

subject: PBX Systems - 800A PBX - Growable Network



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**STANDARD FOR USE IN
THE PACIFIC COMPANY**

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to: Chief Engineers, General Plant Managers, General Traffic Managers
and Marketing Department Mailing List

from: Engineering Director - Customer Telephone Systems

synopsis: Describes a new 800A PBX growable network, utilizing plug-in ferreed switches, to replace the present 8 discrete networks that are now used for this purpose. This will reduce the cost of upgrading the service capabilities of this PBX as well as reducing downtime during these modifications.

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A new growable switching network will be available during the second quarter of 1971 for the 800A PBX featuring "plug-in" ferreed switches which permits growing this network in place from 30 lines up to 80 lines.

The present 800A PBX utilizes 8 separate networks, 4 light traffic and 4 heavy traffic configurations in 30, 44, 60 or 80 line sizes. It requires from 4-8 hours to replace a network on a working system on an out-of-service basis and reuse of a replaced network is limited since there is no convenient way of ordering a new 800A PBX without a network. As a result, many Companies are utilizing 80 line heavy traffic 800A systems exclusively to offset the possibility of a future network changeout. With the new arrangement, it will be practicable to specify 800A systems to meet customer's traffic requirements and grow the system as required without the need of a network changeout. This new arrangement should also relieve the "Class C" reuse problem associated with the present network arrangement.

The Standard and Custom Packages will be utilized as in the present arrangement except the ordering codes will be changed from J58860 PA through PH to J58860 GA through GH respectively to depict the growable network. All new codes will be available with the same lists as provided on the older codes. The existing J58860 PA through PH will be rated Manufacture Discontinued. All present switching networks will be rated M.D. except the 44 line heavy (J58849 AL and BL) and the 80 line heavy (J58849 AP and BR); these will be rated A and M only.

Engineering and installation information is covered in the following BSP's:

<u>BSP</u>	<u>Issue</u>	<u>Description</u>	<u>Date Available</u>
809-850-150	5	Equipment Design	Now
809-850-151	6	Summarizing Spec.	Now
981-705-100	2	General Description	3 Q 71
553-100-100	1	Installation	3-15-71
553-100-210	4	Inst. Connection Tests	3-15-71
553-100-211	2	Custom Packages - Inst., Conn. Tests	3-15-71

A detailed description of the new arrangement including ordering and price information is covered in the attached notes.



Engineering Director

JG:mk

Attachment

800A PBX "Growable" Switching Network

General

A new switching network and network control circuit SD-1E196-01 has been developed to reduce the cost of upgrading the service capabilities of 800A PBX switching machines and to reduce PBX downtime to approximately 1/2 hour vs. the present 4-8 hours during these modifications. The new circuit also eliminates the need for manufacturing and stocking a different network and network control circuit for each of eight discrete service size 800A switching machines and simplifies replacement of faulty network switches during manufacturing testing or subsequent maintenance operations.

The new design was made possible by the availability of the new 275-type pluggable ferreed switches to replace the older 258-type switches which are hard wired into the circuit.

These switches and the new design permit the switching network to be equipped with the minimum number of ferreed switches that are required to serve a given size 800A PBX. When increased requirements dictate, additional switches may be quickly plugged into the prewired receptacles with only a minimum downtime on the PBX.

The new circuit is based on the design of the present 80-line heavy traffic switching network and network control circuit shown on SD-1E010-01. Network growth is provided in discrete steps to furnish the same groups of service features available in 800A switching machines already in use.

Switching Network

The primary switch configuration of the network was changed only by the substitution of pluggable ferreed switches for the older 258-type switches. Wiring is provided in each cabinet for 12 primary switch 4 x 4 sections contained in three 275D ferreed switch units. In the basic arrangement, two of these switches are furnished to provide eight primary switch circuits or 32 primary side terminations in a single 800A PBX cabinet. One additional switch will provide four more primary switch circuits for 16 additional primary side terminations. Similar growth pattern provides 32 or 48 additional primary side terminations in the second cabinet.

The secondary switch configuration of the network was redesigned to facilitate the plug-in feature. It consists of four 12 x 8 ferreed switch circuits in each cabinet. Each of these 12 x 8 secondary switch circuits is composed of three 4 x 8 ferreed switch segments, one from each of three different 275B ferreed switches. Thus, three complete 275B switch units designated, A, B, and C make up two 12 x 8 secondary switch circuits. Each 275B ferreed switch

plugged into a secondary switch position provides an A, B, or C section for two secondary switch circuits 1 and 2, 3 and 4, 5 and 6, or 7 and 8. When not fully equipped with 275B switches, each secondary switch circuit may be reduced in size to 8 x 8 or 8 x 4 by omitting the C or the C and B switches.

The basic arrangement calls for only the A secondary switch segments to be furnished in a single cabinet PBX. This is done by plugging in two 275B switches, one for section A of secondary switch circuits 1 and 2 and one for section A of secondary switch circuits 3 and 4. This basic arrangement will provide four 8 x 4 secondary switch circuits to connect to eight primary switches having 32 primary side terminations. It will also connect to four tertiary switches to provide 32 tertiary side terminations for a 30-line light traffic PBX. As increased service needs require, the B and C sections may be added to connect each secondary switch circuit to additional primary and tertiary switch circuits. Thus either or both the primary side and tertiary side terminations may be expanded in discrete steps from minimum to maximum. Whenever a B or C secondary switch circuit segment is not equipped, an inexpensive universal continuity plug is inserted in its place to complete the series connected control paths of those sections which are furnished.

The tertiary switch circuits were also redesigned. They now consist of eight 4 x 8 tertiary switch segments in each cabinet. One 275B ferreed switch provides two 4 x 8 segments, one for each of secondary switch 1A and 2A, 3A and 4A, etc., in cabinet 1 and 1B and 2B, 3B and 4B, etc., in cabinet 2 when the latter is furnished. In two cabinet systems wiring is provided between cabinets to connect the vertical leads of the B switches in cabinet 2 to the vertical leads of similarly numbered A switches in cabinet 1 to form in effect larger 8 x 8 switches.

The basic arrangement provides four 4 x 8 tertiary switch circuits (two 275B ferreed switches) in one PBX cabinet. These with the A sections of the secondary switch circuits serve 32 tertiary side terminations. As additional service features require tertiary switch circuits (TS5 and TS6) and (TS7 and TS8) may be provided by furnishing one additional 275B ferreed switch for each two additional tertiary switch circuits. In this manner the tertiary side circuit terminations may be expanded from 32 to 64. It should be noted that tertiary switch circuit TS5 to TS8 connect to the B sections of the secondary switches. Therefore, two 275B ferreed switches must also be plugged into the B secondary switch connectors for this expansion. When the second cabinet is not furnished, the multiplying cable connectors of cabinet A are plugged into mating connectors. These are provided in the same cabinet and are wired with continuity paths to complete the control paths for the A cabinet tertiary switches.

The new design also takes advantage of the symmetry between the primary and tertiary side termination circuitry of the network and the similarity between the line side and the trunk side circuits of the 800A PBX. This permits line circuit connections to the primary side terminations of the network to be reversed with trunk circuit connections to the tertiary side terminations. As a result, the same switching network and network control circuit will serve either the 30-line heavy traffic PBX or the 44-line light traffic PBX. Similarly, by

making this reversal of connections to the network and by adding one 275B switch to furnish tertiary switch circuits TS7 and TS8, the 30-line heavy traffic network converts to a 60-line light network. This feature makes it possible for the new network to grow from the small 30-line traffic size to the larger 80-line heavy traffic size. Growth is in discrete steps which furnish all the line size and traffic capabilities of networks that are available in the old design. Block diagrams indicating the switching arrangements for the various line size light and heavy traffic PBXs are shown on SD-1E196-01 H-1 through H-7.

Physically the network will occupy the same cabinet space presently dedicated to the switching network. Connections to the PBX are exactly the same for new and old designs. However, the shelf currently used on the back of the PBX cabinet to facilitate cabling must be removed to permit installation on the new network. The shelf cannot be removed from early vintage cabinets in which it is welded in place, but later cabinets utilize a bolted mounting. Except for this the new network is completely interchangeable with existing networks.

Drawings and SpecificationsA. Circuit Drawings

SD-1E196-01 Issue 1 PBX Systems - No. 800A
Switching Network and Network
Control Circuit (available now)

B. Equipment Drawings1. Manufacturing Codes

<u>Title</u>	<u>Old Code</u>	<u>New Code</u>
Basic System Equipment	J-58849D	J-58849F
Supplementary System Equipment	J-58849E	J-58849G

2. Ordering Codes

<u>Title</u>	<u>Old Code</u>	<u>New Code</u>
Shorting Plug		ED-1E185-50, G-1
4 x 4 Switch		275D Ferreed Switch
4 x 8 Switch		275B Ferreed Switch
30-Line Light Traffic System	J-58860PA	J-58860GA
44-Line Light Traffic System	J-58860PB	J-58860GB
60-Line Light Traffic System	J-58860PC	J-58860GC
80-Line Light Traffic System	J-58860PD	J-58860GD
30-Line Heavy Traffic System	J-58860PE	J-58860GE
44-Line Heavy Traffic System	J-58860PF	J-58860GF
60-Line Heavy Traffic System	J-58860PG	J-58860GG
80-Line Heavy Traffic System	J-58860PH	J-58860GH

All the New codes are available in Lists 100, 200, 300, 101, 201, 301, 102, 202, 302 which are the same lists provided on the M. D. codes. All present switching networks will be rated Manufacture Discontinued except the 44-line heavy (J-58849AL & BL) and the 80-line heavy (J-58849AP & BR) which will be rated A & M only.

Price Information

<u>J Code</u>	<u>List #</u>	<u>Description</u>	<u>Price Each</u>
J58860 GB	100	44 Line - Light - Series 100 Rotary Dial	\$ 7,769.00
	101	44 Line - Light - Series 100 TOUCH-TONE Type C	8,228.00
	102	44 Line - Light - Series 100 TOUCH-TONE Type A	8,534.00
	200	44 Line - Light - Series 200 Rotary Dial	8,551.00
	201	44 Line - Light - Series 200 TOUCH-TONE Type C	9,010.00
	202	44 Line - Light - Series 200 TOUCH-TONE Type A	9,316.00
	300	44 Line - Light - Series 300 Rotary Dial	9,112.00
	301	44 Line - Light - Series 300 TOUCH-TONE Type C	9,588.00
	302	44 Line - Light - Series 300 TOUCH-TONE Type A	9,877.00
J58860 GC	100	60 Line - Light - Series 100 Rotary Dial	7,939.00
	101	60 Line - Light - Series 100 TOUCH-TONE Type C	8,432.00
	102	60 Line - Light - Series 100 TOUCH-TONE Type A	8,721.00
	200	60 Line - Light - Series 200 Rotary Dial	8,738.00
	201	60 Line - Light - Series 200 TOUCH-TONE Type C	9,197.00
	202	60 Line - Light - Series 200 TOUCH-TONE Type A	9,503.00
	300	60 Line - Light - Series 300 Rotary Dial	9,214.00

<u>J Code</u>	<u>List #</u>	<u>Description</u>	<u>Price Each</u>
J58860 GC (Cont'd)	301	60 Line - Light - Series 300 TOUCH-TONE Type C	\$ 9,690.00
	302	60 Line - Light - Series 300 TOUCH-TONE Type A	9,979.00
J58860 GD	100	80 Line - Light - Series 100 Rotary Dial	10,710.00
	101	80 Line - Light - Series 100 TOUCH-TONE Type C	11,169.00
	102	80 Line - Light - Series 100 TOUCH-TONE Type A	11,475.00
	200	80 Line - Light - Series 200 Rotary Dial	11,424.00
	201	80 Line - Light - Series 200 TOUCH-TONE Type C	11,883.00
	202	80 Line - Light - Series 200 TOUCH-TONE Type A	12,189.00
	300	80 Line - Light - Series 300 Rotary Dial	12,002.00
	301	80 Line - Light - Series 300 TOUCH-TONE Type C	12,478.00
	302	80 Line - Light - Series 300 TOUCH-TONE Type A	12,784.00
*J58860 GE	100	30 Line - Heavy - Series 100 Rotary Dial	7,089.00
	101	30 Line - Heavy - Series 100 TOUCH-TONE Type C	7,548.00
	102	30 Line - Heavy - Series 100 TOUCH-TONE Type A	7,871.00
	200	30 Line - Heavy - Series 200 Rotary Dial	7,905.00

* This system available on a non-stock basis only

<u>J Code</u>	<u>List #</u>	<u>Description</u>	<u>Price Each</u>
*J58860 GE (Cont'd)	201	30 Line - Heavy - Series 200 TOUCH-TONE Type C	\$ 8,381.00
	202	30 Line - Heavy - Series 200 TOUCH-TONE Type A	8,687.00
	300	30 Line - Heavy - Series 300 Rotary Dial	8,432.00
	301	30 Line - Heavy - Series 300 TOUCH-TONE Type C	8,925.00
	302	30 Line - Heavy - Series 300 TOUCH-TONE Type A	9,214.00
J58860 GF	100	44 Line - Heavy - Series 100 Rotary Dial	8,058.00
	101	44 Line - Heavy - Series 100 TOUCH-TONE Type C	8,534.00
	102	44 Line - Heavy - Series 100 TOUCH-TONE Type A	8,857.00
	200	44 Line - Heavy - Series 200 Rotary Dial	8,891.00
	201	44 Line - Heavy - Series 200 TOUCH-TONE Type C	9,384.00
	202	44 Line - Heavy - Series 200 TOUCH-TONE Type A	9,673.00
	300	44 Line - Heavy - Series 300 Rotary Dial	9,452.00
	301	44 Line - Heavy - Series 300 TOUCH-TONE Type C	9,911.00
	302	44 Line - Heavy - Series 300 TOUCH-TONE Type A	10,234.00
J58860 GG	100	60 Line - Heavy - Series 100 Rotary Dial	10,200.00
	101	60 Line - Heavy - Series 100 TOUCH-TONE Type C	10,897.00

* This system available on a non-stock basis only

<u>J Code</u>	<u>List #</u>	<u>Description</u>	<u>Price Each</u>
J58860 GG (Cont'd)	102	60 Line - Heavy - Series 100 TOUCH-TONE Type A	\$11,356.00
	200	60 Line - Heavy - Series 200 Rotary Dial	10,498.00
	201	60 Line - Heavy - Series 200 TOUCH-TONE Type C	10,965.00
	202	60 Line - Heavy - Series 200 TOUCH-TONE Type A	11,254.00
	300	60 Line - Heavy - Series 300 Rotary Dial	11,475.00
	301	60 Line - Heavy - Series 300 TOUCH-TONE Type C	11,968.00
	302	60 Line - Heavy - Series 300 TOUCH-TONE Type A	12,257.00
	J58860 GH	100	80 Line - Heavy - Series 100 Rotary Dial
101		80 Line - Heavy - Series 100 TOUCH-TONE Type C	12,121.00
102		80 Line - Heavy - Series 100 TOUCH-TONE Type A	12,631.00
200		80 Line - Heavy - Series 200 Rotary Dial	12,121.00
201		80 Line - Heavy - Series 200 TOUCH-TONE Type C	12,784.00
202		80 Line - Heavy - Series 200 TOUCH-TONE Type A	13,345.00
300		80 Line - Heavy - Series 300 Rotary Dial	12,665.00
301		80 Line - Heavy - Series 300 TOUCH-TONE Type C	13,362.00
302	80 Line - Heavy - Series 300 TOUCH-TONE Type A	13,821.00	

Notes Accompanying E.L. 1020-10

<u>J Code</u>	<u>List #</u>	<u>Description</u>	<u>Price Each</u>
ED-1E185-50		Shorting Plug	\$ 15.00
275D		Ferreed Switch	61.30
275B		Ferreed Switch	61.30