

Electronic Switching Systems



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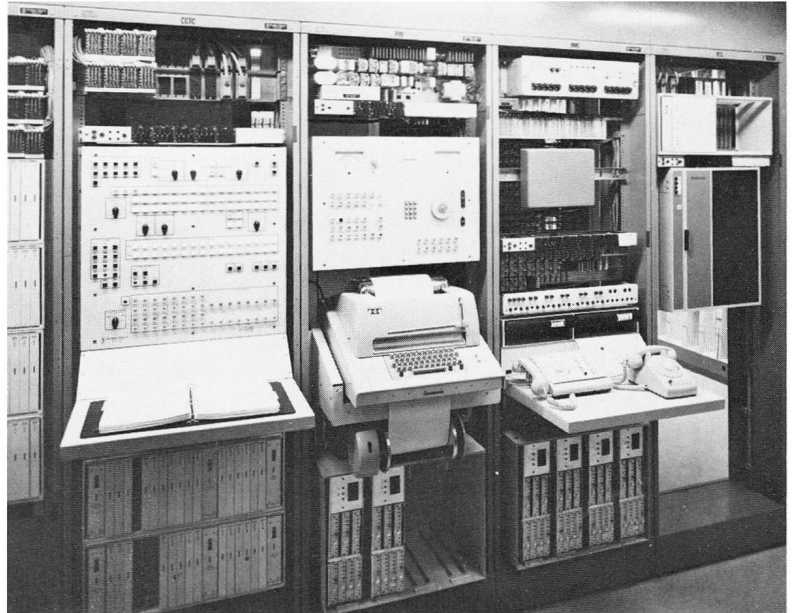
SP-1 Local (2-wire) ESS

The SP-1 Local (2W) ESS is a stored program controlled switching system, designed for use as a Class 5 local switching office. It is economical in initial installations with as low as 2000 lines depending on traffic, growth rate and features. The nominal maximum capacity of SP-1 ESS offices is 25,000 lines, based on average office traffic.

The system includes Centrex business services, a large system configuration, automatic number identification (ANI), local automatic message accounting (LAMA), and facilities for automatic fault recognition and trouble diagnosis of all major system components.

A special-purpose digital computer controls the SP-1 (2W) ESS. Two central processing units and their associated memory modules ensure reliability objectives of less than two hours downtime over a 40-year lifespan. Both CPUs independently process all calls with the results being compared by matching circuits. One of the CPUs then sets up the network. If a mismatch occurs between the processors, each goes through a prescribed test and the one that passes assumes control, diagnoses the other's trouble and prints out the result via teletypewriter. Duplicated central control also enables uninterrupted service to the customer during major modifications or extensions.

One of the most significant features of the SP-1 (2W) ESS is the ease with which it can be operated and maintained. The system is equipped with a maintenance center which provides a man/machine interface through one or more teletypewriters which can be situated local to, or remote from, the maintenance center. Remote system control via teletypewriter permits unattended operation of the office for extended periods of time. Using the teletypewriter, exchange personnel can change assignments, translation and routing information without any wiring changes; they can trace nuisance calls





SP-1 Local (2-wire) ESS

and implement line lock-out, and converse with the machine for maintenance, operation, and trouble diagnosis. The teletypewriters can also provide traffic data for administration and engineering purposes.

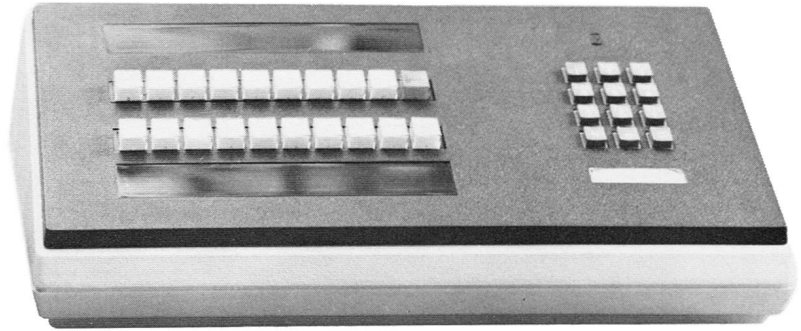
Centrex Services

The SP-1 (2W) ESS can include a wide range of stored-program-controlled business services referred to as Centrex. These services can be provided from switching facilities located either at the central office for Centrex-CO operation, or on the subscribers' premises for Centrex-CU. Employing Centrex-CU operation, the SP-1 (2W) ESS on the subscribers' premises is dedicated to provide business services only, and connects to the message network via interoffice trunks.

In the Centrex-CO operation each subscriber represents a customer group with one or more listed directory numbers, its own attendant facilities, and dedicated outside plant. In addition, unless so restricted by station class of service, each customer group has access to all subscribers and common trunk facilities in the Central Office.

Features such as transfer services, station and tie trunk restrictions and conference services are available to Centrex customers as standard services or as options. Special services, including such items as station hunting and custom calling are available. Special business features are also available to meet hotel/motel, hospital and airport needs.

Conversion of a non-Centrex office to Centrex is easy: the existing stored program package is simply replaced by the Centrex CO program. Additional equipment requirements consist of a data link, attendant console and a control cabinet.



Centrex Console

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Large System Configuration

The large system configuration uses a multiple arrangement of SP-1 (2W) ESS processor pairs with a Processor Information Exchange System (PIES). Functionally, PIES consists of a processor and associated memories which allow information such as the status of lines, trunks, and signaling, to be exchanged. This results in equipment savings in the Central Office, and reduces the amount of inter-office trunking and central processing real-time, especially in offices handling large amounts of tandem traffic.

References

Technical Bulletin TSB-1.01

For further information

contact our nearest sales office

Technical Data

Office Parameters

Office Class 5	Physical Line Network Capacity 37,800 lines	Call Carrying Capacity 45,300 completed calls	Network Traffic Capacity 110,000 CCS ABSBH (approx. 3055 Erlangs)	Directory Numbers 64,000	Line Network Frame Configuration 400 or 600 lines
Impulsing/Outpulsing DP/MF	Station Signaling Rotary Dial or DIGITONE* Key Unit	Minimum Centrex Customer Group Size 20 main stations	Minimum Centrex CO Installation 500 main stations	Maximum Centrex CO Installation Limited by Central Office capacity	Minimum Centrex CU Installation 2000 main stations

Subscriber Loop Resistance (including subset)

Message or Flat Rate Loop Start 2000 Ω at 50 V and 21 mA	Coin Box Ground Start 1500 Ω	Loop Leakage 30,000 Ω (between conductors, and conductors to ground).
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Operating Conditions and Physical Data

Power Requirements		Ambient Service Conditions	Building Data	
Operating voltages	-48 Vdc nominal	Temperature range	Recommended ceiling height	11 ft (3.4 cm)
	+24 Vdc nominal			
	± 130 Vdc nominal	Temperature range (short term)	Maintenance aisle	31 in (788.4)
	120 Vac nominal, single phase			
		Relative humidity	Wiring aisle	23 in (584.2 mm)
			Floor load	150 lb/ft ² (732.4 kg/m ²)

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Information subject to change without notice.

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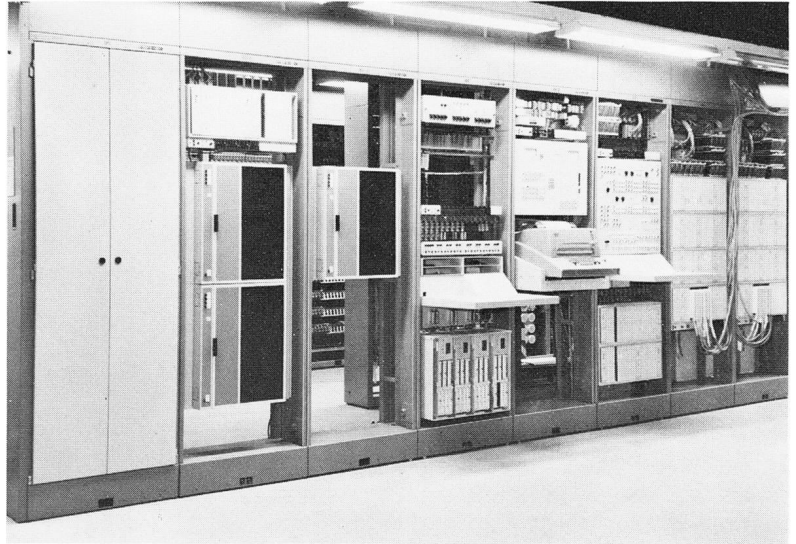
SP-1 Toll (4-wire) ESS

The SP-1 (4W) ESS is a stored program, four-wire switching system designed for toll office operation in the Direct Distance Dialing (DDD) network. The system is suitable as an initial (stand-alone) free-standing toll installation, and/or as a replacement for existing Step-by-Step or Crossbar offices. It serves incoming, outgoing, and toll tandem traffic, and is fully compatible with the DDD network. Local tandem operation is also available either as a separate entity or in conjunction with the toll office operation.

The system includes centralized automatic message accounting (CAMA) with data recorded on magnetic tape, semi-automatic trunk testing, optional automatic trunk testing, matrix scanning, automated service analysis, and many other features that will improve the efficiency of network planning and management.

A special-purpose digital computer controls the SP-1 (4W) ESS. Two central processing units and their associated memory modules ensure reliability objectives of less than two hours downtime over a 40-year lifespan. Both CPUs independently process all calls with the results being compared by matching circuits. One of the CPUs then sets up the network. If a mismatch occurs between the processors, each goes through a prescribed test and the one that passes assumes control, diagnoses the other's trouble and prints out the result via teletypewriter. Duplicated central control also enables uninterrupted subscriber service during extensions.

One of the most significant features of the SP-1 (4W) ESS is ease of maintenance. The highly automated fault detection system includes supervisory, preventive and diagnostic maintenance routines. As an example, if a fault is detected in an essential circuit the faulty module is located, operation



SP-1 Toll (4-wire) ESS

is transferred to a good module, an alarm is initiated, and a teletypewriter prints the nature and location of the trouble — all automatically.

This ease of maintenance is continued in the design of the trunk circuits. The circuitry comprising each SP-1 toll trunk is packaged as a plug-in module. These plug-in facilities not only enable the maintenance technician to replace faulty equipment quickly, but also provide for test bench adjustments or repairs at convenient times.

A semi-automatic trunk test center provides facilities for rapid trunk testing. Loss and noise figures are checked on a transmission test set while supervision and signaling tests are performed using an NE-26B signaling test set. Other facilities available include a voltmeter circuit, a return loss test set and a 6HR impulse noise counter. Similar tests can be performed on a preset automatic basis by the optional automatic trunk test circuit.

SP-1 Local/Toll (2-/4-wire) ESS

The SP-1 (4W) ESS can be combined with an SP-1 (2W) ESS using only one central control complex to provide both local and toll switching. Later, when traffic volume increases, the combined system can be split into separate systems by the addition of another central control complex.

SP-1 Toll (4W) ESS Large System Configuration

The SP-1 toll system design has ample real-time capacity to support in excess of 6000 working incoming trunks at 9 calls per trunk in the busy hour. The large system configuration, consisting of two or more SP-1 (4W) ESS processor pairs, increases the upper limit to more than 15,000 working incoming trunks using similar traffic parameters. Thus the system is suitable for initial applications in toll offices ranging from a few hundred to several thousand working incoming trunks.



Traffic Operator Position System (TOPS)



SP-1 Toll (4-wire) ESS

Traffic Operator Position System (TOPS)

A cordless Traffic Operator Position System (TOPS) can be used in conjunction with the SP-1 (4W) ESS. TOPS makes full use of the flexibility inherent in SP-1 (4W) ESS in order to provide the latest in automated operator techniques, thus effecting substantial savings in operating costs.

References

Technical Bulletin TSB-1.02

For further information

contact our nearest sales office

Technical Data

Office Parameters

Office Class	Capacity	
	Single Unit (with MOS)	Large System Configuration (with MOS)
1,2,3,4	Call-carrying	2 processor pairs 3 processor pairs
	54,000	97,000 135,000
	Network CCS	180,000 250,000
	Trunk network:	
	Incoming trunk appearances	6,400 or 9,600 or 12,800
	Outgoing trunk appearances	6,400 or 9,600 or 12,800

Trunk Types

These trunk types are available with a complete selection of signaling and supervisory options.

Trunk	Pulsing
Intertoll: incoming, outgoing, 2-way	DP and MF for all types
Toll connection:	
CAMA incoming	DP and MF
DDD access incoming	MF
Toll and EAS completing	DP and MF
Tandem: incoming	DP and MF
Switchboard:	
incoming	DP and MF
outgoing	No pulsing
Operator office, 2-way	DP
Miscellaneous:	
CAMA position, test trunks, and many other features	

Operating Conditions and Physical Data

Power Requirements		Ambient Service Conditions		Equipment Specifications		Building Data	
Operating voltages	-48 Vdc nominal	Temperature range	40°F to 100°F (4°C to 38°C)	Frame dimensions:	Height	Recommended ceiling height	11 ft (3.35 m)
	+24 Vdc nominal		35°F to 120°F (short term) (2°C to 49°C)				
	120 Vac nominal, single phase	Relative humidity	20% to 55%	Width (single bay)	28 in (711 mm)	Maintenance aisle	31 in (787.4 mm)
				Width (double bay)	56 in (1.4 m)	Wiring aisle	23 in (584.2 mm)
				Depth	12 in (305 mm)	Floor load	150 lb/ft ² (732.4 kg/m ²)
				Color scheme	Green and ivory		

