communications multiplexer

system 6000

6255

product specification

Communications Multiplexer: Features

- Dual RS422 port access to TCS microprocessor-based instruments allowing two supervisory computer systems to access TCS microprocessor-based instruments.
- Current instruments supported (except 6365, 6355, 6435, 6850).
- Self-configuring.
- No options – standard hardware.
- Transparent to supervisory computer.
- Built-in diagnostics and error reporting.

Description

The 6255 Communications Multiplexer uses the well-proven hardware and software of the System 6000 instruments to provide dual RS422 port communications to groups of TCS intelligent instruments.

The 6255 employs a variant of the standard 72mm wide multi-channel microprocessor based instrument.

The front fascia is simplified, providing an 8-digit alpha-numeric display of status or error message.

Two of the conventional I/O cards are replaced by dual-UART cards providing four additional serial links (three only are used). A third I/O card provides digital outputs indicating status. The fourth slot is unused.

The 6255 may be set up via internal switches, to automatically configure its own database by addressing the instruments connected. This may be achieved at start-up or on power up

The instrument may be instructed to re-configure using commands from a TCS

Programming Terminal (VT100, BBCB, or Epson). Also new configurations may be programmed or existing ones edited using the same terminal connected to the front of the instrument.

The communications ports are all RS422 serial ports using an ANSI protocol.

The 6255 maintains an image of the enquiry polled parameters for the instruments configured. This allows high speed access to these parameters by the supervisory computers. When a parameter is not in this database, the multiplexer will access the data directly from the instrument.

Operator Displays

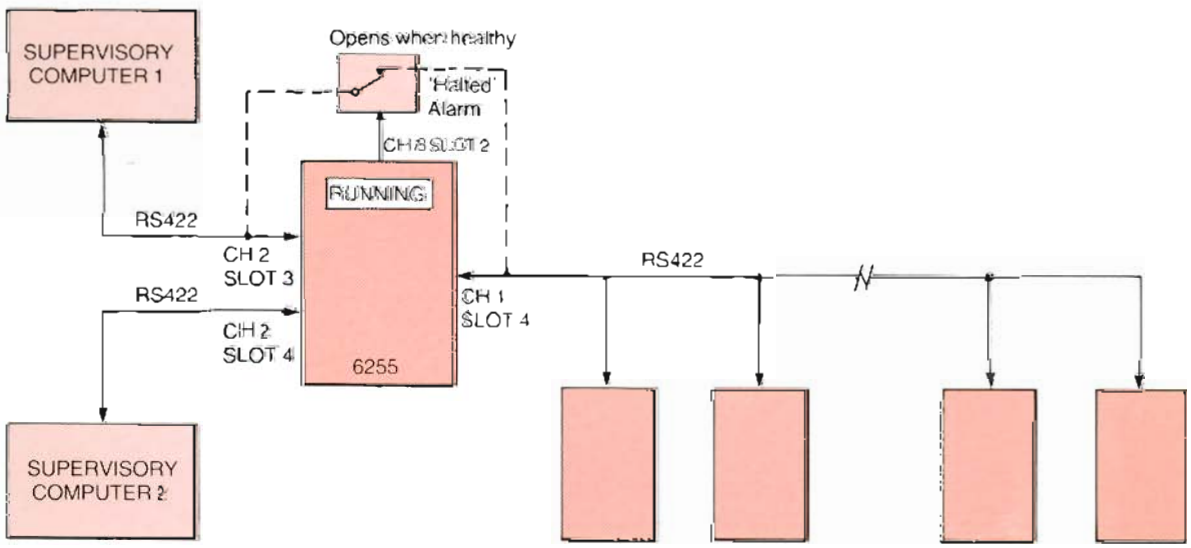
The 6255 has no local operator controls.

The 8-character LED display is used to indicate status data, or error/diagnostic messages.

The displays are.

RUNNING HALTED AUT CFIG MAN CFIG NUL CFIG	STATUS DISPLAY
MEM OVRFL DB INIT DB OVRFL CARD2 ER CARD3 ER CARD4 ER	ERROR/DIAGNOSTIC
WAIT KEY	TEST FUNCTION

Typical Configuration



SYSTEM 6000 MICROPROCESSOR BASED INSTRUMENTS

Applications

- Micro-Vis/Maxi/Vis back-up systems
- Plant strategy computer interface
- Selected front end interface for separate plant analysis computer

Instrument Capacity

The maximum number of instruments that may be linked to the 6255 depends on

1. Bus loading
2. Database size
3. 6255 scan rate

1. Bus Loading

Maximum of 16 instruments may be connected to the instrument port.

(Assuming that the other requirements of available memory, selection rates and scan rates are met.)

The 8245 Communications Buffer may be used to increase the number of instruments above 16.

2. Database Size

(Polled parameters stored within the 6255 database.)

Total memory available for instrument configuration is 5120 byte

Instrument types supported and memory requirements:

Type No.	Functional Description	Memory Usage
6360/63/56/66/55	Positional Single Loop Controllers	56 bytes per loop
6350/51/52/53/58	Positional Single Loop Controllers	40 bytes per loop
6434/35	8 Channel Flow Totaliser	40 bytes per channel
6432/33/Analogue	8 Channel Real/Pseudo Analogue Input or Output Card	320 bytes
6432/33/Digital	8 Channel Real/Pseudo Digital Input or Input Card	20 bytes

3. 6255 Scan Rate

The average time taken for the 6255 to update the complete database from the instruments depends on the following factors:

(a) The number of instruments, and the I/O card types connected to the instrument bus.

(b) The rate of change of plant parameters, i.e. changes in process variables or outputs.

(c) The average rate at which parameters are changed from the supervisory computer, i e manual changes, plus changes requested by the supervisory sequencing tasking system, plus point display selections.

To allow an approximation of the achievable scan time to be made, the following tables gives the best and practical case scan times. A scan time calculation is indicated in the technical manual

It is recommended that the TCS Projects Department is consulted before time critical or large database applications are implemented.

Instrument Scan Times

Instrument Type	Best Case	Best Case Conditions	Practical Case	Practical Case Conditions
6350/60 (Single Loops)	6.5ms	No Changes/Poll	24ms	3 Parameter Changes/Poll (PV, OP and SP)
6358/6434 (8 Channel)	52ms	No Changes/Poll	156ms	2 Parameter Changes/ Channel Poll
6432/6433 (8 Channel) Analogue Card	6.5ms	No Changes/Poll	47ms	1 Parameter Change/ Channel/Poll
6432/6433 (8 Channel) Digital Card	6.5ms	No Changes/Poll	15ms	1 Parameter Change/ Channel/Poll

N B. The worst case scan time/instrument is on power up or at a complete database change.

6350/60 – 50msecs
6358/6434 – 360msecs/8 Channels
6432/6433 Analogue Card – 320msecs/8 Channels
6432/6433 Digital Card – 22msecs/8 Channels

Computer Parameter Changes

Best Case
One computer making changes only – 100ms

Worst Case
Both computers making changes – 250ms

Scan Time Example

N B For most practical systems, a maximum scan time of 300ms is appropriate

Example: 16 × 6350 Controllers
1 Computer Change/Second

Scan Time (Best) = 115.5ms
Scan Time (Worst) = 512ms

Configuration

Two methods of configuring the Multiplexer to its instrumentation are provided.

MANUAL and AUTO

In MANUAL configuration mode, the database is built up using a VDU terminal through the instrument front panel (as for 6433 programming).

In AUTO configuration mode, a command initiated by the VDU causes the 6255 to scan the instrumentation connected to it to automatically generate the database.

Diagnostic messages relating to the 6255 status only are also displayed.

Communications

The 6255 Communications Multiplexer is fitted with an RS232 port and three RS422 ports for serial data communications.

The RS232 port is available via the front socket and is used for the Programming Terminal (VT100, BBC8 or Epson PX8) The RS422 ports are available on the module rear connector pins for connection to the instrument or supervisory computer system

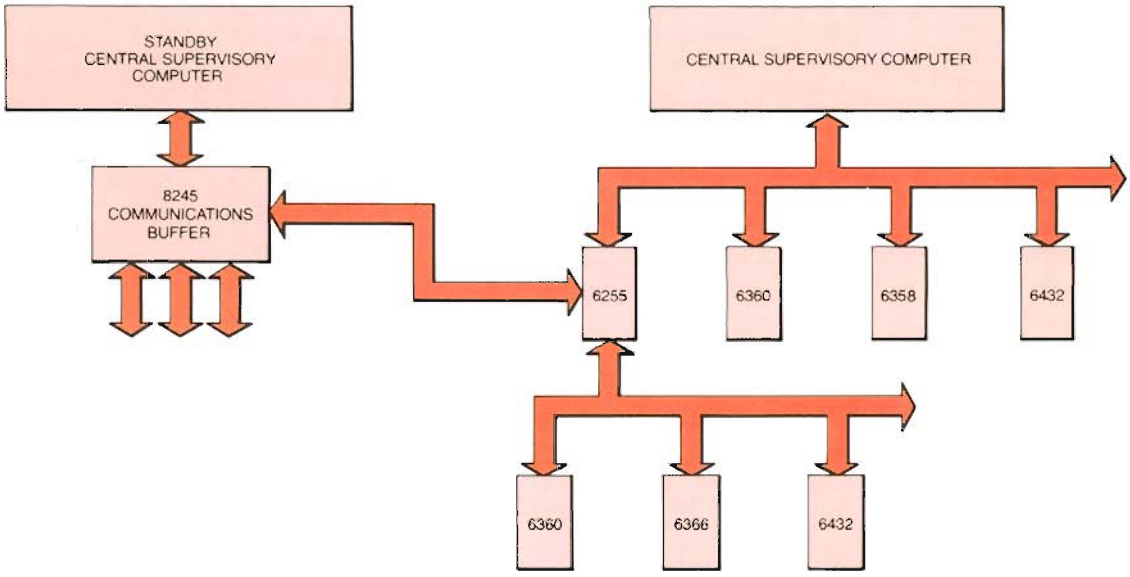
Configuration parameters can only be accessed via the RS232 port and a local programming terminal.

Programming Terminal

Configurations may be entered using any RS232 teletype-compatible VDU plugged into the front panel socket of the 6255. This allows statement entry, editing and listing.

Multi-drop Supervisory Link

Every System 6000 instrument contains an RS422 communications port which enables it to send and receive command parameters over a simple four-wire link connected to other intelligent devices The use of RS422 and the transmission of information in Binary data format makes it particularly easy to communicate with the System 6000 instruments. To hook into a distributed control system requires no modification to the instrument and no further expenditure on options. The four-wire link is simply connected up so that the instrument becomes part of the distributed control system. The illustration shows how an array of instruments can be connected to a supervisory computer which has an RS422 serial port, via the Communications Multiplexer providing links to standby or plant strategy computers. If the computer only has an RS232 serial port then an 8245 Communications Buffer Unit can be used to carry out the required RS232 to RS422 conversion as shown.



Specification

Transmission Standard
4-wire RS422 (0-5V).

Line Impedance
120-240 ohm twisted pair.

Line Length
4000 ft max. (at 9600 baud).

Number of Units/Line
16

Data Rate
Selectable from 110, 300, 600, 1200, 2400, 3600, 4800 or 9600 baud.

Character Length (Binary)
11 bits – 300 to 9600 baud.
12 bits – 110 baud (2 stop).

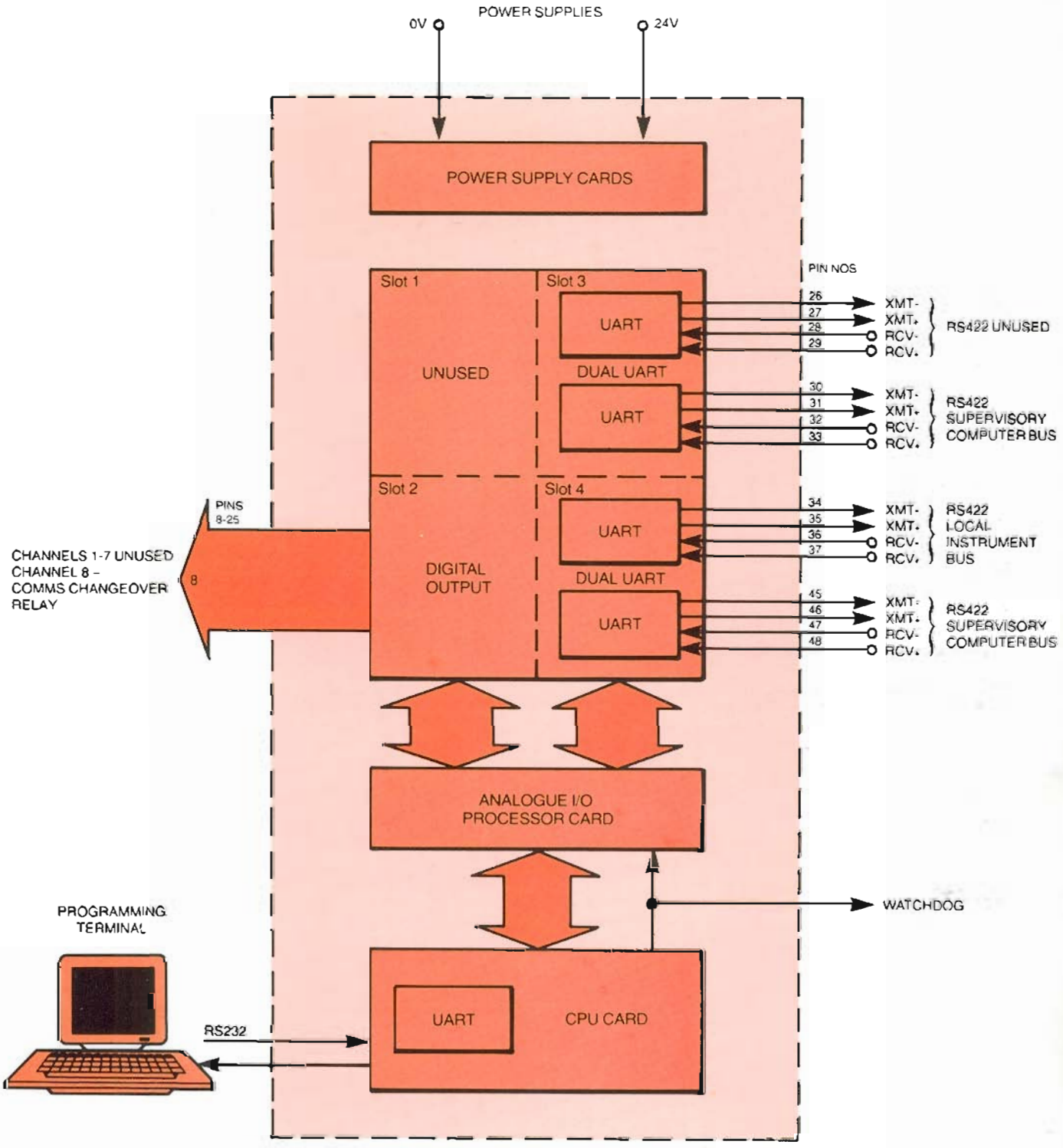
Protocol

All microprocessor based instruments in the System 6000 range employ a standard ANSI protocol known as BI-SYNCH. The exact form of BI-SYNCH implemented within System 6000 corresponds with the American National Standard specification:

ANSI – X3.28 – 2 5 – A4 Revision 1976

The Communications Multiplexer uses only the Binary Protocol which offers the most efficient transmission speed by compressing the data into a binary format, and also supports additional features like Multi-Parameter and Enquiry Polling.

Input/Output signals



6255 BLOCK DIAGRAM

Digital Outputs

Number of Outputs
8 external non-isolated outputs

Output Functions
7 unused, channel 8 communication changeover (comms mux failure).

Output Voltage Level
15V = Logic 1.
0V = Logic Zero.

Output Drive Capability
2k2 open-collector pull-up to +15V supply, maximum logic zero sink current = 16mA.

Power Supplies

Input Voltage
(May be unsmoothed, full-wave rectified AC.)
20-30V DC recommended operating range.
19-35V DC absolute maximum input limits.

Input Current
600mA

Input Fuse Rating
2A

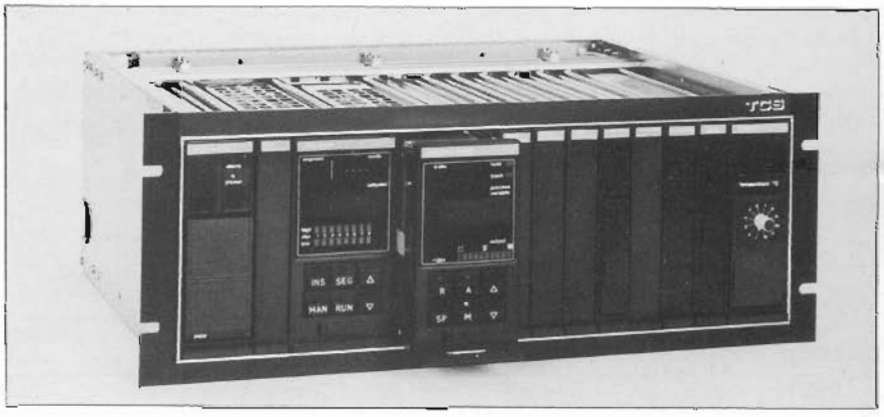
Power Failure Detect Threshold
When input voltage falls below 16.5 ± 0.5V.

Mechanical Details

All System 6000 microprocessor based instruments are supplied in 72mm wide metal housings fitted with front-panel fascias and catch handles for module retention. These may be used with a wide variety of rack and panel mounting hardware as illustrated in the examples below.

7000 Series Racks

Up to six 6255 multiplexers may be fitted into a 7000 series 19-inch rack as shown Interconnections between instruments are made by wire wrapping while external connections may be brought out to two rows of 64-way screw terminal blocks fitted to the hinge down rear door. The 7000 series rack is also available with a panel mounting option, and a 10-inch half rack version for mounting up to three 6255s can also be supplied



7900 Powered Sleeves

The 7900 powered sleeve allows a 6255 to be mounted with a mains power unit. This is incorporated in the associated 7255 Rear Termination Assembly which gives access to all module connections via screw terminals. The 7900 assembly is available in single, 3-way, or 6-way versions for mounting in panels from 1.5mm to 6.5mm thick. A 6-way 19 inch rack mounting version can also be supplied.

Overall dimensions in mm of housings illustrated:

	7000 Rack	7900 Sleeve
Width:	482	105
Height:	177	177
Depth:	380	423

Panel cut-out dimensions in mm:

	7000 Rack	7900 Sleeve
Width	448.2	88.2
Height	166.3	166.3

Details

For further details refer to:
6255 Technical Manual.

6255 Facts Card.

7255 Communications Multiplexer rear termination assembly.

7900 Single or multi-way sleeve assembly for microprocessor based instrumentation.

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Advanced Instrumentation

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