TECHNICAL REFERENCE

INDEX

HARDWARE/SOFTWARE SPECIFICATIONS

STANDARD SOFTWARE VER 6.0, 7.0 or 9.0
REMOTE (RS232)
LOCAL (RS422)

Data format: 8 bit, no parity, two stop bits
Baud rate: RS422 = 4800 Baud unless specified otherwise
RS232 = 300, 1200, 4800 baud selectable (V6 & 7)
= 300, 1200, 2400, 4800, 9600 (V9.0)
Message format: Refer to your specific model
The suffix of the model number will indicate the total number of characters per page. Divide this by the number of lines of text to get the number of characters per line.
Structure your message accordingly.
EXAMPLE: Model 13 is a four line display
Model 13-80 is an 80 character display with 20 characters per line.
Command format: Each message is followed by 10 Command codes.

TRANSMISSION FORMAT: ($ INDICATES HEX VALUE)

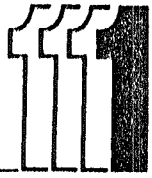
1. Header) $53) Minimum 8 repetitions (minimum 8 bytes)
) $31) 1 byte
2. Sign ID #) $30) Sign # 01 (2 bytes)
) $31)
3. Function code $13) 1 byte
4. Graphics range) $30) For purposes of this specification
) $30) it is assumed only text is sent to sign.
5. Text range $T1$T2) Where 1 =< T1 =< TMAX
and T1 =< T2 =< TMAX

NOTE: If $T1 or $T2 = 0, then no text is sent.

6. MESSAGE:
Text string = characters on first page of message to be sent
Commands = 10 characters
Repeat step 6 for range T1 to T2.
8. CHECKSUM:
Equal to 1's complement of sum of data sent from 4 to 6 inclusive.

NOTE: If sign Checksum agrees, an ACK will be returned from the sign. If not agreed, a NAK will be returned from the sign. Standard header will preceed ACK or NAK (ie 32 x $53, 1 x $31). No reply from sign indicates transmission or system fault.

NOTE: TIMEOUT period is 2 seconds. Sign will return to normal operation if a byte is not received after 2 seconds during a transmission.



EXAMPLES

1. Two page transmission to a Model 632 sign (Sign # 01):

Message to send:

THIS IS PAGE ONE OF YOUR MESSAGE	0D3
THIS IS PAGE TWO OF YOUR MESSAGE	1D3*

Bytes to send: (All bytes are Hex numbers)

```
53 53 53 53 53 53 53 53 53 53 53 53 31 (Header up to 32 S's + 31)
30 31 ( ID number)
13 (Function Code)
00 00 (Graphics range)
01 02 (Text range)
54 48 49 53 20 49 53 20 50 41 47 45 20 4f 4e 45 (Top line page 1)
4f 46 20 59 4f 55 52 20 4d 45 53 53 41 47 45 20 (Bottom line p.1)
30 44 33 20 20 20 20 20 20 20 (Command page 1)
54 48 49 53 20 49 53 20 50 41 47 45 20 54 57 4f (Top line page 2)
4f 46 20 59 4f 55 52 20 4d 45 53 53 41 47 45 20 (Bottom line p. 2)
31 44 33 2a 20 20 20 20 20 20 (Command page 2)
d4 (Checksum)
```

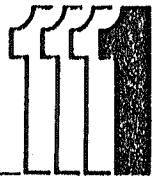
2. One page transmission to a model 1380 sign (Sign # 02):

Message to send:

THE QUICK BROWN FOX JUMPED OVER THE LAZY SLEEPING DOG	4D36*

Bytes to send: (All bytes are Hex numbers)

```
53 53 53 53 53 53 53 53 53 53 53 53 31 (Header up to 32 S's + 31)
30 32 (ID number)
13 (Function Code)
00 00 (Graphics range)
01 01 (Text range)
54 48 45 20 51 55 49 43 4b 20 42 52 4f 57 4e 20 46 4f 58 20 (line 1)
20 20 20 20 4a 55 4d 50 45 44 20 4f 56 45 52 20 20 20 20 20 (line 2)
20 20 20 20 20 20 54 48 45 20 4c 41 5a 59 20 20 20 20 20 20 (line 3)
20 20 20 20 20 53 4c 45 45 50 49 4e 47 20 44 4f 47 20 20 20 (line 4)
34 44 43 36 2a 20 20 20 20 20 (Command page)
9d (Checksum)
```



MEMORY CONFIGURATIONS

Following is the formula for determining the amount of memory required in a sign where specific amounts of Graphics and Text pages are required.

The formula for total memory (X) follows:

X = (((B+10) * D) + (A * C *(E+2)) + 335) / 1,025

X MUST BE ROUNDED UP TO THE NEAREST MULTIPLE OF 8K (UP TO 32K).

Where:
A = 16 for models 5, 6 and 12 signs
A = 32 for models 10 and 13 signs
B = Number of characters per page for your sign.
C = Number of characters per line for your sign
D = Number of Text pages required
E = Number of Graphics pages required

EXAMPLE 1: Model 680, minimum 100 text pages, minimum 30 graphics.

A = 16, B = 80, C = 40, D = 100, E = 30

X = (((80 + 10) * 100) + (16 * 40 *(30 + 2)) + 335) /1,025
X = (9,000 + 20,480 + 335) / 1,025
X = 29,815 / 1,025
X = 29K bytes
X = 32K required memory

EXAMPLE 2: Model 1396, minimum 60 text pages, minimum 30 graphics.

A = 32, B = 96, C = 24, D = 60, E = 30

X = (((96 + 10) * 60) + (32 * 24 * (30+2)) + 335) /1,025
X = (6,360 + 24,576 + 335) / 1,025
X = 31,271 / 1,025
X = 31K bytes
X = 32K required memory

EXAMPLE 3: Model 540,minimum 250 text pages, minimum 9 graphics.

A = 16, B = 40, C = 20, D = 250, E = 9

X = (((40 + 10) * 250) + (16 * 20 *(9+2)) + 335) /1,025
X = (12,500 + 3,520 + 335) / 1,025
X = 16,355 / 1,025
X = 16K bytes
X = 16K

PLC SOFTWARE PACKAGE (for Programmable Logic Controllers)

Any model is capable of displaying pre-programmed messages triggered from a PLC or other intelligent transmitting device. Optional variable data fields can be filled as part of the trigger code sequence.
Data format is 8 bit ASCII, 2 stop bits, no parity.
Baud rate can be specified by the user.

Variable data is programmed on any page where a " mark appears.
Variable data can be programmed as groups not exceeding a total of 20 characters on two consecutive pages.

Example: ENTER VARIABLE DATA HERE " ".

THE ENTRY TABLE (Message triggering):

Pre-programmed messages are trigerred by transmitting an "entry table" via RS232. The entry table is set up as follows: ($ = hex value)

1. Header: $53 (minimum 8 repetitions)
   $31
   $30)Unit
   $31)# 01
   $17 (Function code)
2. Entry number (1 - 8 hex), 1 byte
3. Page number (1 - 255 hex), 1 byte
4. Variable data string (0 - 20 ASCII characters)
5. Either:
   a) a comma if further entries follow, go to 2 above, or
   b) an asterisk if this is the last entry.
6. Checksum.

Note: Sign will return an ACK if checksum for received data agrees.

The sign will run all pages for which an entry number is set up.
In order to remove an entry number from the table, send the header, entry number plus 0.
Pages will run in sequence according to their entry number.
This does not have to correspond to the sequence the pages are programmed in the display.
When all entry numbers are blank, the display will run from page 1.
You should have a message on page one which you want to run when triggered messages are inactive.

OPTIONAL FUNCTIONS: (x = characters per line for your display)

Function code	Purpose
$61 + x ASCII characters	Place x ASCII characters on the top line of page 1.
$62 + x ASCII characters	Place x ASCII characters on the bottom line of page 1.
$63	Clear top line of page 1
$64	Clear bottom line of page 1
$65	Clear all entries in page run table
$2a +2x ASCII characters	Send top line and bottom line to Page 1.

EXAMPLES:

1. Data stream for a run table without variable data.

```
$53 53 53 53 53 53 53 53 31 (header)
$30 30 (sign number)
$17 (function code)
$01 0a 2c (trigger page 10)
$02 0b 2c (trigger page 11)
$03 19 2c (trigger page 25)
$04 14 2a (trigger page 20)
$06 (checksum)
```

2. Data stream for a run table with variable data.

```
$53 53 53 53 53 53 53 53 31 (header)
$30 30 (sign number)
$17 (function code)
$01 0a 30 31 32 33 2c (trigger page 10, variable data 0123)
$02 0b 34 35 36 37 2c (trigger page 11, variable data 4567)
$03 19 38 39 2c       (trigger page 25, variable data 89)
$04 14 41 42 43 44 2a (trigger page 20, variable data ABCE)
$ef (checksum)
```

3. Data stream to clear entry table set up in above examples.

```
$53 53 53 53 53 53 53 53 31 (header)
$30 30 (sign number)
$17 (function code)
$01 00 2c (clear entry 1)
$02 00 2c (clear entry 2)
$03 00 2c (clear entry 3)
$04 00 2a (clear entry 4)
$48 (checksum)
```

4. Data stream to send a message to the top line of a model 640.

```
$53 53 53 53 53 53 53 53 31 (header)
$30 30 (sign number)
$61 (function code for top line message to follow)
$20 20 20 20 20 20 20 20 20 20 30 31 32 33 34 35 36 37 38 39
$b3 (checksum)
```

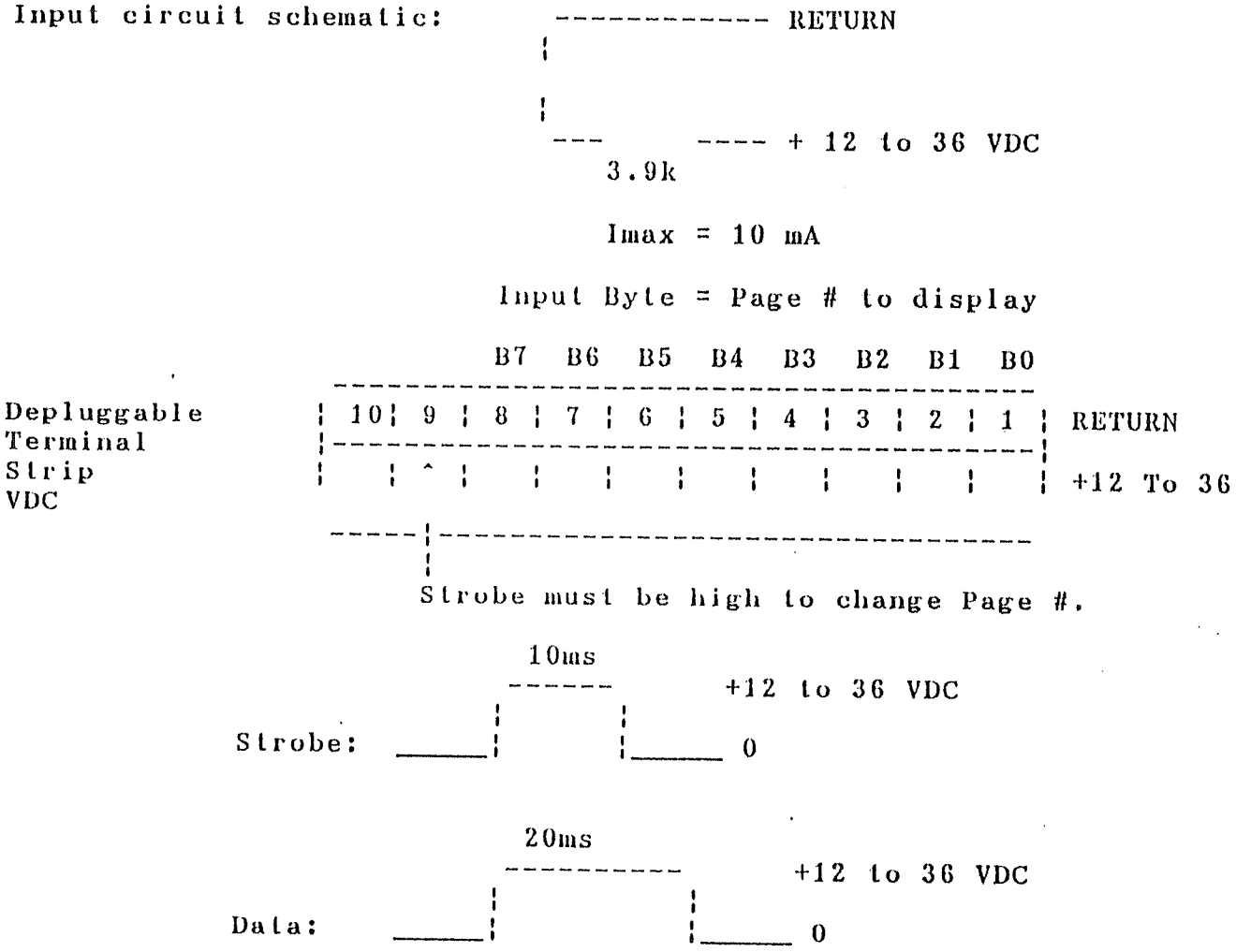
5. Data stream to send a message to Page 1 of a model 640.

```
$53 53 53 53 53 53 53 53 31 (header)
$30 30 (sign number)
$2a (function code)
$20 20 20 20 20 20 20 20 20 20 30 31 32 33 34 35 36 37 38 39
$20 20 20 20 20 20 20 20 20 20 41 42 43 44 45 46 47 48 49 50
$b6 (checksum)
```

PARALLEL INPUT CIRCUIT

12 to 36 VDC input circuit:

Input circuit schematic:



Note: The display will run Page 1 when no alarms are active.
Program each page of the sign with an alarm and Command.
Program Page 1 with the message for inactive state.
Include an asterisk on Command Page 1.
Display Pages 1 to PageMax by changing the input byte.

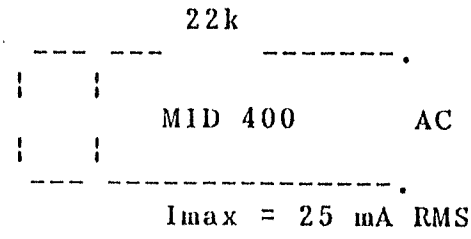
Note: All input pairs are isolated from ground and from each other.

Note: Alarms can be time stamped and saved to a historical file.
For further information, about this or other required features, contact factory.

PARALEL INPUT CIRCUIT

120 VAC input circuit:

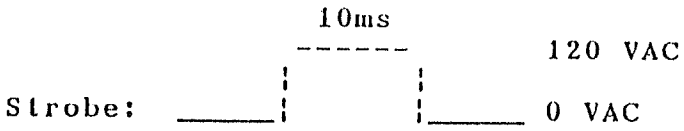
Input circuit schematic:

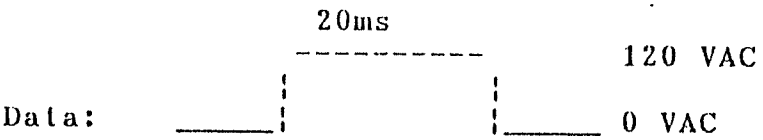


Input Byte = Page # to display

	B7	B6	B5	B4	B3	B2	B1	B0	
Depluggable Terminal Strip	10	9	8	7	6	5	4	3	2	1	AC
		^									AC

Strobe must be high to change Page #.





Note: The display will run Page 1 when no alarms are active.
Program each page of the sign with an alarm and Command.
Program Page 1 with the message for inactive state.
Include an asterisk on Command Page 1.
Display Pages 1 to PageMax by changing the input byte.

Note: All input pairs are isolated from ground and from each other.

Note: Alarms can be time stamped and saved to a historical file.
For further information, about this or other required features, contact factory.

DISCRETE INPUT CIRCUIT (120 VAC)

Each alarm input board includes 16 inputs of 120VAC. Alarm boards can be stacked to provide any multiple of 16 alarms per sign.

When an alarm input is active, the corresponding pre-programmed message will display on the sign.

Multiple active alarms are displayed in numeric sequence.

Each pre-programmed message is two pages long.
The first alarm page is calculated as follows:
Alarm Page 1 = MaxPage - 2(total inputs)

When no alarms are active, the sign will display whatever is programmed in Memory Page 1 to Alarm Page 1.

Note: Software parameters above can be modified to meet customer specifications.

Note: Alarms can be time stamped and saved to a historical file. For further information, about this or other required features, contact factory.

EXTERNAL DEVICE DRIVERS

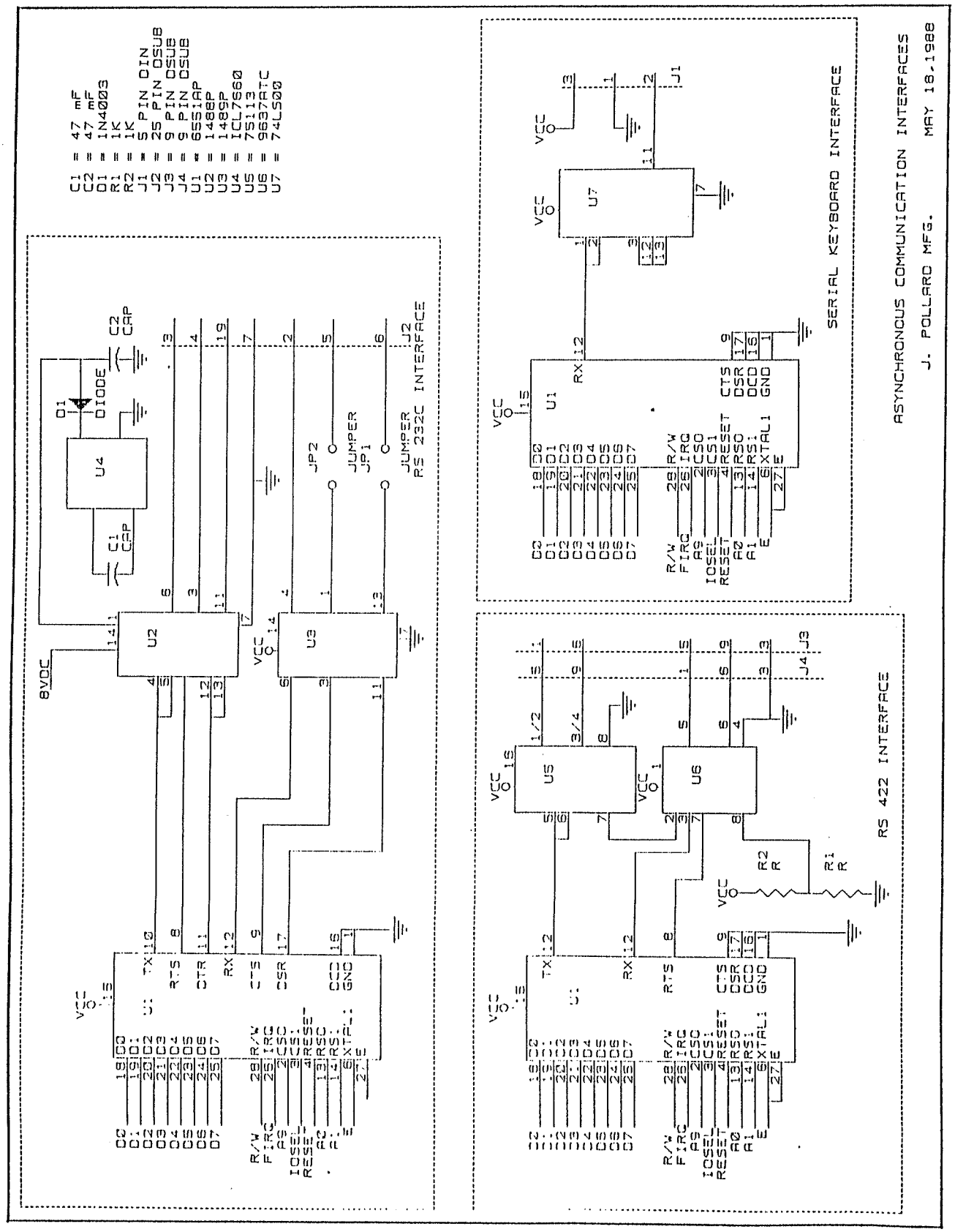
Any sign can be equipped with hardware and software to drive up to 8 120 VAC resistive loads. ie Lamps etc.

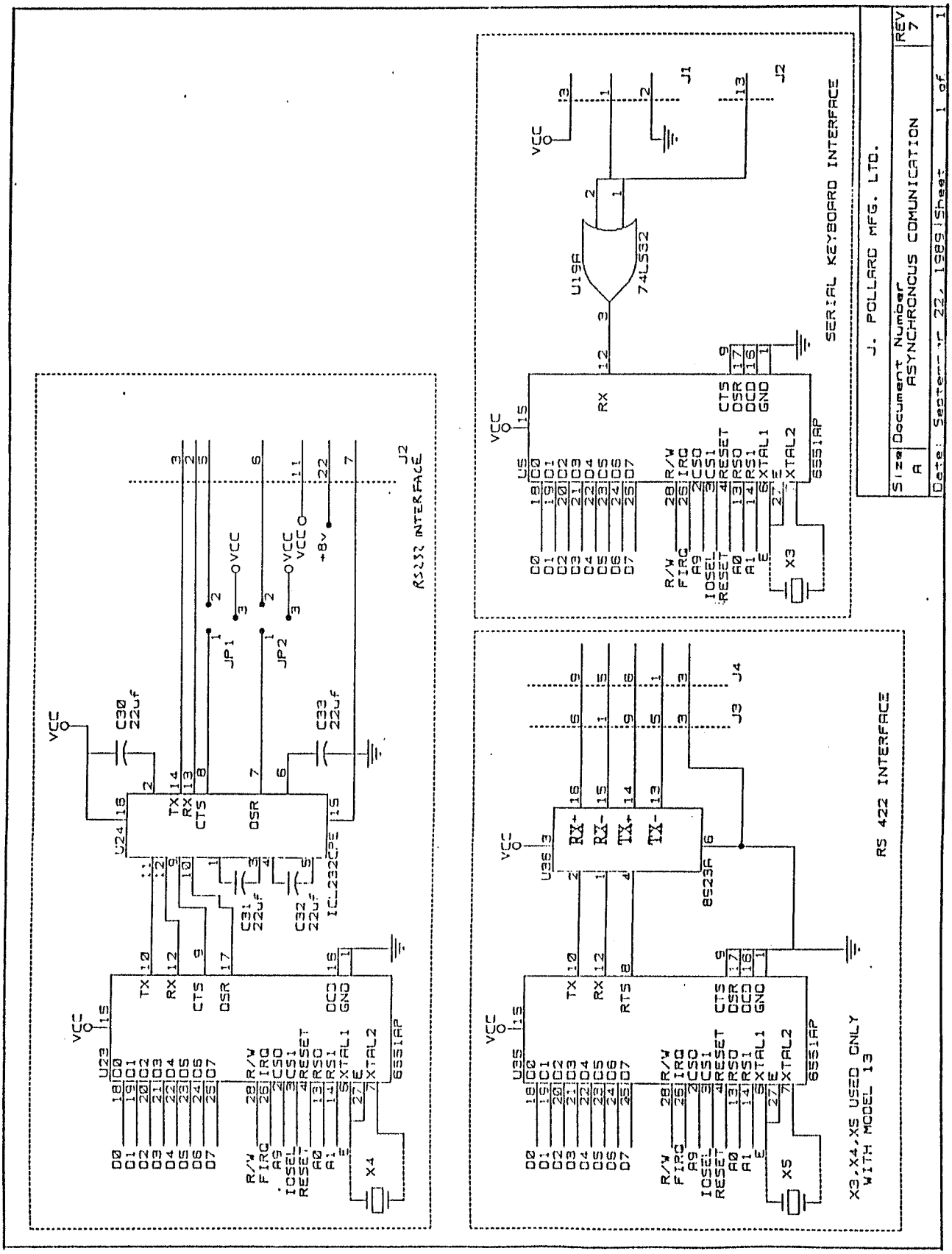
Each output is triggered on and off by Commands on any Command page.

The Command O + output number will turn on the output.
The same Command sequence used again will turn off the output.

Example: The Command code sequence 103D403 will wipe the message on from top to bottom, turn on output # 3, delay for 4 seconds and turn off output # 3.

ASYNCHRONOUS COMMUNICATION INTERFACE CPU REV 6




J. POLLARD MFG. LTD.
Size A
Document Number
ASYNCHRONOUS COMUNICATION
REV 7
Date: September 22, 1989 Sheet 1 of 1
SERIAL KEYBOARD INTERFACE
RS232 INTERFACE
RS 422 INTERFACE
X3,X4,X5 USED ONLY WITH MODEL 13