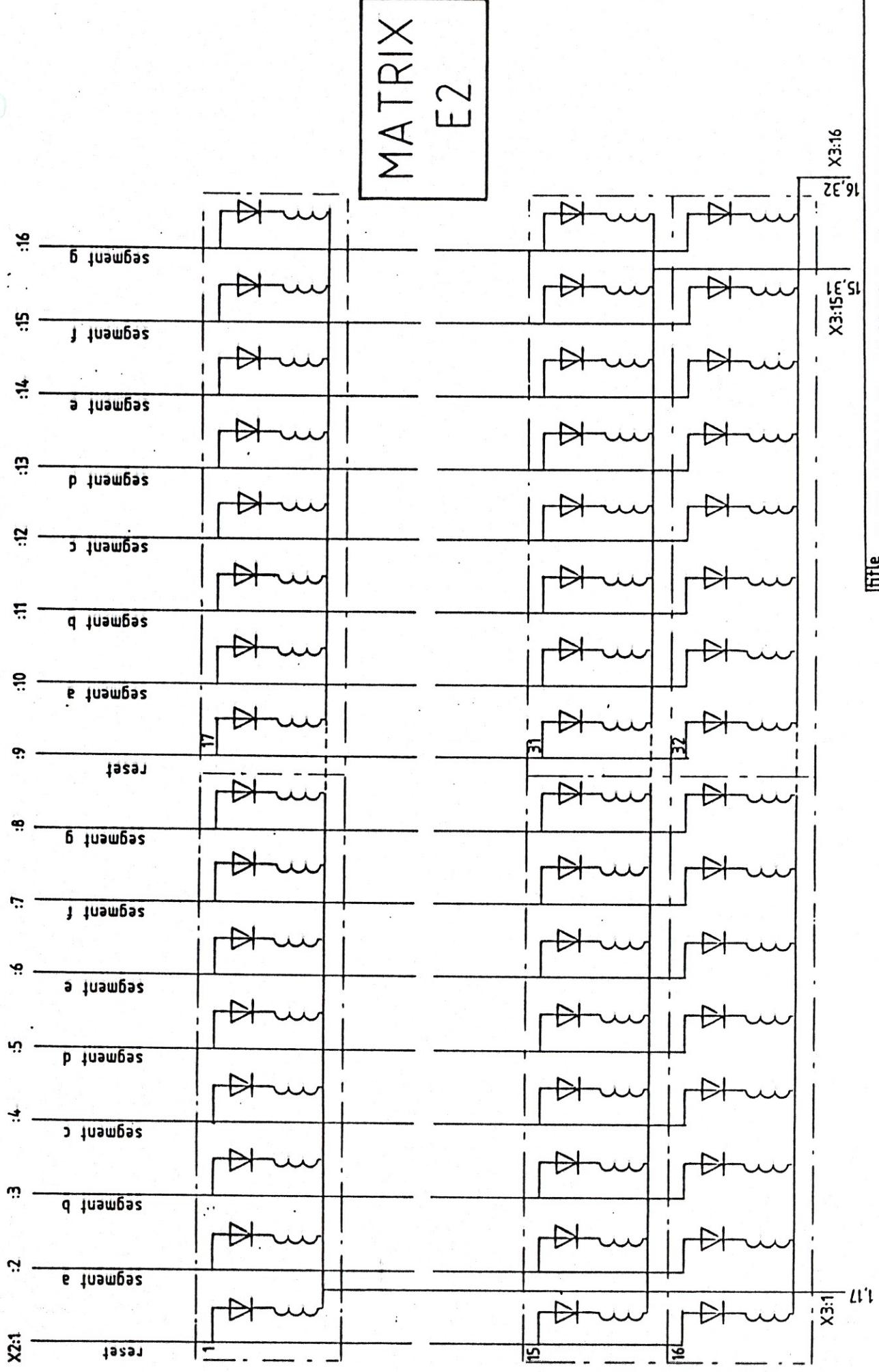
MATRIX B1



MATRIX C1







| Title CABLE DIAGRAM COMMON RESET 7-SEGMENT DISPLAYS | | | |
|---|------|----------------|------|
| | Date | March 1987 | Scal |
| Hedon | | Project number | pag |
| Electronic development | 149 | | |

MATRIX

F1

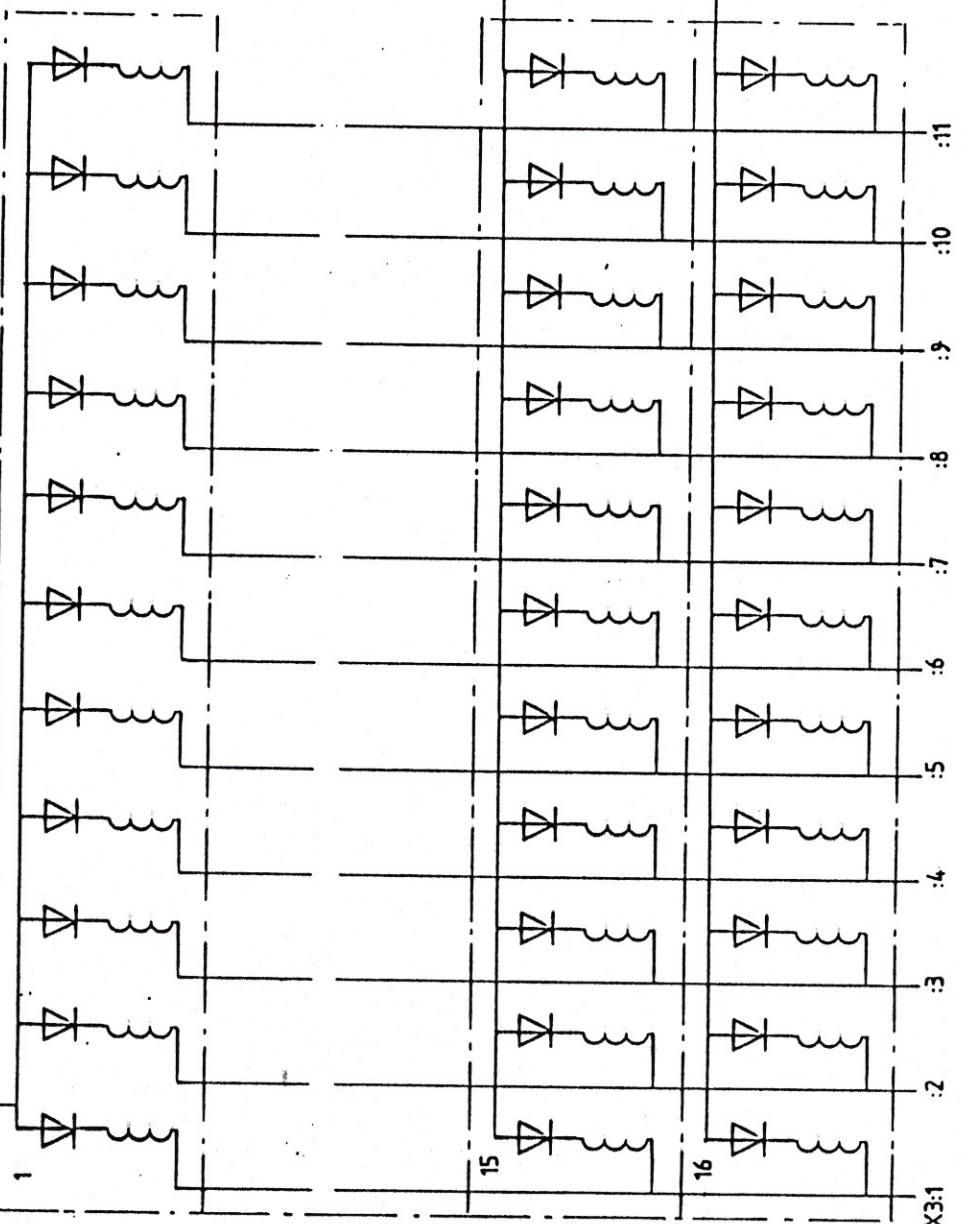
:16

Display 16

:15

Display 15

:14



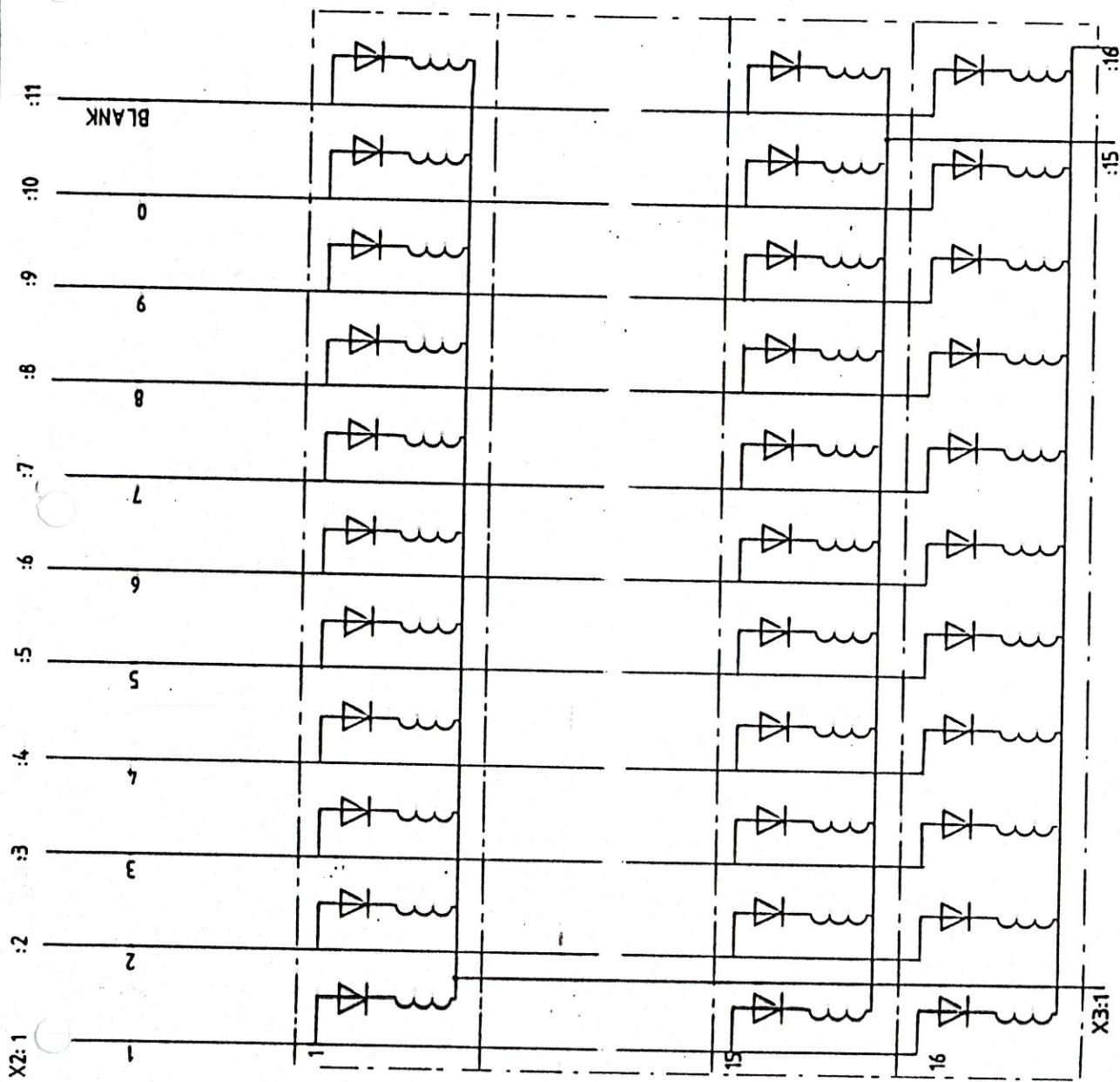
X2:1

Display 1

| CABLE DIAGRAM PRE-ENCODED COMMON. POSITIVE DISPLAYS | | |
|---|-------|------|
| date | scale | page |
| March 1987 | | 22 |
| Project number 14.9 | | |

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Electronic derivelegermaan

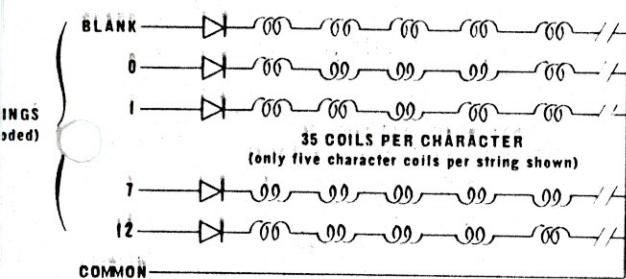
MATRIX F2



| FILE CABLE DIAGRAM PRE-ENCODED COMMON NEGATIVE DISPLAYS - | | | |
|---|-----------------------------------|----------------|------|
| date | scale | project number | page |
| March 1987 | | 149 | 23 |
| Hedon | Electronic Development Department | | |

CTRICAL OPERATION

Each element is controlled by a coil for each character coded into the module. The stator for each character contains up to 14 coils. The coils for each character all 35 stators are connected in series. Each character winding in the 270 PE2-35 module consists of 35 coils in series and the module has up to 14 such windings. A 1 millisecond pulse through one winding of 35 coils magnetizes all 35 stators in the correct polarity for that character, automatically erasing and writing with it. The remanent magnetic field in the stators with the permanent magnet in the element holds it as required for the selected character. Elements are held in position by the remanent magnetic field until changed by a pulse on a different character winding.



ELECTRICAL SCHEMATIC
(shown with diodes common negative)

CONFIGURATIONS

| TYPE | DCP | DCN | NDP | NDN |
|-----------------------|--------------------------------------|--------------------------------------|---|---|
| OIL TRICAL GRAM | COMMON SIGNAL | COMMON SIGNAL | COMMON | COMMON |
| OIL MBLY YPE | WITH DIODES COMMON POSITIVE | WITH DIODES COMMON NEGATIVE | WITHOUT DIODES COMMON POSITIVE | WITHOUT DIODES COMMON NEGATIVE |

CHARACTER COLORS

| STANDARD FROM STOCK | | |
|---------------------|------|-----|
| COLOR | CODE | ## |
| BLACK | 00 | |
| WHITE *** | 01 | |
| YELLOW | 06 | 95% |

*** WHITE IS NOT FLUORESCENT
SUBJECTIVE BRIGHTNESS,
LUMINANCE FACTOR
NOTE: 1. Modules supplied with color
in set position, Black in
reset position.
2. Any special colors or other
color combinations, - Prices
upon request.
3. Color samples - upon request.

RING DATA

Ordering always specify:

MODEL TYPE COLOR

270 PE2-35 DCN 06/00 2.7 in. (70 mm) pre-encoded module,
with diodes, common negative,
yellow/black.

MODEL 270 PE2-35 RATING AND SPECIFICATION SUMMARY

SPECIFICATIONS

Overall Size: 3.7 in. (94 mm) high; 2.6 in. (66 mm) wide;
1.8 in. (46 mm) thick.

Character Size: 2.7 in. (70 mm) high; 1.95 in. (50 mm) wide.
5 oz (142 g)

Character Set: Standard coding for 0-9 and blank. Alternate character sets available up to a maximum of 14 per module on special order. For details consult factory or local sales representative.

Character Format: 5 by 7 matrix of 0.35 in. (8.9 mm) diameter light reflecting discs.

Drive Requirements: Current pulse of 1 millisecond duration (minimum) 10 amps peak amplitude from a 48 volt source. Maximum pulse duration: 8.3 milliseconds. Maximum pulse rate: 5 pulses per second. Drive requirements achieved by discharging 300 microfarad capacitor.

Coil Resistance: 4.3 ohms +10% (at 22°C ambient).

Module Thermal Resistance: 3.5°C/watt, with maximum allowed module temperature of 92°C.

Power to Maintain Displayed Data: zero

Electrical Connections: .025 in. (0.6 mm) square pins, suitable for
- connector
- wire wrap
- wave solder

Mating Connector: AMP INC. No. 86427-3 bright tin contacts or equivalent.

Temperature Range: -40°F to 167°F (-40°C to 75°C)

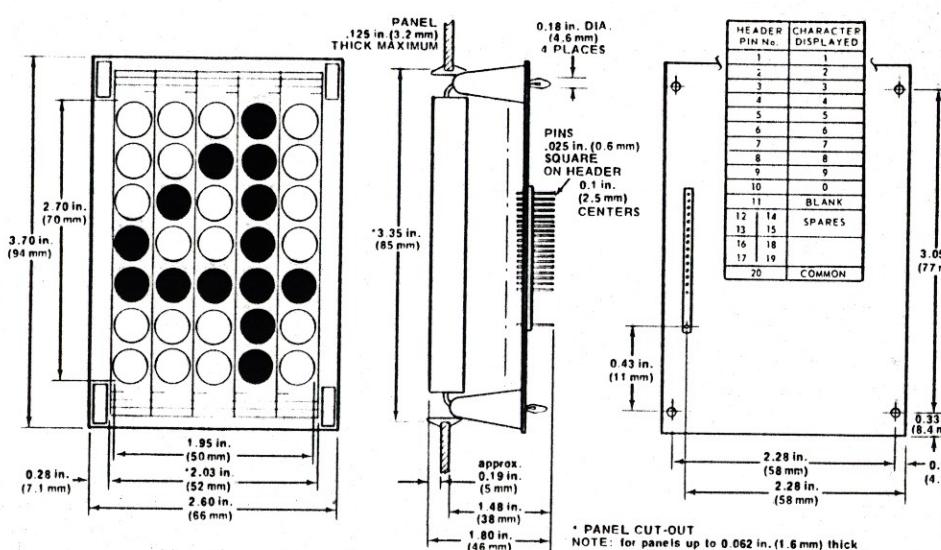
Relative Humidity: up to 95% provided no condensation.

| VIEWING ANGLE (degrees from normal) | DISTANCE (feet) |
|--|--------------------|
| 0 | 130 (40 m) |
| 45 | 115 (35 m) |
| 60 | 85 (26 m) |
| 75 | 45 (14 m) |
| 82.5 | 20 (6 m) |

Outdoor Applications: Requires an enclosure

Illumination: Fluorescent lamp recommended, placed 1 to 3 inches (25 to 75 mm) in front of the display. Not required for normal daytime ambient light conditions.

DIMENSIONS and MOUNTING DETAILS



* PANEL CUT-OUT
NOTE: for panels up to 0.062 in. (1.6 mm) thick
Cut-Out 2.03 in. (52 mm) x 3.25 in. (83 mm)