

Model 3936-S001

U-Port Adapter

January 1982

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Transformer-isolated U-Port Adapter

Adds transformer isolation to the Serial Highway

3936

Features

- Transformer isolation of Serial Highway for high-noise environments
- Biphase multiplexing provides transformer-compatible signals over a single pair
- Bypass and loop collapse are provided
- Meets IEEE-583 and IEEE-595 requirements
- Clock restorer allows many units in tandem at high speeds
- Active signal repeater in return path

Typical Applications

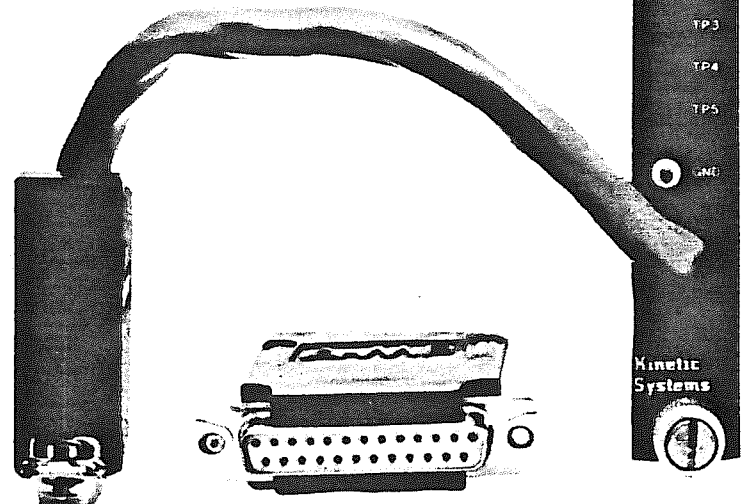
- Transformer-isolated highway for serial crate controllers and serial drivers
- Auxiliary loop control for Type L-2 serial crate controllers
- Serial systems in a high common-mode noise environment
- Serial systems with higher operating speeds over longer distances than can be obtained with D-Port connections

General Description

The 3936 U-Port Adapter is a single-width module providing auxiliary loop control when used with a 3952 Type L-2 serial crate controller (SCC) or with a 3992 Serial Highway Driver operated in bit-serial mode. Only power connections are made to the Dataway.

A Serial Highway Driver and Type L-2 SCCs operated in bit-serial mode may be interconnected by a loop consisting of two pair, one for clock and one for data. While this connection is satisfactory for many applications, auxiliary loop control may be needed. The 3936 can be used to enhance serial system operation in the following ways:

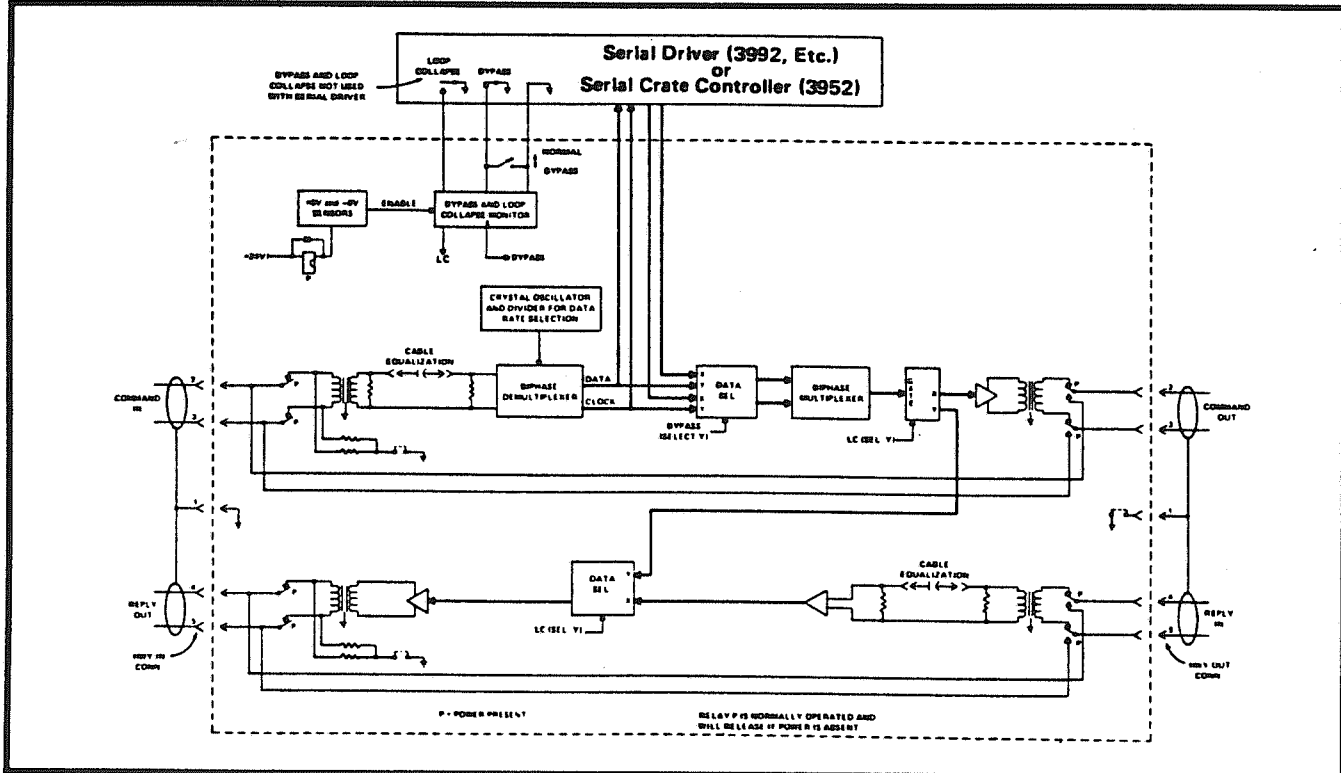
1. It provides bypass and loop collapse under control of the associated Type L-2 SCC.
2. It provides a multiplexed signal and transformer isolation. This reduces interference with the data signals in high-noise environments as well as allowing for increased operating speed and/or distance.



General Description

The Serial Highway input and output connections are isolated by transformers for high common-mode rejection. This is necessary when the transient ground potential difference between adjacent crates on the Serial Highway exceeds approximately ten volts or when very high electrostatic or magnetic fields couple into the Serial Highway. Clock and data are transmitted over a single pair in the form of the biphase signal. This signal format was chosen because it contains no d-c component and can readily be coupled through transformers. The 3936 provides an increase in reliable operating speed over a given cable or an increase in distance at a given operating speed.

Simplified Block Diagram



Power Requirements

| | |
|------------|--------|
| +6 volts: | 500 mA |
| -6 volts: | 30 mA |
| +24 volts: | 100 mA |

Ordering Information

Model 3936-Z1B U-Port Adapter with clock restorer

Related Products

| | |
|-----------------|--------------------------|
| Model 5800-Cxyz | Bit-serial Highway Cable |
| Model 5800-Dxyz | Bit-serial Highway Cable |
| Model 5930-Z1A | Mating Connector |
| Model 5931-Z1A | Mating Connector |

The Model 3936-S001 U-Port Adapter provides auxiliary loop control when used with a Type L-2 Serial Crate Controller. This module is composed of two single-width CAMAC modules and an interconnect bus cable. The two modules are the 3936-S001A and the 3936-S001B. The bus cable is the Model 5841-A47L.

The 3936-S001 allows a serial crate to be controlled by one of two serial highways. Selection of which serial highway is being used is made by the SELECT A/SELECT B front-panel switch on the 3936-S001A. Which serial highway is selected is also indicated by the A and B LED on the 3936-S001A front panel.

Highway "A" is connected to the 3936-S001A. Highway "B" is connected to the 3936-S001B.

The connection to the Type L-2 Serial Crate Controller is made via the cable tail attached to the 3936-S001B.

The 3936-S001A and 3936-S001B are connected together using the 5841-A47L 20-conductor bus cable plugged into the front-panel bus.

The 3936-S001B may be used by itself simply by removing the front panel bus cable. The unit may be made functionally identical to the 3936-Z1B by moving the "C/D" strap to the "C" position. However, the combination of the 3936-S001A/3936-S001B may not be used with the C/D strap in "D" position.

OPERATING STATUS

A) One of two U-port serial highways, A and B, is selected and is interfaced to D-port. The selection is to be done by manual switch on front panel. Remaining U-port (the one which is not selected) is to be used as repeater.

- 1) When A-port is selected: As per the attached FIG-C.
- 2) When B-port is selected: As per the attached FIG-D.

B) BYPASS

The state of BYPASS is attainable when manual switch (NORMAL/BYPASS) on front panel is set to the side of BYPASS. The state of BYPASS is attainable also by BYPASS signal of SCC which is input from D-port. In this case, signal of each U-port-in is output at two U-port-outs. In case of power failure, in-connector and out-connector of two serial highways are connected by relay.

- 1) In case of BYPASS by manual or SCC: As per the attached FIG-E.
- 2) In case of BYPASS due to power failure: As per the attached FIG-F.

C) COLLAPSE

COLLAPSE is done by signal of SCC which is input from D-port. During the state of collapse, output signal is output from reply out port (see the attached FIG G).

D) Interface with CAMAC Dataway

CAMAC dataway is only to receive supply of power.

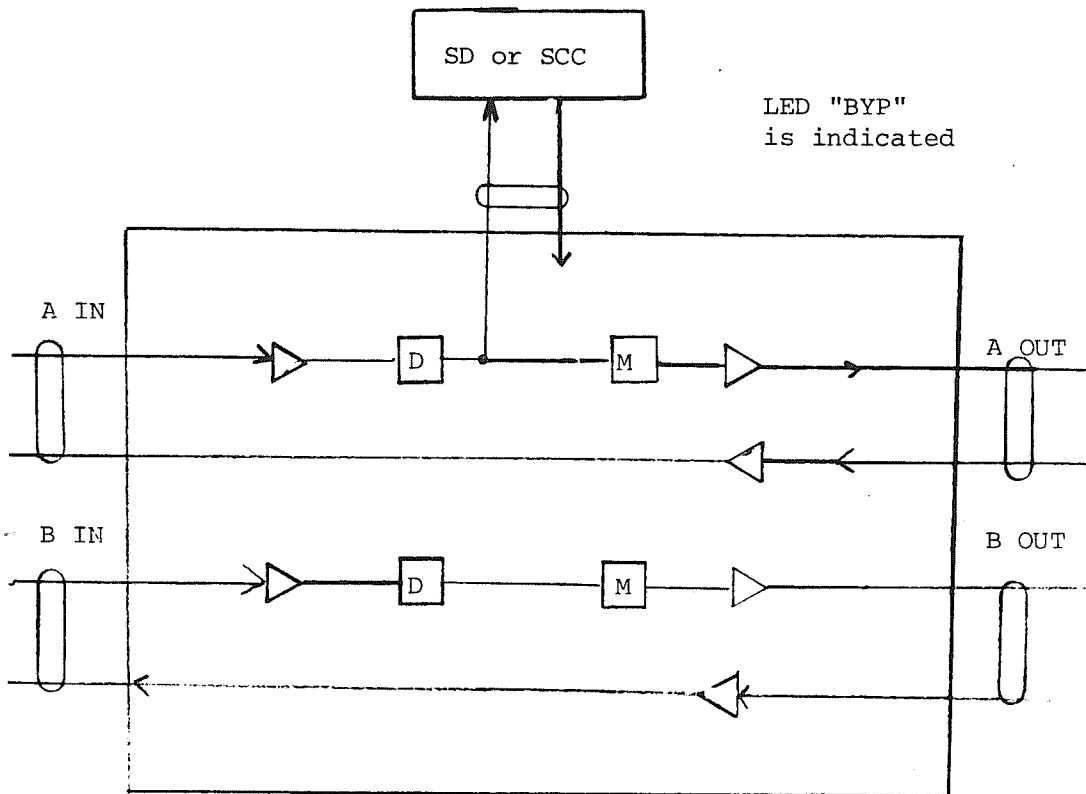


Figure E -- Bypass (manual or SCC)

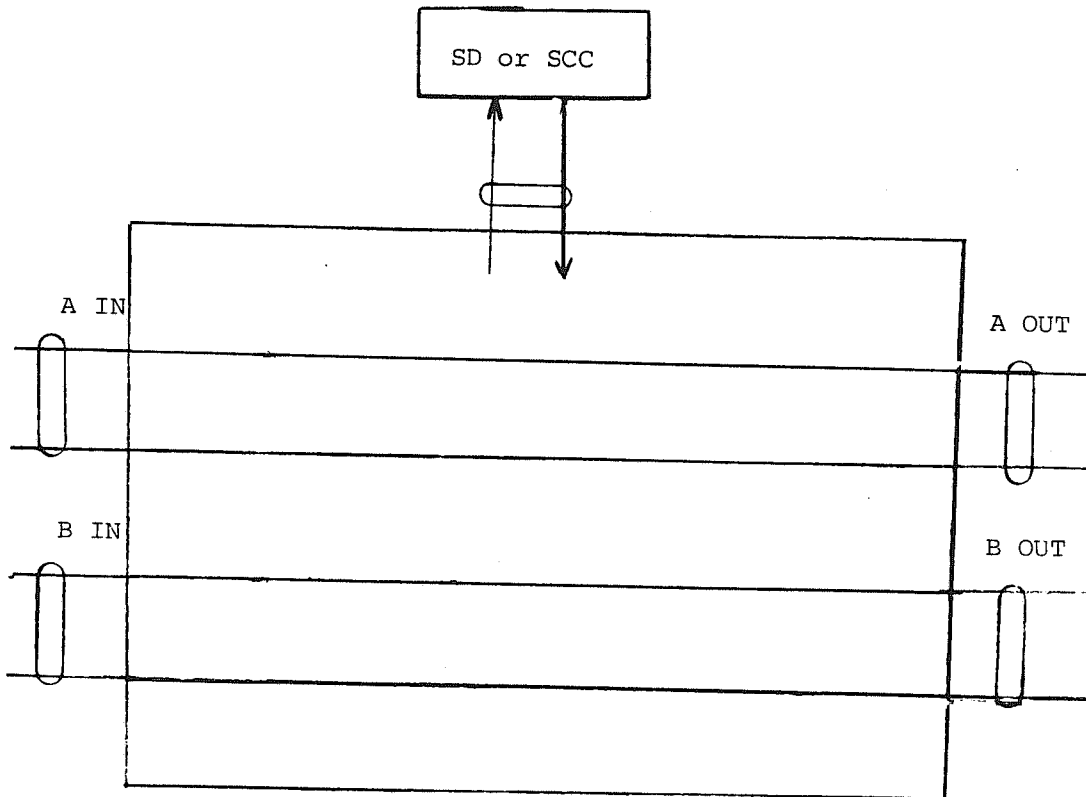


Figure F -- Bypass (Power Loss)

BASIC OPERATION

The biphasic signal is normally fed through the input line transformer. An adjustable equalizer (high frequency peaker) enhances operation over long cables. The high sensitivity line receiver converts the input signal to TTL level. Hysteresis is provided for greater stability on signals with slow rise time.

The biphasic signal is fed into the demultiplexer, which converts that signal to serial highway D-Port clock and NRZ data signals. These signals are coupled to the D-In port of the Serial Highway Driver (SD) or Serial Crate Controller (SCC). The D-Out port from the SD or SCC is coupled to the 3936 multiplexer. This multiplexer converts the clock and NRZ data to the biphasic signal. This signal is coupled to the line driver and the highway via isolating transformers.

The use of the 3936 can provide a substantial increase in reliable operating speed over a given cable or an increase in distance at a given operating speed. Note that for D-Port signals the low frequency components in the data are attenuated far less than the high frequency components. When the data is asymmetrical, a d-c offset is produced. This causes the data to barely reach the zero-crossing point, resulting in a very narrow pulse for the recovered data; this precludes D-Port operation with this combination of speed and cable.

The biphasic signal fundamental frequency components cover only a two-to-one frequency range. The variation in cable attenuation with frequency can be equalized by a single capacitor. The capacitance value is determined by cable length and frequency. A 100 pf capacitor produced the waveform shown. A high quality signal is obtained from the line receiver, and the demultiplexer provides the clock and data signals for the D-Port. Tests with the Beldfoil 22 gauge cable indicate that the maximum reliable speed for a 500-foot D-Port link is one megabit per second. With the 3936, this can be increased to five megabits. Also for this cable, the maximum distance for a reliable D-Port link at five megabits is 100 feet. Therefore, the 3936 provides a five-fold increase in speed or distance under these conditions.

SCC BYPASS

The SCC bypass contact is closed (bypass true) whenever +6 volt power is removed from the SCC or by command. This contact remains closed until the SCC is unbypassed by serial highway command. This contact is monitored by the 3936 and, when closed, causes the output of the 3936 demultiplexer to be fed directly to the multiplexer. Therefore, the biphasic-out signal is a "repeat" of the biphasic-in signal. The SCC still monitors the input signal so that an unbypass command can be received. The serial driver contains no bypass contact; bypass is inoperable when the 3936 is used with a SD.

SWITCHED BYPASS

The bypass condition can be forced by the front panel NORMAL/BYPASS switch on the 3936-S001B.

- 1) Cable loss
- 2) Number of crates allowed to be in a power bypass ("transparent" no-repeat) state with guaranteed operation
- 3) Noise environment

Generally, operation should be satisfactory with a maximum unrepeated link cable loss of 12 decibels (1.38 nepers) at the bit frequency. This results in a received signal level (at the U-Port) with peak-to-peak amplitude approximately 25% of the transmitted level. In some cases, operation at losses beyond this will give satisfactory results.

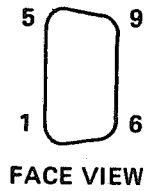
DATA RATE SELECTION (See Figure 6)

| <u>Data Rate</u> | <u>Switch P</u> | <u>Switch Q</u> |
|------------------|-----------------|-----------------|
| 5 MHz | 1 | 1 |
| 2.5 MHz | 2 | 1 |
| 1 MHz | 4 | 1 |
| 500 KHz | 1 | 2 |
| 250 KHz | 2 | 2 |
| 100 KHz | 4 | 2 |
| 50 KHz | 1 | 4 |
| 25 KHz | 2 | 4 |
| 10 KHz | 4 | 4 |

EQUALIZATION SELECTION (See Figure 6)

| <u>Capacitance</u> | <u>Switch CAR, CA</u> | <u>Comments</u> |
|--------------------|-----------------------|---|
| ----- | 0 | Open--not a valid position |
| 100 pf | 1 | Do not use below 5 MHz. |
| 220 pf | 2 | Do not use below 2.5 MHz. |
| 320 pf | 3 | Do not use below 2.5 MHz. |
| 470 pf | 4 | Do not use below 1 MHz. |
| 570 pf | 5 | Do not use below 1 MHz. |
| 690 pf | 6 | Do not use below 1 MHz. |
| 790 pf | 7 | Do not use below 1 MHz. |
| Strap | 8 | As supplied, no equalization; input strapped to output. A customer-supplied capacitor can be used here. (1000 pf for 500 KHz, 2200 pf for 250 KHz, 4700 pf for 100 KHz) |

B-IN Connector



Pin/Wire List

9 PIN 'D'

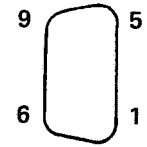
PIN NO.

| | |
|---|----------------|
| 5 | B - Reply Out |
| 4 | B - Reply Out |
| 3 | B - Command In |
| 2 | B - Command In |
| 1 | GND |

PIN NO.

| | |
|---|----|
| 9 | NC |
| 8 | NC |
| 7 | NC |
| 6 | NC |

A - Out Connector



FACE VIEW

Socket/Wire List

9 SOCKET 'D'

SOCKET NO.

| | | |
|---|----|-------|
| 9 | NC | _____ |
| 8 | NC | _____ |
| 7 | NC | _____ |
| 6 | NC | _____ |

SOCKET NO.

| | | |
|---|-----------------|-------|
| 5 | A - Reply In | _____ |
| 4 | A - Reply In | _____ |
| 3 | A - Command Out | _____ |
| 2 | A - Command Out | _____ |
| 1 | GSA Strap | _____ |

STRAP OPTIONS -3936-S001A

There are seven push on strap selections on the 3936-S001A. Five provide a choice between position A or B. All must be in position A. One is A only and must be plugged on. One allows a choice between C or D and must be in position D.

Loop Collapse - "E" enables loop collapse in response to the loop collapse signal from the SCC; "D" disables loop collapse.

GSA - A jumper may be installed between the GSA pad and the ground grid on the solder side of the printed circuit board allowing the shield on the A OUT connector to be grounded in the 3936.

GA - When installed, this strap provides a balanced ground on the receive go loop. This prevents the conductors from "floating" at high potentials in high electrostatic fields. It may be desirable to remove this strap in certain special noise environments where high electrostatic fields are not present.

GAR - Performs the same function as GA except for the return path outputs.

Model 3936-S001

FRONT PANEL - 3936-S001A

LEDS

A (red) Indicates highway "A" is selected.

B (red) Indicates highway "B" is selected.

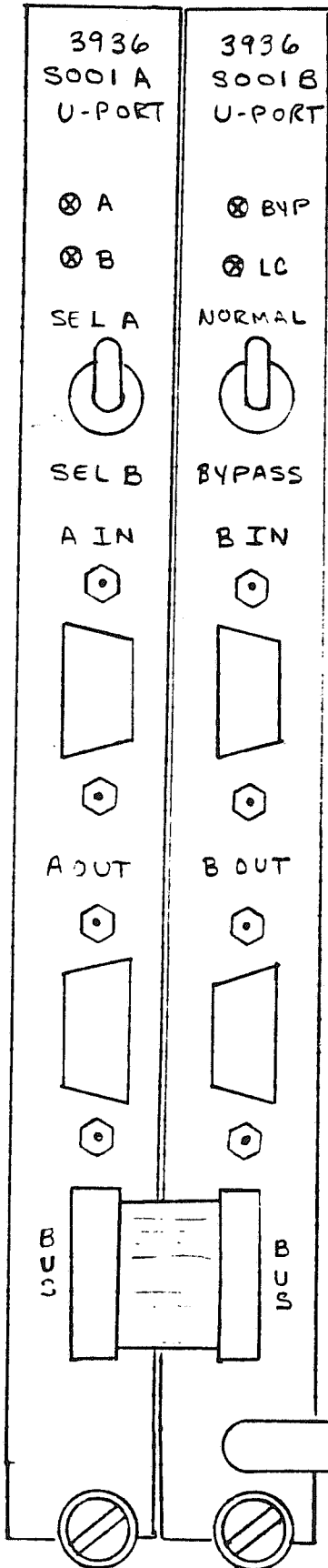
(NOTE: These LEDS will not light if 3936-S001B NORMAL/BYPASS switch is in the BYPASS position.)

Switch

SELECT A/SELECT B Allows selection of highway A or B.

Connectors

| <u>U-Port Connectors</u> | <u>Type</u> | <u>Mating Connector Kits</u> |
|--------------------------|-------------|------------------------------|
| A-IN | DE9P | KSC #5930-Z1A |
| A-OUT | DE9S | KSC #5931-Z1A |



ONE 3936-5001
EQUALS 3936-5001(A)
+ 3936-5001(B)

20-WIRE
FLAT RIBBON
CABLE

ALSO USE TURN-AROUND CONN.

APPENDIX I

KINETIC SYSTEMS CORPORATION

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PAGE 1

BILL OF MATERIALS FOR W03936S01A
3936-S01A ASSEMBLY

PARTS LIST REV # 3

| ITEM NO | QUANTITY | DESCRIPTION | PART NO |
|---------|----------|--------------------------------|-----------|
| 1 | 2 | 100PF/100V/10% #CN15A101K | CA 150101 |
| 2 | 3 | .01UF RD CW15C103M/CS15C103M | CA 150103 |
| 3 | 18 | .1UF RD .2"LD SPCG #CZ20D104Z | CA 150104 |
| 4 | 2 | 1UF REDCAP CY30C105M/CR30D105 | CA 150105 |
| 5 | 2 | 220PF REDCAP CW15C221K | CA 150221 |
| 6 | 1 | 33PF REDCAP CN15A330K | CA 150330 |
| 7 | 2 | 470PF REDCAP CW15C471K | CA 150471 |
| 8 | 2 | 22UF/15V PT KMT#T310B226K015A | CA 215226 |
| 9 | 1 | 6.8UF35V PT KMT#T310B685K035A | CA 235685 |
| 10 | 2 | 330PF 5% MALLORY SXL 333 | CA 901026 |
| 11 | 2 | 1500PF 5% MALLORY SXM 215 | CA 901027 |
| 12 | 1 | 10PF 5% ERIE 831-000-COG0100D | CA 901028 |
| 13 | 1 | 36P UNPROTECTED SPECTRA#800-27 | CO 911025 |
| 14 | 1 | 25POS PIN D HOUS AMP 205208-1 | CO 914001 |
| 15 | 1 | 9POS PIN D HOUSING AMP205204- | CO 914010 |
| 16 | 1 | 9POS SKT D HOUSING AMP205203- | CO 914011 |
| 17 | 1 | 20 HDR RT.ANG. LOW 3M3492-100 | CO 919048 |
| 18 | 7 | JUMPER FLX-TRON#MJB2654-08CUS | CO 919113 |
| 19 | 42 | B-SOCKETS AMP 2-331272-7 | CO 921006 |
| 20 | 2 | MALSCR LK ASY CANN D2041921D9 | CO 991004 |
| 21 | 4 | FEMSCR LK ASY CANN D204182DB | CO 991005 |
| 22 | 1 | AMP SHELL DB AMP #206478-3 | CO 991010 |
| 23 | 16 | CRIMP STYLE PIN AMP 66507-3 | CO 991075 |
| 24 | 5 | CRIMP STYLE SOCKET AMP 66505- | CO 991076 |
| 25 | 8 | 1N914A/1N4446 | DI 100914 |
| 26 | 2 | 1N4005 (1 AMP) | DI 104005 |
| 27 | 1 | 1N5401 (3 AMP) | DI 105401 |
| 28 | 2 | 1N4738A 8.2V 5% 1W | DI 234738 |
| 29 | 3 | 1N5223B 2.7V 5% | DI 235223 |
| 30 | 2 | SMALL RED LED MONSANTO #MV507 | DI 901003 |
| 31 | 1 | 3936-S001A B-3079 S-3080 | FP 413936 |
| 32 | 2 | 1 AMP #LITTLEFU 275.001/27600 | FU 911001 |
| 33 | 1 | 3 AMP LITFU 275.003/276.003 | FU 911003 |
| 34 | 2 | REAR MOUNTING RAIL(SEC) B-122 | HD 231229 |
| 35 | 1 | SEC SHIELD B-1057 | HD 241057 |
| 36 | 1 | SNAP BUSHING HEYCO SB-437-5 | HD 901002 |
| 37 | 3 | .4 JMPR JO.400X0.125IRD22 | HD 901006 |
| 38 | 2 | TIWRAP 3/4" PANDUIT #PLT-IM-C | HD 901026 |
| 39 | 1 | .2 JMPR JO.200X0.125IRD22 | HD 901027 |
| 40 | 1 | GND SHIELD LABEL #77-631979-2 | HD 901046 |
| 41 | 1 | GRD SHIELD INSULATION LE BLK | HD 901065 |

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BILL OF MATERIALS FOR W03936S01A
3936-S01A ASSEMBLY

PARTS LIST REV # 3

| ITEM NO | QUANTITY | DESCRIPTION | PART NO |
|---------|----------|------------------------------|-----------|
| 85 | 2 | GOLD CONT MAGNECRT W64TPCX-3 | RY 921006 |
| 86 | 1 | SPDT LOCKTOGL C&K #7101KZQ | SW 911008 |
| 87 | 5 | BINARY 3933 EECO #230002G | SW 911026 |
| 88 | 4 | 1.0MH PULSE ENG PE5156X | XF 921006 |
| 89 | 1 | MPS2369 NPN MOTOROLA ONLY | XS 102369 |
| 90 | 7 | 2N3643/PN3643-5 NPN NATIONAL | XS 103643 |
| 91 | 1 | 2N5191/MJE521 NPN | XS 105191 |
| 92 | 4 | 2N3644 PNP NAT#PN3644-5 | XS 203644 |

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BILL OF MATERIALS FOR W03936S01B
3936-S01B ASSEMBLY

PARTS LIST REV # 3

| ITEM NO | QUANTITY | DESCRIPTION | PART NO |
|---------|----------|-------------------------------|-----------|
| 42 | 2 | .1 JUMPER#JO.100X0.250B24 SQI | HD 901074 |
| 43 | 1 | DATA FINGER GRDS BORER#151-97 | HD 901113 |
| 44 | 4 | 4-40 X 3/16 BND HD | HD 911005 |
| 45 | 1 | 4-40 X 3/8 BND HD | HD 911007 |
| 46 | 6 | 4-40 X 3/16 FLT HD | HD 911012 |
| 47 | 2 | 4-40X1/4 PHIL PAN HDMS BLK OX | HD 911035 |
| 48 | 1 | #4-40 KEPNUT | HD 912002 |
| 49 | 1 | #4 NYL SHLDR WASHR B51547F01 | HD 913011 |
| 50 | 1 | LG MICA WASHER MOT B08853A001 | HD 913012 |
| 51 | 1 | DEUTSCH FASTNR FJBA-7500-4MMB | HD 914000 |
| 52 | 2 | 8830 NATIONAL | IC 108830 |
| 53 | 1 | ECL10116 MOT. ONLY | IC 110116 |
| 54 | 1 | ECL10125 MOT. ONLY | IC 110125 |
| 55 | 1 | ECL10131 MOT. ONLY | IC 110131 |
| 56 | 4 | 75107 | IC 175107 |
| 57 | 1 | 74S00 | IC 207400 |
| 58 | 1 | 74S02 | IC 207402 |
| 59 | 2 | 74S04 | IC 207404 |
| 60 | 1 | 74S11 | IC 207411 |
| 61 | 2 | 74S74 | IC 207474 |
| 62 | 1 | 74S86 | IC 207486 |
| 63 | 3 | 74S113 FAIRCHILD | IC 274113 |
| 64 | 1 | 26LS31 AMD | IC 402631 |
| 65 | 1 | 26LS32 | IC 402632 |
| 66 | 1 | 74LS157 | IC 474157 |
| 67 | 2 | 74LS390 | IC 474390 |
| 68 | 1 | .22UHY NYTRO HWEEV-LO.22 | IN 911002 |
| 69 | 4 | 2.7UHY COIL JW MILLER HVLS-2R | IN 911007 |
| 70 | 1 | 02-3936-S01A/S01B | PC 163936 |
| 71 | 4 | 1/8W 1% 1000OHM MEPCO RN55D10 | RE 111001 |
| 72 | 2 | 1/4W 5% 33 OHM | RE 220330 |
| 73 | 4 | 1/4W 5% 100 OHM | RE 221000 |
| 74 | 24 | 1/4W 5% 1000 OHM | RE 221001 |
| 75 | 6 | 1/4W 5% 10K | RE 221002 |
| 76 | 3 | 1/4W 5% 150 OHM | RE 221500 |
| 77 | 3 | 1/4W 5% 1500 OHM | RE 221501 |
| 78 | 4 | 1/4W 5% 220 OHM | RE 222200 |
| 79 | 7 | 1/4W 5% 2200 OHM | RE 222201 |
| 80 | 2 | 1/4W 5% 22K | RE 222202 |
| 81 | 6 | 1/4W 5% 330 OHM | RE 223300 |
| 82 | 5 | 1/4W 5% 470 OHM | RE 224700 |
| 83 | 8 | 1/4W 5% 4700 OHM | RE 224701 |
| 84 | 2 | 1/2W 5% 2200 OHM | RE 322201 |

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BILL OF MATERIALS FOR W03936S01B
3936-S01B ASSEMBLY

PARTS LIST REV # 3

| ITEM NO | QUANTITY | DESCRIPTION | PART NO |
|---------|----------|------------------------------|-----------|
| 85 | 2 | GOLD CONT MAGNECRT W64TPCX-3 | RY 921006 |
| 86 | 1 | SPDT LOCKTOGL C&K #7101KZQ | SW 911008 |
| 87 | 5 | BINARY 3933 EECO #230002G | SW 911026 |
| 88 | 4 | 1.0MH PULSE ENG PE5156X | XF 921006 |
| 89 | 1 | MPS2369 NPN MOTOROLA ONLY | XS 102369 |
| 90 | 7 | 2N3643/PN3643-5 NPN NATIONAL | XS 103643 |
| 91 | 1 | 2N5191/MJE521 NPN | XS 105191 |
| 92 | 4 | 2N3644 PNP NAT#PN3644-5 | XS 203644 |

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BILL OF MATERIALS FOR W03936S01B
3936-S01B ASSEMBLY

| ITEM NO | QUANTITY | DESCRIPTION | PART NO |
|---------|----------|-------------------------------|-----------|
| 1 | 2 | 100PF/100V/10% #CN15A101K | CA 150101 |
| 2 | 3 | .01UF RD CW15C103M/CS15C103M | CA 150103 |
| 3 | 18 | .1UF RD .2"LD SPCG #CZ20D1042 | CA 150104 |
| 4 | 2 | 1UF REDCAP CY30C105M/CR30D105 | CA 150105 |
| 5 | 2 | 220PF REDCAP CW15C221K | CA 150221 |
| 6 | 1 | 33PF REDCAP CN15A330K | CA 150330 |
| 7 | 2 | 470PF REDCAP CW15C471K | CA 150471 |
| 8 | 2 | 22UF/15V PT KMT#T310B226K015A | CA 215226 |
| 9 | 1 | 6.8UF35V PT KMT#T310B685K035A | CA 235685 |
| 10 | 2 | 330PF 5% MALLORY SXL 333 | CA 901026 |
| 11 | 2 | 1500PF 5% MALLORY SXM 215 | CA 901027 |
| 12 | 1 | 10PF 5% ERIE 831-000-COG01000 | CA 901028 |
| 13 | 1 | 36P UNPROTECTD SPECTRA#800-27 | CO 911025 |
| 14 | 1 | 25POS PIN D HOUS AMP 205208-1 | CO 914001 |
| 15 | 1 | 9POS PIN D HOUSING AMP205204- | CO 914010 |
| 16 | 1 | 9POS SKT D HOUSING AMP205203- | CO 914011 |
| 17 | 1 | 20 HDR RT.ANG. LOW 3M3492-100 | CO 919048 |
| 18 | 7 | JUMPER FLX-TRON#MJB2654-08CUS | CO 919113 |
| 19 | 42 | B-SOCKETS AMP 2-331272-7 | CO 921006 |
| 20 | 2 | MALSCR LK ASY CANN D204192109 | CO 991004 |
| 21 | 4 | FEMSCR LK ASY CANN D2041820B | CO 991005 |
| 22 | 1 | AMP SHELL DB AMP #206478-3 | CO 991010 |
| 23 | 16 | CRIMP STYLE PIN AMP 66507-3 | CO 991075 |
| 24 | 5 | CRIMP STYLE SOCKET AMP 66505- | CO 991076 |
| 25 | 8 | 1N914A/1N4446 | DI 100914 |
| 26 | 2 | 1N4005 (1 AMP) | DI 104005 |
| 27 | 1 | 1N5401 (13 AMP) | DI 105401 |
| 28 | 2 | 1N4738A 8.2V 5% 1W | DI 234738 |
| 29 | 3 | 1N5223B 2.7V 5% | DI 235223 |
| 30 | 2 | SMALL RED LED MONSANTO #MV507 | DI 901003 |
| 31 | 1 | 3936-S001B B-3081 S-3082 | FP 423936 |
| 32 | 2 | 1 AMP #LITTLEFU 275.001/27600 | FU 911001 |
| 33 | 1 | 3 AMP LITFU 275.003/276.003 | FU 911003 |
| 34 | 2 | REAR MOUNTING RAIL(SEC) B-122 | HD 231229 |
| 35 | 1 | SEC SHIELD B-1057 | HD 241057 |
| 36 | 1 | SNAP BUSHING HEYCO SB-437-5 | HD 901002 |
| 37 | 3 | .4 JMPR JO.400X0.125IRD22 | HD 901006 |
| 38 | 2 | TIWRAP 3/4" PANQUIT #PLT-IM-C | HD 901026 |
| 39 | 1 | .2 JMPR JO.200X0.125IRD22 | HD 901027 |
| 40 | 1 | GND SHIELD LABEL #77-631979-2 | HD 901046 |
| 41 | 1 | GRD SHIELD INSULATION LE BLK | HD 901065 |

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BILL OF MATERIALS FOR W03936S01A
3936-S01A ASSEMBLY

PARTS LIST REV # 3

| ITEM NO | QUANTITY | DESCRIPTION | PART NO |
|---------|----------|-------------------------------|-----------|
| 42 | 2 | .1 JUMPER#JO.100X0.250B24 SQI | HD 901074 |
| 43 | 1 | DATA FINGER GRDS BORER#151-97 | HD 901113 |
| 44 | 4 | 4-40 X 3/16 BND HD | HD 911005 |
| 45 | 1 | 4-40 X 3/8 BND HD | HD 911007 |
| 46 | 6 | 4-40 X 3/16 FLT HD | HD 911012 |
| 47 | 2 | 4-40X1/4 PHIL PAN HDMS BLK OX | HD 911035 |
| 48 | 1 | #4-40 KEPNUT | HD 912002 |
| 49 | 1 | #4 NYL SHLDR WASHR B51547F01 | HD 913011 |
| 50 | 1 | LG MICA WASHER MOT B08853A001 | HD 913012 |
| 51 | 1 | DEUTSCH FASTNR FJBA-7500-4MMB | HD 914000 |
| 52 | 2 | 8830 NATIONAL | IC 108830 |
| 53 | 1 | ECL10116 MOT. ONLY | IC 110116 |
| 54 | 1 | ECL10125 MOT. ONLY | IC 110125 |
| 55 | 1 | ECL10131 MOT. ONLY | IC 110131 |
| 56 | 4 | 75107 | IC 175107 |
| 57 | 1 | 74500 | IC 207400 |
| 58 | 1 | 74502 | IC 207402 |
| 59 | 2 | 74504 | IC 207404 |
| 60 | 1 | 74511 | IC 207411 |
| 61 | 2 | 74574 | IC 207474 |
| 62 | 1 | 74586 | IC 207486 |
| 63 | 3 | 745113 FAIRCHILD | IC 274113 |
| 64 | 1 | 26LS31 AMD | IC 402631 |
| 65 | 1 | 26LS32 | IC 402632 |
| 66 | 1 | 74LS157 | IC 474157 |
| 67 | 2 | 74LS390 | IC 474390 |
| 68 | 1 | .22UHY NYTRO HWEEV-LO.22 | IN 911002 |
| 69 | 4 | 2.7UHY COIL JW MILLER HVLS-2R | IN 911007 |
| 70 | 1 | 02-3936-S01A/S01B | PC 163936 |
| 71 | 4 | 1/8W 1% 1000OHM MEPCO RN55D10 | RE 111001 |
| 72 | 2 | 1/4W 5% 33 OHM | RE 220330 |
| 73 | 2 | 1/4W 5% 100 OHM | RE 221000 |
| 74 | 24 | 1/4W 5% 1000 OHM | RE 221001 |
| 75 | 6 | 1/4W 5% 10K | RE 221002 |
| 76 | 3 | 1/4W 5% 150 OHM | RE 221500 |
| 77 | 3 | 1/4W 5% 1500 OHM | RE 221501 |
| 78 | 4 | 1/4W 5% 220 OHM | RE 222200 |
| 79 | 7 | 1/4W 5% 2200 OHM | RE 222201 |
| 80 | 2 | 1/4W 5% 22K | RE 222202 |
| 81 | 6 | 1/4W 5% 330 OHM | RE 223300 |
| 82 | 5 | 1/4W 5% 470 OHM | RE 224700 |
| 83 | 6 | 1/4W 5% 4700 OHM | RE 224701 |
| 84 | 2 | 1/2W 5% 2200 OHM | RE 322201 |

FRONT PANEL - 3936-S001B

LEDS

- BYP (red) Indicates that the SCC is bypassed by the SCC bypass bit being set or the 3936-S001B front panel switch being set to BYPASS. The bypass state only affects the highway, A or B, selected.
- LC (red) Indicates that the SCC loop collapse is true. Affects only the highway, A or B, selected.

Switch

NORMAL/BYPASS Forces a bypass condition when switched to BYPASS.

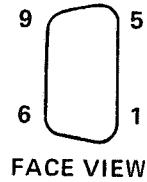
| <u>U-Port Connectors</u> | <u>Type</u> | <u>Mating Connector Kits</u> |
|--------------------------|-------------|------------------------------|
| B-IN | DE9P | KSC #5930-Z1A |
| B-OUT | DE9S | KSC #5931-Z1A |

STRAP OPTIONS - 3936-S001B

There are seven push on strap selections on the 3936-S001B. Five provide a choice between position A or B. All must be in position B. One is B only and must be plugged on. One allows a choice between C or D and must be in position D when the 3936-S001B is used with the 3936-S001A.

- Loop Collapse - "E" enables loop collapse in response to the loop collapse signal from the SCC; "D" disables loop collapse.
- GSA - A jumper may be installed between the GSA pad and the ground grid on the solder side of the printed circuit board allowing the shield on the B OUT connector to be grounded in the 3936.
- GA - When installed, this strap provides a balanced ground on the receive go loop. This prevents the conductors from "floating" at high potentials in high electrostatic fields. It may be desirable to remove this strap in certain special noise environments where high electrostatic fields are not present.
- GAR - Performs the same function as GA except for the return path outputs.

B-Out Connector



Socket/Wire List

9 SOCKET 'D'

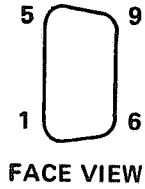
SOCKET NO.

| | | |
|---|----|-------|
| 9 | NC | _____ |
| 8 | NC | _____ |
| 7 | NC | _____ |
| 6 | NC | _____ |

SOCKET NO.

| | | |
|---|-----------------|-------|
| 5 | B - Reply In | _____ |
| 4 | B - Reply In | _____ |
| 3 | B - Command Out | _____ |
| 2 | B - Command Out | _____ |
| 1 | GSA Strap | _____ |

A-IN Connector



Pin/Wire List

9 PIN 'D'

PIN NO.

| | |
|---|----------------|
| 5 | A-- Reply Out |
| 4 | A - Reply Out |
| 3 | A - Command In |
| 2 | A - Command In |
| 1 | GND |

PIN NO.

| | |
|---|----|
| 9 | NC |
| 8 | NC |
| 7 | NC |
| 6 | NC |

Note that operation may be satisfactory with the equalization in Position 8 for any operating speed in a particular system. The capacitor peaking becomes more important at higher cable losses and may allow operation with more crates in power bypassed state.

For operation below 100 KHz, the input and output transformers should be replaced with 20 mH transformers.

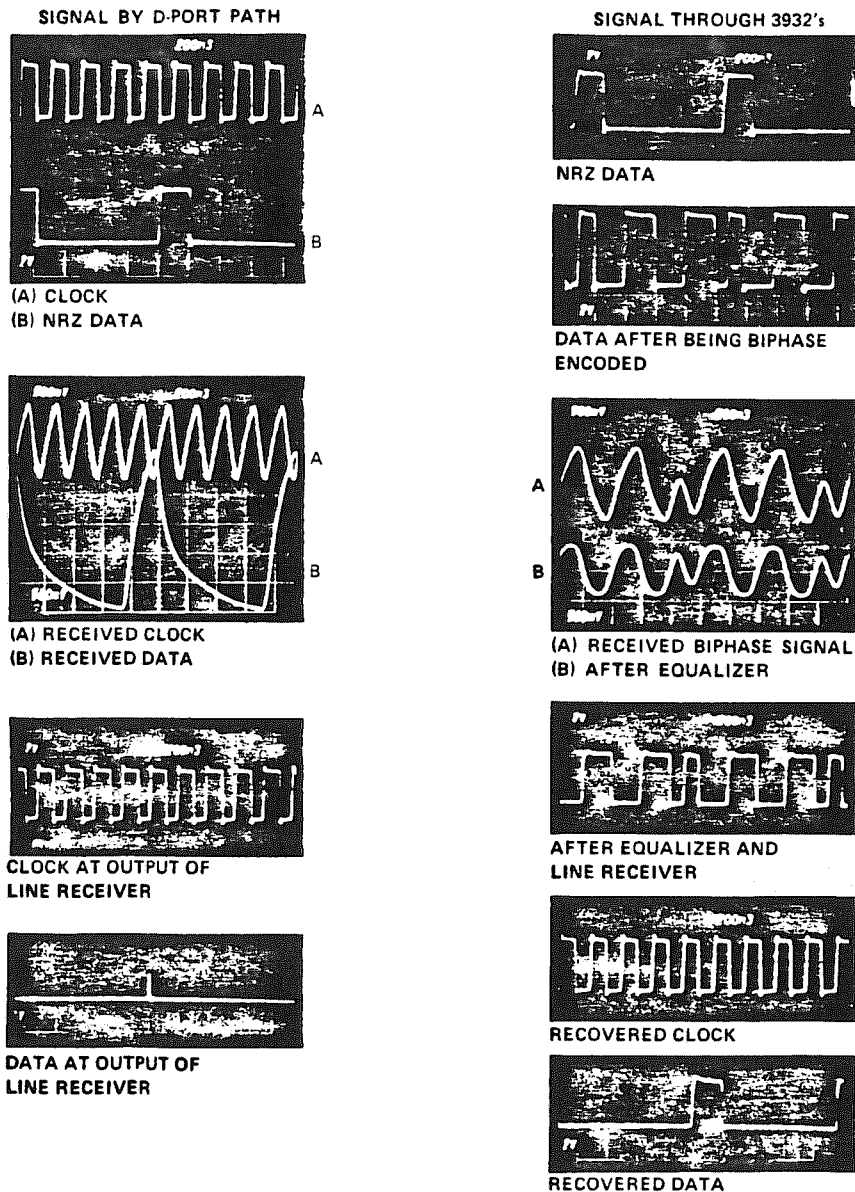


Figure 2 -- Comparison of Data Recovery

POWER BYPASS

The 3936 monitors the +6 volt and -6 volt busses (as supplied to the 3936). If either of these voltages (or the +24 volts for the relays) is not present, the power-down relays make "transparent" connection between all In and Out paths. In the power bypass state, there is no circuitry bridging the U-Port highway paths.

LOOP COLLAPSE

Loop collapse can be used to isolate problems in the serial highway system by isolating the highway beyond an SCC. The loop collapse contact from the SCC is monitored by the 3936. When the loop collapse bit is set by command in the SCC, the 3936 removes its multiplexer output from the go path and connects this output to the return path.

The 3936 return path (NOT loop collapsed condition) contains active gain so that the signals are reshaped and increased to full amplitude. Isolation transformers are also included in the In and Out paths. The return path also includes adjustable equalization.

Loop collapse can be disabled by strap option in the 3936 whenever the return path is not used. This prevents accidental collapse to an "open" loop from the SCC. Loop collapse is not provided in the serial driver. When in the power bypass state, the return path is "transparent", In to Out, in a similar manner to the go path.

MODULE CONNECTIONS

The 3936 contains a cable tail terminated with a 25-contact "D" plug. This plug should be connected to the D-Out connector of the SD or SCC. The 25-contact "D" socket turnaround connector supplied with the 3936 should be connected to the D-In connector of the SD or SCC. This makes clock, data (in and out), bypass and loop collapse connections (bypass and loop collapse not provided on the SD).

The U-Port In highway connections are made via cables with nine-contact "D" sockets; the Out connections are made via cables with nine-contact "D" plugs. Shielded twistef pair cable is strongly recommended. Only the go path pairs are required if loop collapse is not used. Where loop collapse is used and the return path is in the same cable as the go path, two pair with separate shields OR a single shield over both pair is acceptable. As shipped (no GSA strap), the shield is connected to ground only at one end. Under certain noise conditions, grounding the shield at both ends (GSA installed) will improve operation.

HIGHWAY LENGTH

The maximum length (or the maximum data rate at a particular highway length) depends upon several conditions:

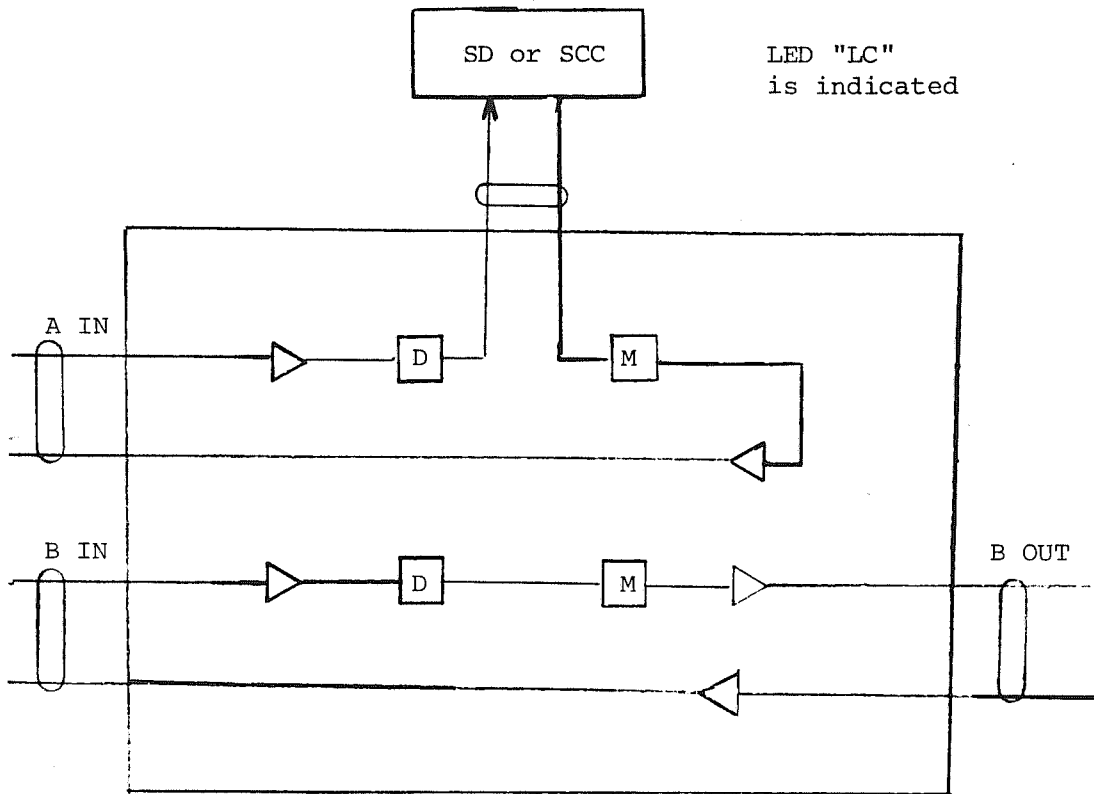


Figure G -- (Collapse)

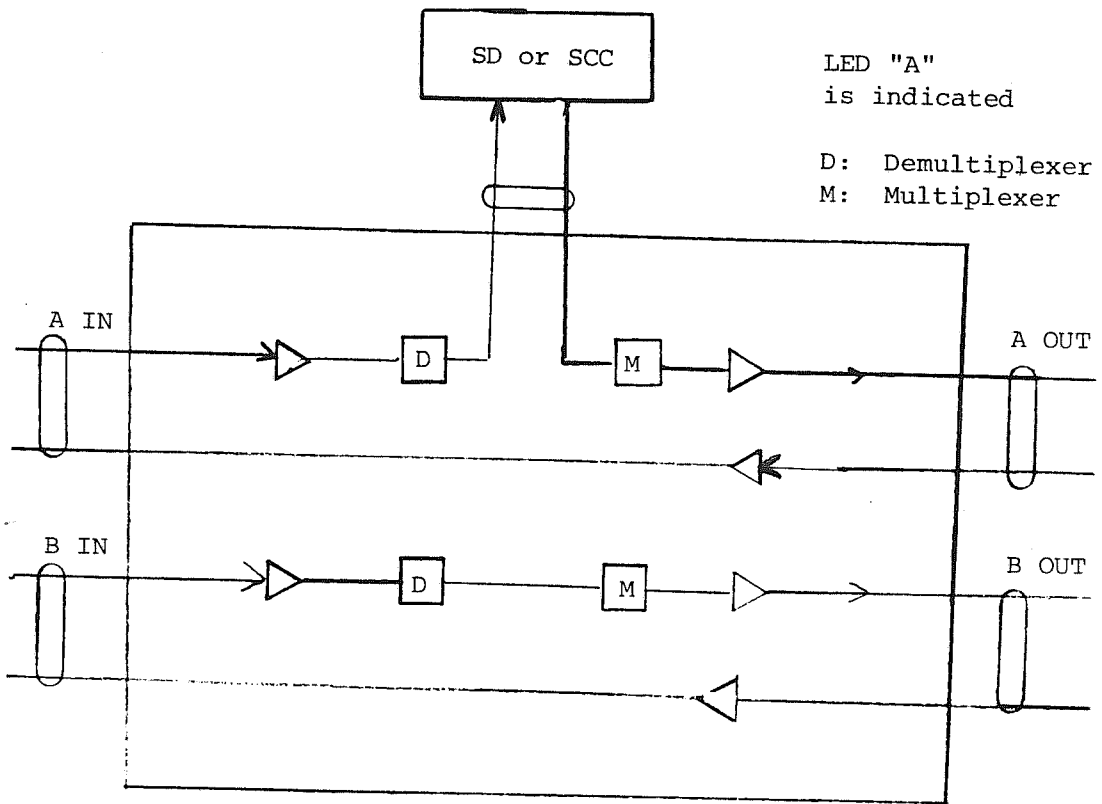


Figure C

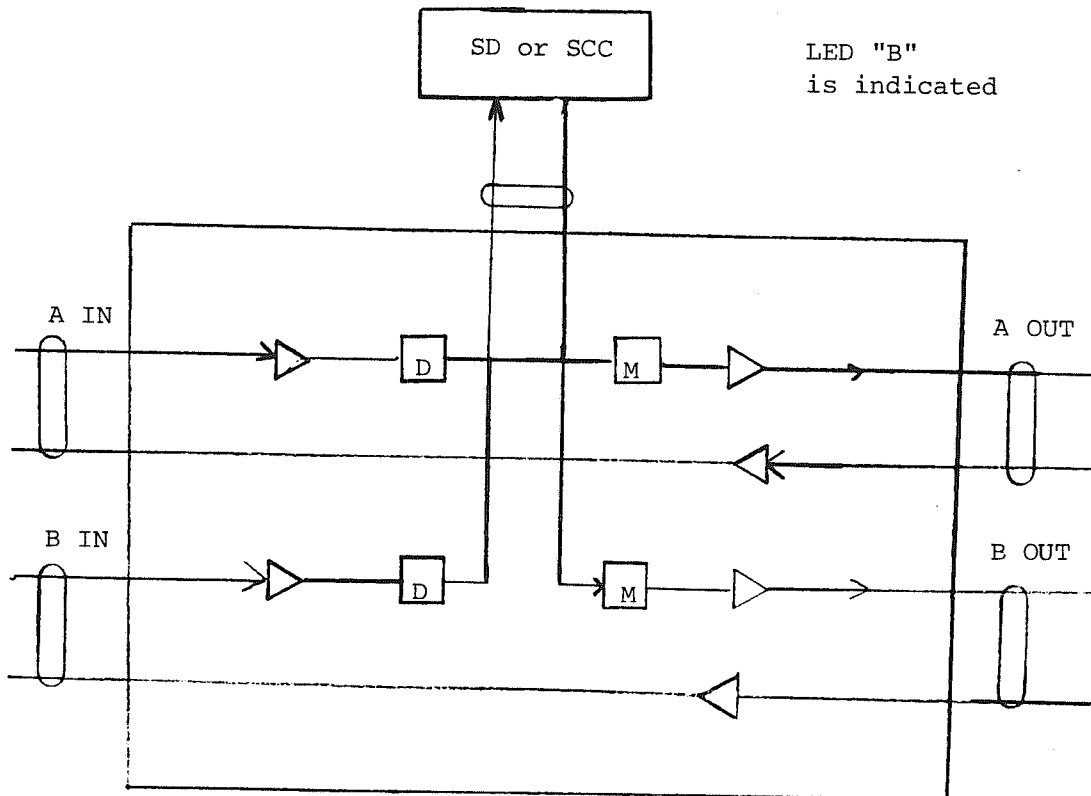


Figure D