DESCRIPTION OF SIGNALLING SYSTEM AC 13 (SSAC 13)

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1 GENERAL SSAC 13 is an inter-PBX 1VF system used for automatic signalling, with or without dialling, over routes where a suitable d.c. path is not available, between any of the PBXs listed in para 15. The signalling frequency is 2280 Hz.

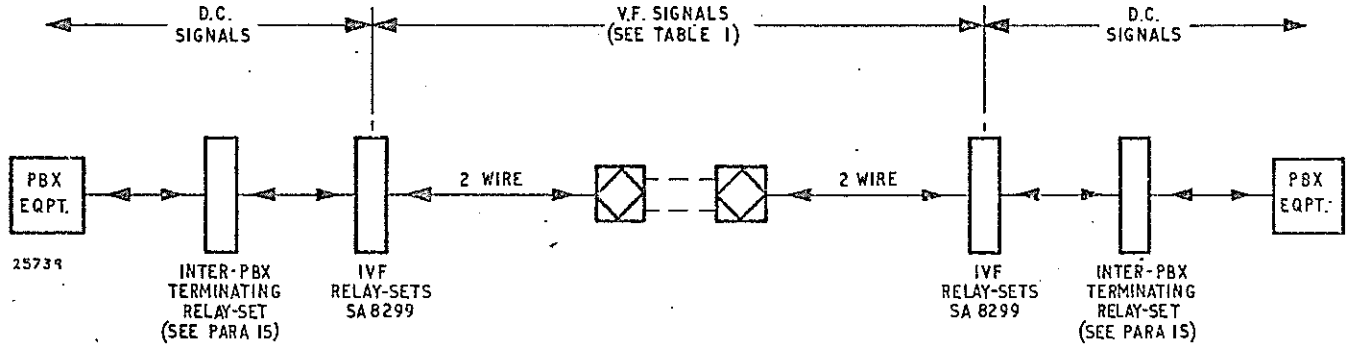

FIG.1 SIGNALLING SYSTEM AC 13 (SS AC 13)

In addition to the 1-VF relay-sets, SA 8299, each PBX requires a particular inter-PBX terminating relay-set. PABXs 1, 2 and 5 also require an auxiliary inter-PBX terminating relay-set. Para 15 shows which relay-sets are used at each PBX.

The use of SSAC 13 at pre-standard PABX 4 and at proprietary PABXs is subject to the manufacturer having available approved designs of inter-PBX terminating relay-sets.

The SSAC 13 equipment is installed in the customer's premises in all cases and is connected to the 2-wire of the inter-PBX circuit. The 4-wire termination may be situated in either PO or customers premises according to the tariff applicable to the circuit (see TI C3 P1050).

2 FACILITIES These are listed in diagram notes SA 8299 and in the diagram notes associated with each terminating relay-set. The principal facilities are:-

2.1 Bothway Working - no special provision is made for unidirectional working.

2.2 Signalling Via Tandem Connexions on a Link Basis (Note - Tandem dialling is normally possible via PABXs 3 and 4 equipment only).

2.3 Sending VF Pulses to Line when Dial Pulses are Received from the Terminating Relay-Set A fixed break pulse corrector is included.

2.4 Forward Operator Recall An originating operator may recall the distant operator(s) on a link by link basis by momentary operation of the ring or recall key. At the distant end the supervisory will flash (Note - If the distant end is a PABX 2 or 3 the call must have been routed via the distant operator).

2.5 Converting the Received VF Pulses to Loop-Disconnect Pulses or Make/Break Earth Pulses A ratio corrector is included.

2.6 Access for tester TRT 150 by means of test-jacks.

2.7 Correct termination of the line.

3 TRUNKING ARRANGEMENTS

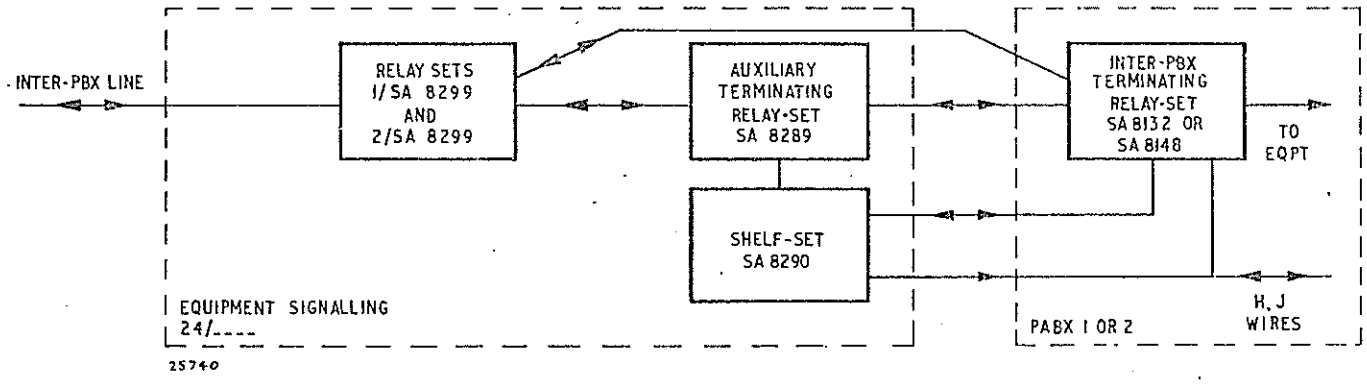

FIG.2 TRUNKING ARRANGEMENTS (SS AC 13) PABX 1 AND 2

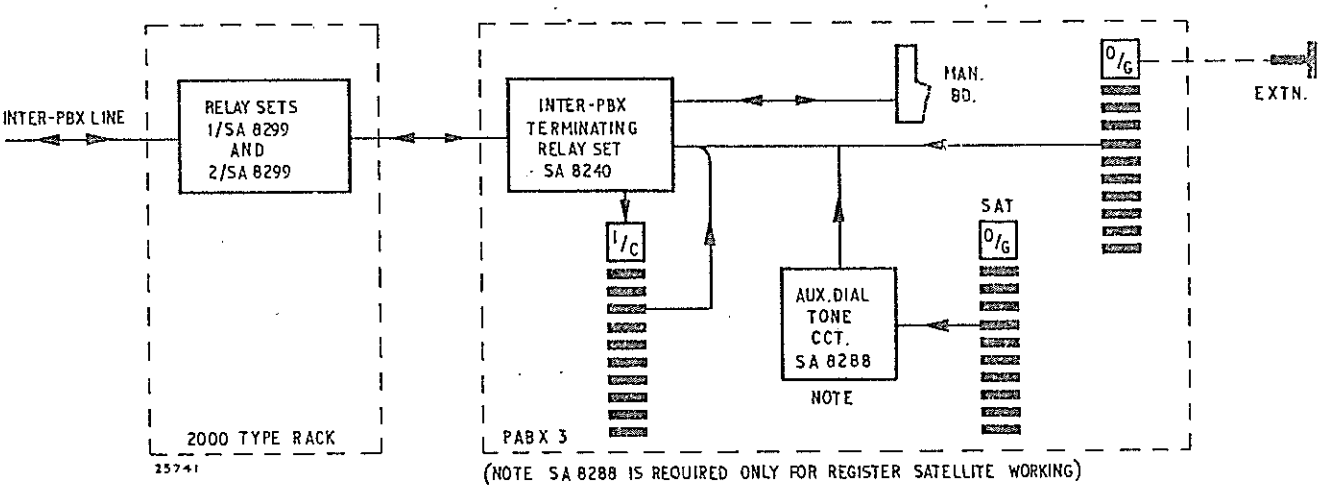

FIG.3 TRUNKING ARRANGEMENTS (SSAC13) PABX 3

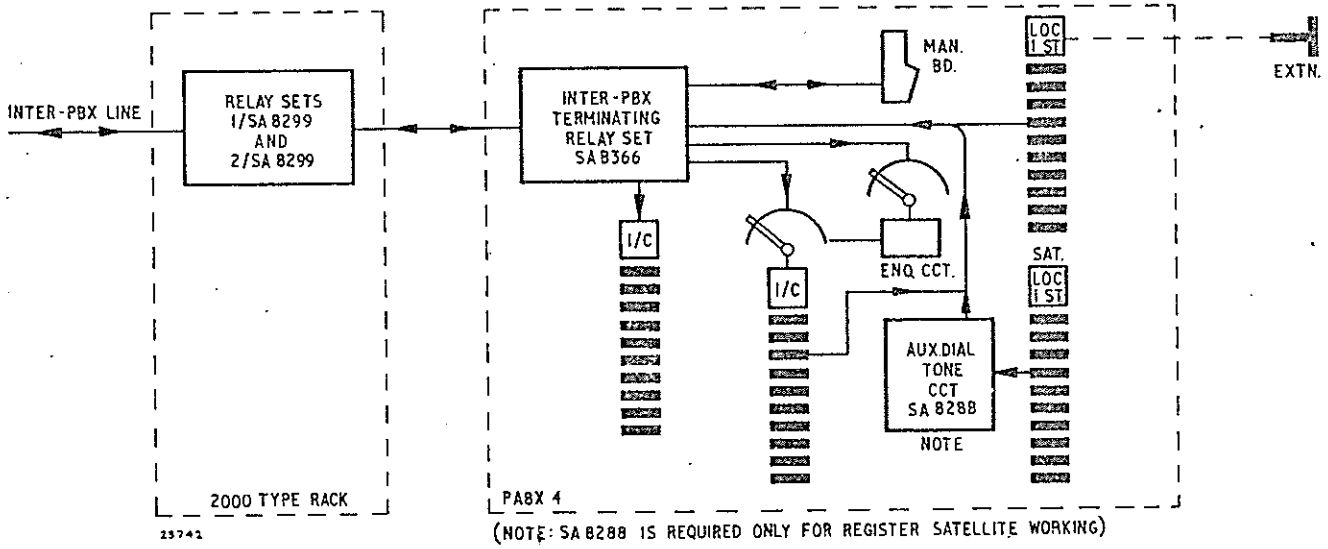

FIG.4 TRUNKING ARRANGEMENTS (SSAC13) PABX4

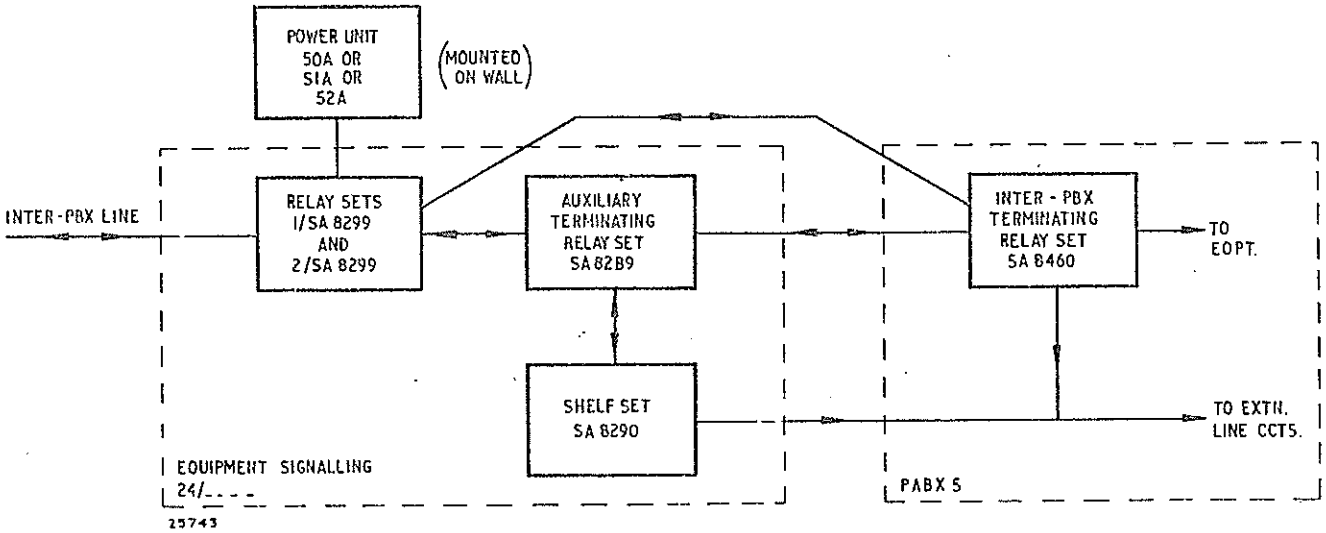

FIG.5 TRUNKING ARRANGEMENTS (5SAC 13) PABX 5

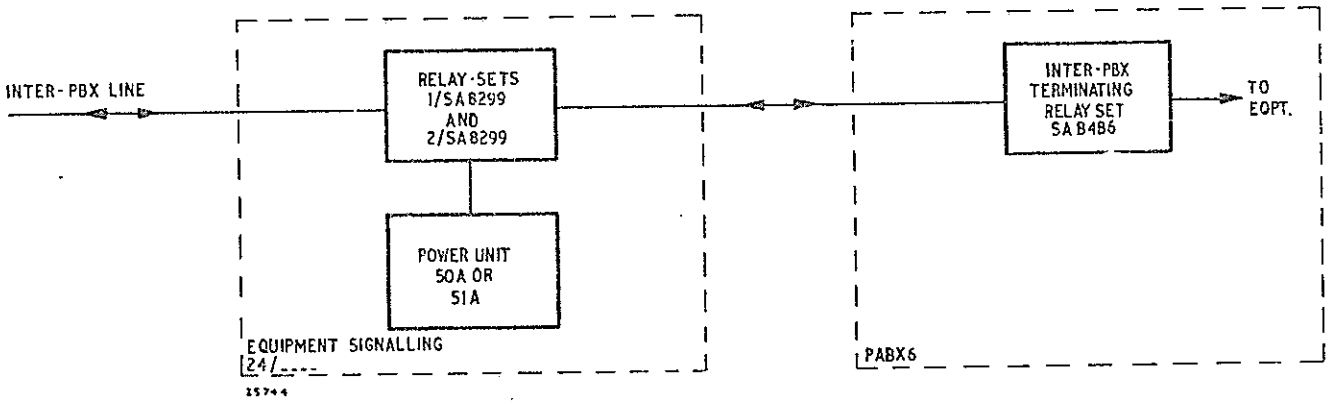

FIG.6 TRUNKING ARRANGEMENTS (5SAC 13) PABX 6

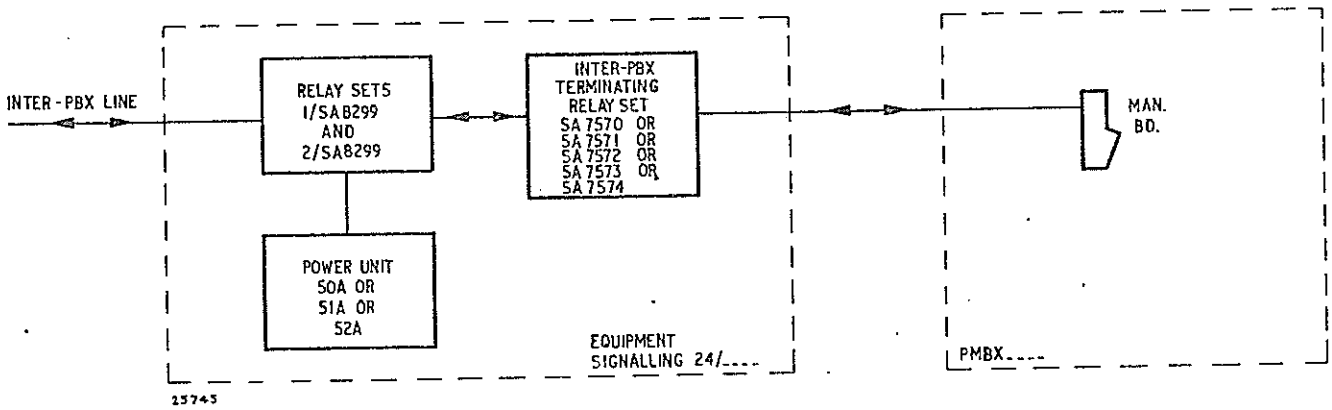

FIG.7 TRUNKING ARRANGEMENTS (5SAC 13) PMBXS (EXCEPT PMBX 4)

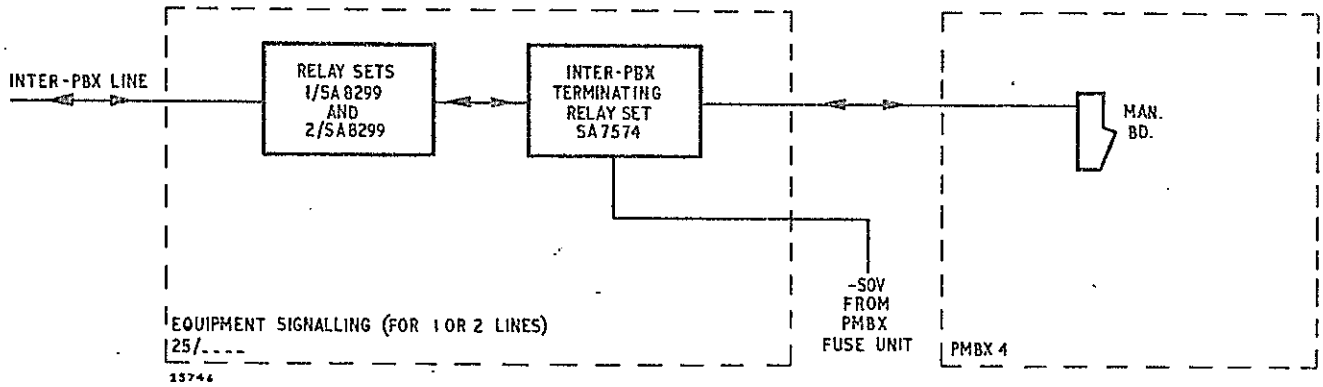

FIG. 8 TRUNKING ARRANGEMENTS (SSAC 13) PMBX 4

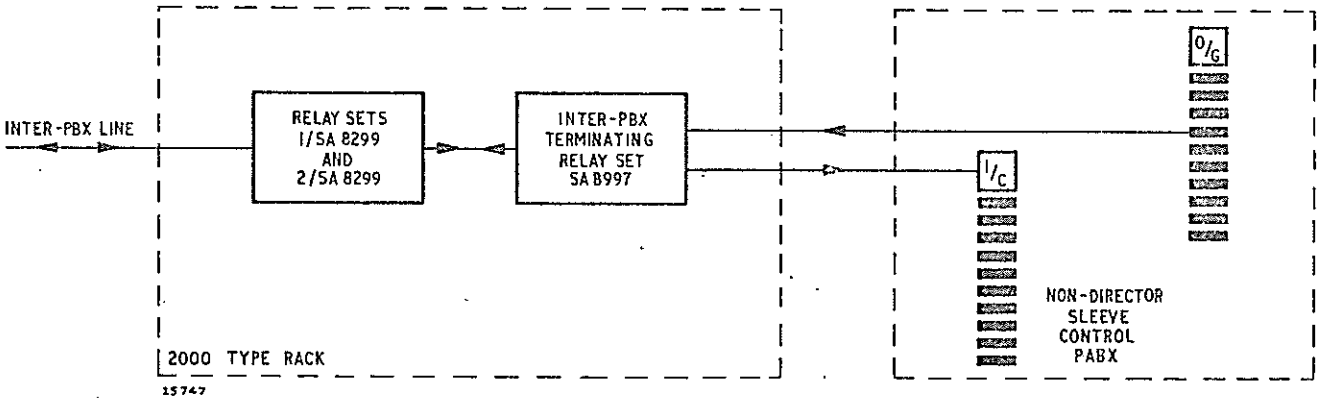

FIG. 9 TRUNKING ARRANGEMENTS (SSAC 13) ND SLEEVE CONTROL PABX

4 LINE LOSS AT 2280 Hz The maximum line loss allowable for SSAC 13 signalling is 17 dB between PBXs. The loss may be required to be less than this for other purposes according to the tariff of the circuits. See TI C3 P1061 (Provision of inter-PBX ccts).

5 1-VF SIGNALLING CIRCUIT SA 8299 This consists of two relay sets, 1/SA 8299 and 2/SA 8299, within which are mounted the 1-VF receiver SA 8297 (see para 9) and the pulse generators SA 8286 and SA 8287 (see para 8).

6 SIGNALLING Signal discrimination is effected by the duration, direction of transmission and sequenee of the 2280 Hz signal - see Table 1.

TABLE 1 SIGNALLING CODE FOR SSAC 13

SIGNAL	DURATION (ms)
Seize	57 ± 4
Pulses	57 ± 4
Answer	265 ± 65
Answer acknowledge	57 ± 4
Period between repeated answer signals	275 ± 75
Clear-back	265 ± 65
Clear-back acknowledge	57 ± 4
Period between repeated clear-back signals	275 ± 75
Clear-forward	1200 minimum
Period between repeated clear-forward signals	300 - 600
Release guard	650 minimum
Forward operator recall	100 - 150
Backward busy	continuous

Supervisory signals are repeated until an acknowledgement is returned. This is to ensure reliable operation of the system should transients or speech inhibit the receiver during the first transmission.

Line splitting occurs during transmission of all signals to prevent feed-through to the next link or to the users.

Circuit arrangements are such that the 1-VF relay-set will work in conjunction with terminating relay-sets designed for other than 50V working.

*7 OSCILLATOR (SA 8295) 119A - 2280 Hz The frequency of the oscillator is 2280 Hz ± 6 Hz. The level of the oscillator may be varied (see note on diagram SA 8295) by varying taps on the output transformer and, for fine adjustment, strapping points on the feedback resistor chain. The normal level of the signal from the 1-VF relay-set is -10 dBm. The method of determining the level required in particular cases is given in TI C3 P5001.

The oscillator is provided on the basis of one per ten circuits or per Equipment Signalling. Automatic changeover to a spare oscillator is not normally provided but an alarm indicates reduction in the supply level.

8 PULSE GENERATORS 6A OR 1A1/SA 8286 AND 6B OR 1A1/SA 8287

8.1 Pulse Generator 6A or 1A1/SA 8286 This is mounted in relay-set 2/SA 8299. It provides an earth output at terminal 2, approximately 965 ms on, 35 ms off, while an earth is applied to terminal 1. This intermittent earth applied to the SL lead desconnects the speech path for 35 ms every second. The resulting mutilation of continuous tone or near end noise allows the clear forward signal to be received in the face of such conditions.

8.2 Pulse Generator 6B or 1A1/SA 8287 This is mounted in relay-set 2/SA 8299. It provides an earth output at terminal 3, approximately 1.3 seconds on, 400 ms off, while an earth is applied to terminal 1. This intermittent earth provides the minimum 1.2 seconds clear forward signal repeated at intervals of 300 ms to 600 ms.

9 VF RECEIVER SA 8297 This consists of a receiver VF 4A (Mk 1) and either a capacitor unit 14A (Mk 1)-(SA 8291) or a filter, frequency 176A (Mk 1) (SA 8294).

The receiver is mounted in relay-set 1/SA 8299. It responds to a frequency of 2280 Hz ± 25 Hz normally down to a level of -23 dBm. If frequencies other than 2280 Hz are present at the input the receiver may be inhibited. (See Spec S 938).

The capacitor unit 14A is normally fitted but, if dial tone may be encountered (see para 10), a Filter, Frequency 176A must be fitted (in place of the capacitor unit). The Filter, Frequency 176A is a high pass filter with an attenuation of 40 dB (minimum) below 800 Hz, thus avoiding interference to the VF receiver from dial tone.

10 DIAL TONE If dial tone and 2280 Hz signal are fed simultaneously to the VF receiver it will be inhibited and the 2280 Hz signal will become ineffective.

10.1 SSAC 13 Terminations At PABXs 1, 2 and 5 the shelf-set SA 8290 is used and no dial tone is connected. At PABXs 3 and 4, and ND PABXs directly connected selectors with DIAL TONE REMOVED MUST BE USED. At PABX 6 no dial tone is connected.

* 10.2 DC Links in Tandem with SSAC 13 Circuits If dial tone is returned from the d.c. link(s) then Filters, Frequency 176A (see para 9) MUST BE FITTED at ALL tandem PABXs through which a call to the d.c. link(s) may be routed. If the dial tone will be returned to the tandem(s) from one direction only (ie the d.c. links occur at only one end of the network) then the filters will be required only in the VF receivers on the sides of the tandems remote from the source of dial tone. If dial tone will be returned to the tandem(s) from either direction then the filters will be required in the VF receivers on both sides of the tandem(s).

When the source of such dial tone is a PABX 3 or 4 or a ND PABX, a dial tone generator SA 8293 (see para 10.3) must be fitted to replace the dial tone supply to the 1st group selector racks concerned. In the case of PABXs 5 and 7 SA 8293 must replace the source of dial tone to the PABX.

* 10.3 Dial Tone Generator SA 8293 The generator consists of an oscillator 120A (Mk 1) and a filter, frequency 177A (Mk 1). The fundamental frequency of the oscillator is in the range 30-44 Hz. Filter, Frequency 177A is a low-pass filter with an attenuation of 75 dB (minimum) above 1000 Hz. It is complementary to Filter, Frequency 176A (see paras 9 and 10.2) and is used to replace sources of dial-tone containing harmonics which would inhibit VF receivers (see para 10.2). It may be shelf-mounted (1/SA 8293) or wall-mounted (2/SA 8293).

*11 CLEAR DOWN IN THE FACE OF SUPERVISORY TONE Clear down in the face of NU tone, wnich would prevent the VF receiver from recognising a clear-forward signal, is effected by splitting the transmission path at the incoming termination for a nominal 35 ms every second until receipt of the clear forward signal. This splitting is perceptible when listening to supervisory tones, especially when SSAC 13 circuits are connected in Tandem. Data or any recorded announcements must not be transmitted until an answer acknowledge signal has been received as mutilation of intelligence may occur.

12 DATA TRANSMISSION Subject to the requirements of para 11, data may be transmitted over circuits using SSAC 13.

13 POWER REQUIREMENTS SSAC 13 requires a 50V (nominal) negative d.c. supply. At PABXs 1, 2 and 3 a figure of 0.05 AH per call and at PABX 4 a figure of 0.06 AH per call should be used for battery calculations. At PABXs 5 and 6 the PABX power unit will cater for the main terminating relay-set, the items mounted on the equipment signalling 24/... being fed from the power unit mounted thereon.

At PMBXs, other than PMBX 4, power arrangements should be in accordance with the relevant N diagrams. At PMBX 4 the power arrangement should be in accordanee with specifications S 1155 and S 1156.

14 OTHER RELEVANT INFORMATION

Maintenance of SSAC 13 see relevant TI

Setting up of SSAC 13 circuits at PO Standard PABX's & PMBX's. See TI C3 P5001.

Provision of inter-PBX circuits see TI C3 P1061

Lining-up instructions see TI A8 J0411

15 DIAGRAMS follows

*15 DIAGRAMS

PBX	DGM NO.	DESCRIPTION
PABX 1	SA 8132	Inter-PBX terminating relay-set
" 2	SA 8148	" " " " "
" 3	SA 8240	" " " " "
" 4	SA 8366	" " " " "
" 5	SA 8460	" " " " "
" 6	SA 8486	" " " " "
ND PABX	SA 8997	" " " " "
PMBX 1A, 1B Swbd AT 3796 and N1070	SA 7570	" " " " "
	SA 7571	" " " " "
PMBX 2, 3	SA 7272	" " " " "
BECB 10	SA 7573	" " " " "
PMBX 4	SA 7574	" " " " "
PABX 1, 2, 5	SA 8289	Aux " " " " "
PABX 3, 4	SA 8288	Aux selr level access and dial-tone cct
PABX 1, 2, 5	SA 8290	Shelf-set
All	SA 8291	Capacitor unit 14A
"	SA 8292	Tone distribution cct 2280 Hz
"	SA 8293	Dial tone generator
"	SA 8294	High pass filter 176A
"	SA 8295	Oscillator, 2280 Hz
"	SA 8296	Alarm unit
"	SA 8297	1-VF receiver
"	SA 8299	1-VF signalling relay-set
"	SA 8286	Pulse generator
"	SA 8287	Pulse generator

TMk2.6

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(Supersedes S Branch Memo 24)