NEW ZEALAND POST OFFICE

MECHANICIANS' TRAINING SCHOOLS

N.Z.P.O. Types 120, 135, 149 P.A.B.X.s: Contents Circuit Summaries.

Part 1, 20 Line System:

Part 2, 35/49 Line Systems: description of circuits which differ from those used in 20 Line System.

NEW ZEALAND POST OFFICE

MECHANICIANS TRAINING SCHOOLS

N.Z.P.O. Types 120, 135, 149 P.A.B.X.s:
amendments to circuit summaries

Page 3 - par. 3.6: delete "When first call is answered, second call proceeds as in Section 3.5".

Page 5:- in rel column of GBW.13160, opposite "J wire via LF-2. Pulse & tone oct start", add E. Delete E lower down column.

Page 7: in Remarks column, par. 6.3.2, line 3, delete "0", thus making it to read "... for marked 7 tab ..."; in line 14, before closing bracket, amend to read "via PS-3, TP or ATP wire)".

Page 8: in Remarks column, par. 6.7.3.2, line 8, after BR add "(TOLL & CALLING PARTY REL only).

Page 9 - par. 6.7.3.4.1: delete all entries except first sentence in remarks column. Then add "Exch caller clears but trunk will not rel because CL is retained by M7. When called extn restores trunk is extended but extn gets RING NO REPLY condition. Trunk clears when extn restores".

Page 11: Remarks column, par. 7.4, delete last sentence.

Page 12 - par. 7.9: in Remarks column delete "circuits normal". In rel column of GBW.13240 delete "LP". In rel column of GBW.13220 delete all entries.

In Remarks column, after "releases", add "Extn receives RING NO REPLY condition. (similar to par. 6.7.3.4.1)".

Page 15 - par. 8.8.3: in Remarks column, line two, after "wires", add LP extinguished. Opposite in the same line under rel column of GBW.13220, add "CR".

Page 17 - par. 9.2: under op column of GBW.13220, delete MH.

Page 18:-in rel column of GBW.13160, opposite "ST via N/SW start earth. EF drives", add E. Delete E lower down column.

Page 23: in Remarks column delete last entry in brackets.

Page 27: in rel column of GBW.13200, at bottom on left of "BT", insert "F".

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MECHANICIANS' TRAINING SCHOOLS

N.Z.P.O. Types, 120, 135, 149 P.A.B.X.s: Contents Circuit Summaries.

Part 1, 20 Line System.

Remarks	GBW.13210		GBW.13260		GBW.13160		GBW.13210	
	rel	op	rel	op	rel	op	rel	op
1. Local call EXTN to EXTN.								
1.1 Extn. loop-1150 ohm batt & CO to HF wire (L/f); line start		LS		PA				
PS held via R2				PB,PS				
PS steps			PS,PA					
PA & PB interact to step PS 2½ steps per sec (E from LS1 earth via PS4)			PB	PA		E		
N dis						A		
LF hunts for calling line				P		B LF,LP1		
Line picked. Tone primary cct closed. LF drive dis.		CO			L.F.	FT		
Extn. loop to A; start chain re-routed; line start dis.	LS					K		
D.T. to caller					E			
Relays operated at dial tone:-		CO		P		A,B,FT,K LP1 glows		
1.2 Extn dials 1st fig(7 or 8)								
1.2.1 Assume 8 dialled - A follows impulse train - CS steps twice						CD&CS		
N locks self; D.T. dis:B&CD hold during impulsing			P		LP1	N		
End of train. CS on step 3					CD	E		
Relays operated awaiting 2nd fig (8 dialled for 1st fig)		CO				A,B,FT,K N,E		
1.2.2 If 1st fig had been a 7, when CD rel - DF via CS-2. CS self interrupts to step 14					CD	E,DF CS		
Relays operated awaiting 2nd fig (7 dialled for 1st fig.)						A,B,FT,K N,E,DF		
1.3 Second fig. dialled - A follows impulse train - CS steps accordingly DF rel if operated.						CD NR		
Ring start				RS	DF			
End of train - CD rel-E rel slowly				PA,VB	CD			
Called line tested before E rel (assume free)PA & PB interact to step PS. IA operates via PS-2. Int ringing to line & ring tone to caller during IA releasals			PA PB	PB,RR IA	E	H		CO
			IA					
Relays operated during ringing PS stepping from PA-PB,IA op & rel. Calling and called extns busied		CO		RS,VB RR		A,B,FT,K N,H,NR		CO
1.4 Called extn answers. Ringing & R.T. dis,ring start dis-ring tone and pulse ccts normal			RS RR,VB			F D		
Relays operated during speech:-		CO				A,B,FT,K N,H,ED,NR		CO

Remarks	GBW.13210		GBW.13260		GBW.13160		GBW.13210	
	rel	op	rel	op	rel	op	rel	op
1.5 Releases 1.5.1 Calling extn clears first P-if called extn does not clear after a suitable period, an alarm is extended to attendant - for details see section 11.1	CO			P	A B FT,K NR	LP1		
Relays operated while awaiting called extn to release				P		N,D,H,F LP1) glows)		CO
Called extn rel LP1 out,CS homes via CS-1 arc Conditions normal			P		D N,H F		CO	
1.5.2 Called extn clears first P - alarm to attendant if caller does not clear after a suitable period				P	D H	LP1 glows	CO	
Relays operated while awaiting calling extn to release		CO		P		A,B,FT,K N,NR,F, LP1) glows)		
Calling extn rel CS homes LP out Conditions normal	CO		P		A B N,K,FT F,NR			
1.6 Called extn busy. Position when testing called line (E dis but has not yet rel) Tone primary cct closed. PA & PB interact to step PS, BT operates via PS-1.H does not op- busy tone to caller via conn cct during BT releasals(0.8 sec on & off)		CO	BT	RS PA PB BT	E	A,B,FT,K N,E,NR		
Relays operated during busy tone PS stepping from PA-PB,BT op&rel Release (caller restores) CS homes Conditions normal	CO	CO	RS	RS	A B N,K,FT NR	A,B,FT,K N, NR		
2. Extn dials wrong first digit 2.1 Position at dialling tone ~~PA & PB stepping PS~~ dial ~~busy~~ tone primary cct closed, ~~BT op & rel via PS-1.~~		CO		P		A,B,FT,K LP 1) glows)		
2.2 Extn dials (9,6,5,4 or 3) DT. dis End of train (CS on step 2,5,6, 7 or 8) Busy tone to caller			P	RS	LP1,CD	CD & CS N NR		
Relays operated after wrong 1st fig. dialled. RS maintaining pulse and tone ccts operated		CO		RS		A,B,FT,K N, NR		
2.3 Release same as in section 1.6								

NO A.M.O.K. IN NEW PLANS 14710 14650 14720

Remarks	GBW. 13210 rel	GBW. 13210 op	GBW. 13260 rel	GBW. 13260 op	GBW. 13160 rel	GBW. 13160 op	GBW. 13270 rel	GBW. 13270 op
3. Extension dials attendant (dial "0")								
3.1 Position at dialling tone.		CO		P		A,B,FT,K		NB,NA
In cct 13270 NA & NB normally remain operated.								
[illegible], dial tone primary closed.				PA-PB		LP1 glows		
3.2 Extn dials "0". CS to contacts 11						CD&CS		
D.T. dis						N		
CS steps to 125 via CS-2			P		LP1,CD	E		
E dis but attendants line tested before						NR		
E rel (assume free) RS				RS		H		KA
maintains pulse & ring tone ccts. Ring tone to caller;				PA,VB	E			LP 11
flicker earth flashing LP11				PB,RR				
on & off from PA-2 (PA & PB			PA	IA				
continue to interact)								
Alarm buzzer if KAA.								
Relays operated while awaiting attendant to answer. RS maintaining pulse, ring & tone ccts.		CO		RS		A,B,FT,K N,NR,H		NB,NA KA,LP11
3.3 Attendant throws KO to answer. Buzzer dis; CS via DM wire								SA
LP11 dis.						CS		S
CS steps to contacts 1					CS		KA	SB
F from attendant's loop via 3						F		CO
& 1 OUT. Pulse, ring & tone ccts normal			RS			D		
Relays operated during speech:		CO				A,B,FT,K N,NR,H,F D		NB,NA SA,SB CO,S
3.4 Release. Attendant restores KO							S,SA	
							SB	
Connecting cct releases as indicated in section 1.5.2					D			
					H			
Attendant's line normal							CO	
3.5 Attendant's line already talking.								
Position when testing attendant's line (E dis but has not yet rel)		CO		RS		A,B,FT,K N,NR,E		NB,NA SA,SB CO,S
Pulse & tone set maintained by RS								
Relays in drawing 13270 op from previous call								
H & KA via OLW wire						H		KA
Flicker earth flashing LP12 on & off.					E			LP12
Relays operated while awaiting attendant to restore LP12 flashing. Ring tone to caller		CO		RS		A,B,FT,K N,NR,H		NB,NA SA,SB,S CO,KA
Attendant restores KO							SA	
LP12 dis; LP11 flashes							S,SB)	LP11
Call proceeds as indicated in section 3.3							LP12)	

3.6 Second call made to attendant before first call is answered.

CS of both conn. ccts on T25. H of second conn cct does not operate, being shunted by first H-7 earth. Busy tone sent back to caller of second call.

Note: This condition will also apply to the third of three simultaneous dial "0" calls, i.e., 1st call talking, 2nd in waiting, third receiving busy tone.

Remarks	GBW.13270		GBW.13260		GBW.13160	
	rel	op	rel	op	rel	op
4. Attendant calls extn.						
4.1 Attendant operates KO Buzzer dis. Earth to line start 1150 OHM batt & CO to OLHF. PA & PB operate pulse & tone ccts (details section 1)		SA SB,LS,S		PA-PB		E A B
LF hunts for attendant's line				P		LF,LP1
Attendant's line picked - LF dis		CO				FT
Tone primary cct closed by P. Earth from line start	LS					K
D.T. to attendant via 3 & 1 OUT					E	
Relays operated at dial tone:-		CO SA,SB		P		A,B,FT,K
		S,NA,NB				LP1 glows
4.2 Attendant dials required number - conn cct functions as described in sections 1.2, 1.3, 1.4 or 1.6						
Relays operated during speech (also CO of called extn)		CO,SA,SB S,NA,NB		✱		A,B,FT,K N,NR,H,F
4.3 Release. Attendant restores KO	SA S,SB					
Release of conn cct proceeds as described in section 1.5.1					A B	
Attendants cct normal	CO		P	✱		

Remarks	GBW.13210		GBW.13260 14710		GBW.13270 14270		GBW.13160 14650		GBW.13220 or 14690	
	rel	op	rel	op	rel	op	rel	op	rel	op
5. Extn calls main exchange (dial "1")										
5.1 Relays operated when extn hears D.T. (for details see section 1) (in exch line cct MF normally remains operated)		CO		P		NA,NB		A,B,FT,K LP1 glows		MF
5.2 Extn dials "1" CS to contact 10								CD & CS N		
End of impulse train			P				LP1 CD			
Earths to pulse start & PS-5. 1150 ohm batt to J wire via LF-2. Pulse & tone cct start.						AS		E F		
PS stepping - ST via PS-5				PA-PB			E			ST
EF hunts for calling extn (marked via J wire)										EF
Marked term picked; EF drive dis.										ET
Extn to exch line cct										H
FT rel from S/C by H-7 (exch line) which retains CO of calling line							FT		E F	LS
Busy chain to next exch line cct closed. Earth to B wire to call exch.					AS		K G, A			B BR,CA
CS homes via CS-1			PA-PB				B		SF,ET	
Conn cct normal							N			
Exchange line connected - earth from A wire operates MH										MH
Exch line looped. AC & MH off exch loop. MH held via MH-1										CL R.G. Tick Tock tone
Extn hears D.T. from main exch, relays operated:-		CO				NA,NB				MF,H,LS,B BR,CA,MH,CL R.G
5.3 Extn dials main exch. number. A operates on releasals of LS. B holds during impulses. Impulses are relayed to line.									LS A	A LS
5.4 During speech relays operated in exch line cct are same as when D.T. was heard										
5.5 Release. Extn restores									LS B CA CL H A G	
Exch loop opened										

Remarks	GBW.13210		GBW.13260		GBW.13270		GBW.13160		GBW.13220	
	rel	op	rel	op	rel	op	rel	op	rel	op
Extn line normal Exch equipment released Exch line cct normal	CO								MH BR	
5.6 All exchange lines busy Position after "1" has been dialled (E has not yet operated) All trunk BRs operated		CO						A,B,FT,K N		
Cct for E now dis. NR operates via CS-6,LF-1				RS				NR		
BD-EB & exch line busy chain to E on last cct. Busy tone to caller who must call again Relays operated:-		CO		RS				A,B,FT,K N,NR		
5.7 Extn barred direct access has local terms E & BD strapped. This ensures operation of IR in same manner as described in section 5.6. Calling extension therefore gets busy-tone.										
							GBW.13240			
6. Incoming call from auto main exch.										
6.1 Incoming ring (NA,NB & MF are normally operated)						NB,NA				AC,MF
Attendant's buzzer operates if KAA. Each line start chain re-route prep. Pulse and tone start.						EC				CR BR
Pulse & tone cct operating (details section 1.1)				PA-PB						
LP of associated line flashing from flicker earth from PA. Relays operated while awaiting attendant to answer:-				PA-PB		NB,NA EC		LP		AC,CR,BR MF
6.2 Attendant answers by operating KDO. Attendant's OUT wires to trunk										SA
SA,SB&S hold in series. Attendants IN wires to TR1 Exch ring tripped								S		CA,SB
Relays operated when attendant answers (LP still flashing				PA-PB		NB,NA EC		S,LP	AC	MH,CL CR,BR,MH SA,SB,CA CL,MF
6.3 Attendant keys required extn (assume 75)										
6.3.1 Attendant depresses key 7								CX,BX		
Key 7 released. CX & BX hold in series with RX								RX ST		
LP dis							LP			
Buzzer cct dis					EC				CR	
Pulse and tone ccts to normal			PA							

Remarks	GBM. 13210		GBM. 13260		GBM. 13270		GBM. 13240		GBM. 13220	
	rel	op	rel	op	rel	op	rel	op	rel	op
Relays operated while awaiting depression of second key:						NB,NA		S,CX,BX RX,ST		BR,MH,SA SB,CA,CL MF
6.3.2 Attendant depresses key 5. Key 5 released. AY & BY hold in series with RY EF drives via D wire & hunts for marked 7- tab on M wire Tab picked. EF drive dis								AY,BY RY CD SD		 EF drives
K does not operate because of slow-op design EF hunts for marked 75 tab on M wire Tab picked. EF drive dis							CD	 CD K		EF drives
M operates on ML wire and holds via Z wire. ML prep. trunk offering if required. (ML drawings 13240 & 13270 is one & same relay) Pulse, tone & ring ccts operated (RS from M-6) Reqd extn tested (assume free) (H&CO from pulse earth via PS-3, TP or ATP wire) Called line busied. Ringing to extn. LP steady light. (K slow to release as well as slow to operate)		CO		RS M.L. Not on Later SY.		ML	ST CD,SD RX,BX,CX RY,BY,AY K	ML LP		M H
Relays operated while awaiting extn to answer. LP steady light. (ML drawings 13240&13270 is one & same relay) (Note if 79 had been keyed CD would have been retained when SD & EF would have remained on tab marked by first fig. (7).		CO		RS		NB,NA ML		S,LP,ML		BR,MH,SA SB,CA,CL H,H,MF
6.4 Called extn answers Ringing dis. from extn. LS to extn loop			RS		ML		ML LP		M ST	ST LS B
Attendant can speak to extn if desired (via IN wires)		CO				NB,NA		S		BR,MH,SA SB,CA,CL
Relays operated:-										H,LS,B,MF
6.5 Attendant restores KDO Relays operated when call connected & Talking:- (NB,NA is normal condition)		CO				NB,NA	S		SB,SA	BR,MH,CA CL,H,LS B,MF

Remarks	GBW.13210		GBW.13260		GBW.13270		GBW.13240		GBW.13220	
	rel	op	rel	op	rel	op	rel	op	rel	op
6.6 Called extn busy Position when testing called extn was:- (ML drawings 23240 & 13270 is one and same relay)				RS		NB,NA ML		S,ML		BR,MH,SA SB,CA,CL M,MF LP
As called extn is busy H does not operate. LP flashes to busy earth interrupted by BT-2 in pulse cct. ~~Attendant does not withdraw KDO~~, called extn line will continue to be tested from TP wire (details section 6.3.2). Call will proceed normally when line is free.										
6.7 Attendant trunk offers. 6.7.1 Position before trunk offering is:- (ML drawings 13240 & 13270 is one and same relay)				RS		NB,NA ML		S,ML		BR,MH,SA SB,CA,CL M,MF,LP flashes
6.7.2 Attendant operates KSS (EF does not op in series with 1650 ohm TO) Attendant can now offer call to busy extn; exch caller cannot overhear; warn tone from pulsing PB in pulse cct. (TO drawings 13240 & 13270 is one and same relay).						TO		TO		
6.7.3 alternatives:- 6.7.3.1 Extn rejects call and caller is rerouted to another extn. Attendant restores KSS Attendant keys second extn & call proceeds as indicated in section 6.3. M & ML will release when ST (GBW.13240 - see section 6.3.1 and will reoperate again later when K operates.					TO		TO			
6.7.3.2 Extn rejects call which is cancelled. Attendant restores KSS (TO drawings 13240&13270 are one and same) Attendant operates KR (ML drawings 13240 & 13270 are one and same) LP out indicates that KR can be released Attendant restores KDO MH will remain operated if exch caller has not released and will hold BR (Toll & Calling Party Rel only) (Assumed that exch caller has released)			RS		TO ML		TO ML S		M LP SB,SA CA CL,MH BR	
6.7.3.3 Extn accepts call and former connections released immediately. When called extn line is free H operates and retains CO. Call proceeds as described from section 6.3.2.										

Remarks	GBW.13210		GBW.13260		GBW.13270		GBW.13240		GPW.13220	
	rel	op	rel	op	rel	op	rel	op	rel	op
6.7.3.4. Extn will accept call when existing connection finished, caller left camped on busy. Attendant restores KSS (TO drawings 13240 & 13270 are one and same) Attendant restores KDO.Attendant dis fron trunk & TR1 MH holds to main exch earth Relays operated awaiting called extn to clear:-				RS	TO ML	NB,NA	TO S ML	LP Flashing	SB,SA CA	BR,MH,CL
(LP flashing to busy earth) 6.7.3.4.1 Exch caller clears before extn free. Exch caller clears but trunk will not rel because CL is retained by H7. When called extn restores trunk is extended but extn gets RING NO REPLY conditions. Trunk clears when extn restores.										M, MF
6.7.3.4.2 Called extn clears. Extn seized & line rung Extn answers Ringing dis from line		CO	RS						M ST	H ST LS
Relays operated during speech:-		CO				NB,NA				B CA BR,MH,CL,CA H,LS,B,MF
6.8 Release. Extn restores - for details see section 5.5									LS	
6.9 Rapid consecutive testing of extensions. Relays operated when exch call received & extn busy:- (attendant still across trunk)								S,ML		BR,MH,SA SB,CA,CL M,MF,LP flashes
6.9.1 Attendant keys 1st fig of 2nd choice extn (assume 8 of 83) Key 8 released, AX, BX & CX hold in series with RX								AX,BX,CX RX ST		

Remarks	GBW. 13240		GBW. 13220	
	rel	op	rel	op
Position in ccts 13240 & 13220 now the same as at conclusion of section 6.3.1 except that different marking relays operated.	ML		M LP	
6.9.2 Attendant depresses key 3. Call proceeds as described in 6.3.2. Calls may also be similarly keyed to consecutive no reply extensions				
6.10 Incoming call cannot be extended immediately, held on dial "44" facility Call answered, attendant across line. Relays operated:- (For details of earlier operations see sections 6.1 & 6.2)		S,LP		CR,BR,MH SA,SB,CA CL,MF
6.10.1 Attendant keys 1st fig.(4) Key 4 released. AX holds in series with RX		AX RX ST		
			CR	
6.10.2 Attendant keys 2nd fig. (4) Key 4 released. AY holds in series with RY EF hunts for marked 40 tab on M wire Tab picked. EF drive dis	LP	AY RY CD SD		 EF drives
K does not operate because of slow-up design EF hunts for marked 44 tab on M wire Tab picked. EF drive dis	CD	 CD K		 EF drives
Marking relays (AX, RX,AY,RY)& CD,K,SD rel. H does not operate as line 44 not wired. LP flashing to busy earth (ring start from M-6) Attendant restores KDO	ST S ML	ML LP	 SB,SA CA	M
Relays left operated while awaiting call to be extended normally:-		LP flashing		BR,MH,CL M,MF

Remarks	GBW. 13270		GBW. 13240		GBW. 13220	
	rel	op	rel	op	rel	op
7. Outgoing calls set up by attendant.						
7.1 Attendant operates KT. LPs of engaged trunks light KT rel			LPs	LPs		
7.2 Attendant operates KDO of free trunk Busy chain to next trunk cct. Earth to B-wire to call main exch Exch line connected (earth back on A wire) AC & MH dis from trunk & exch loop to attendant Relays operated when attendant hears DT:-				S S		SA SB,CA,BR MH CL SA,SB,CA BR,MH,CL MF
7.3 Attendant dials - CR via DON wire, impulses direct to line. EC operates PA (tone & pulse cct) LP flashes from flicker earth. Attendant is connected for speech when exch number answers. Relays left operated while attendant remains across trunk are same as before extending an incoming call (section 6.2)		EC NA,NB EC		LP S,LP		CR SA,SB,CA BR,MH,CL CR,MF
7.4 Attendant may retire from cct without losing call. Attendant restores KDO Position when attendant retires from cct:- LP flashing reminds attendant of uncompleted trunk condition.		NA,NB EC	S	LP	SB,SA CA	BR,MH,CL CR,MF
7.5 Attendant may extend call to an extn. Position before extending is as indicated at conclusion of section 7.3. Extn reqd is keyed-up and trunk extended as described from section 6.3.						
7.6 Attendant can release call from dialling tone (section 7.3) Attendant restores KDO M.H. Released when main X [illegible] Trunk normal			S		SB,SA CA CL,MH BR	
7.7 Attendant can release call after dialling main exch number & before keying extn. With KDO still operated, KR is also operated. KDO then released - cct restores as indicated in section 7.6.					CR	
7.8 Attendant can release call after keying-up extn number - (extn has not answered) Relays operated:- (LP steady light)(ML drawings 13240 & 13270 is one and same relay) With KDO still operated, KR is also operated	ML	NA,NB ML	ML LP	S,LP ML	M	BR,MH,SA SB,CA,CL M,H,MF
KDO released - ccts release as indicated in section 7.6 with the addition that H rel after CL releases.						

Remarks	GBW. 13270		GBW. 13240		GBW. 13220	
	rel	op	rel	op	rel	op
7.9 Trunk caller has been extended to extn but releases before extn answers. (attendant has restored KDO) Relays operated:- (LP steady light) Trunk caller releases. Extn receives RING NO REPLY condition (similar to par. 6.7.3.4.1)		NA, NB		LP		BR, MH, CL H, M, MF
7.10 Normal release - see section 5.5						

14690 14670

Remarks	GBW.13270		GBW.13170		GBW.13220	
	rel	op	rel	op	rel	op
8. Enquiry calls. Extn connected to exchange call. Relays operated:-		NA,NB				BR,MH,CL,CA H,LS,B,MF
8.1 Extn momentarily depresses enquiry call button on telephone thus earthing -ve wire					-	DR
8.1.1 Assume enquiry cct already engaged. CR via NSK wire (ER-3 back) EC operates PA (pulse cct) LP of trunk flashes on attendant's cabinet from flicker earth. Extn releases enquiry call button Attendant operates KDO to answer Position is now the same as when called extn answers with attendant across the connection (section 6.4)	EC	EC			DR CR LP -	CR LP SA SB
8.1.2 Assume enquiry cct is free. ER via ST wire. Exch line looped to hold; MH & CL held for possible transfer conditions; EB cct prep. Extn releases enquiry call button Extn dis from exch caller & connected via TR1 to enquiry cct					DR	ER EB
R7 S/G; ring start wire earthed to operate RS (pulse cct)				A B		
Dial tone to extn. Relays operated:-		NA,NB RS		A,B		BR,MH,CL H,LS,B,CA, ER,EB,MF
8.2 Extn dials 1st fig. (7 or 8)						
8.2.1 Assume 8 dialled - LS releases twice - A (trunk cct) operates twice - A (enquiry cct) releases twice - ES steps to contact 3. CD on 1st releasal. B & CD hold during impulse train. End of train. (dial tone dis when ES stepped off normal contacts) Ringing kept dis from - ve line. H prep for testing Relays operated awaiting 2nd fig when 8 dialled for 1st fig:- ES on contacts 3			A CD	CD A E A,B,E	LS A	A LS BR,MH,CL H,LS,B,CA ER,EB,MF
8.2.2 Assume 7 dialled for 1st fig - ccts function same as described in section 8.2.1 except that on conclusion of impulse train ES is on contact 4 when DF operates via ES-8 instead of relay E:- ES self-interrupts to drive to contact ~~15~~ 14 via ES-1 arc Relays operated awaiting 2nd fig when 7 dialled for 1st fig:- ES on contacts ~~15~~ 14			CD	A DF E A,B,E,DF	A	 BR,MH,CL H,LS,B,CA, ER,EB,MF
8.3 Extn dials 2nd fig - impulses relayed to step ES accordingly DF releases if 7 was dialled for 1st fig			A DF	CD NR	LS	A

Remarks	GBW.13270		GBW.13170		GBW.13220	
	rel	op	rel	op	rel	op
End of train E dis but slow to release. Called extn line tested before E releases (assume free) CO (called extn) and extn busied. ES dis. Ring tone to caller; ringing to called extn			CD E	A H	A	LS
Relays operated during ringing:-				A,B,NR H		BR,MH,CL H,LS,B,CA ER,EB,MF
8.4 Called extn answers. Ring tone & ringing dis; earth off ring start				F D		
Extns talking. Relays operated				A,B,NR H,F,D		BR,MH,CL H,LS,B CA ER,EB,MF
8.5 Assume called extn was busy - H does not operate, relays otherwise are the same as at conclusion of section 8.3. Busy tone is sent to caller.						
8.6 Calling extn reverts to original exchange call.						
8.6.1 Extn momentarily redepresses enquiry call button Z via DR wire and locks independently. Earth to ring start to operate RS (pulse cct) Extn dis from enquiry cct and reconnected to trunk			A	Z	DR ER,EB	DR
8.6.2 Called extension releases Note, if D does not rel, i.e., called extn does not restore immediately, B is rel by S/C from RP pulse via PS-3. B would then rel H-D-Z, F & NR. Earth from ring start. ES homes and enquiry cct is normal			A D Z,B,H F,NR			
8.7 Extn transfers call to enquiry extn Relays operated before transfer commences:-				A,B,NR H,F,D		BR,MH,CL H,LS,B,CA ER,EB,MF
8.7.1 Extn replaces receiver					LS	A
CO of extn rel & extr normal. S/C of TR removed RP wire dis; BT (exch line) does not op. in series with TR (2000 ohms) 1050 ohm batt to J wire (CD rel from S/C by TR-6)			A CD	CD TR	B H,CA	
EF Hunts for marked tab on J arc (marked via EF2 & ES6)						ST
Enquiry extn picked & drive dis						ET
Enquiry extn to exch line cct					ST A	H LS B
				A Z		CA

Remarks	GBW.13270		GBW.13170		GBW.13220	
	rel	op	rel	op	rel	op
			H D TR			
200 ohm holding loop dis from trunk; enquiry extn & main exch sub connected					ET,EB,ER	
			A B			
ES homes via ES1 arc Enquiry cct normal Relays left operated in exch line cct are same as for "1" calls (sections 5.2 & 5.3) and extension of incoming calls (section 6.8 - position before release)			Z,NR,F			BR,MH,CL H,LS,B, CA,MF
8.8 Extn recalls attendant 8.8.1 Extn depresses enquiry call button & releases to engage enquiry cct - for details see sections 8 to 8.1.2 incl. Extn has D.T. from enquiry cct. Relays operated are:-				A,B		BR,MH,CL H,LS,B,CA ER,EB,MF
8.8.2 Extn dials "0" - LS & A (exch cct) follow impulse train - .. (enquiry cct) steps			..	CD	LS	A
ES to contacts 11. CD on 1st releasal, B & CD hold during impulse train End of train (D.T. dis when ES stepped off normal) CR via CR wire. LP of trunk cct flashes on attendant's cabinets from flicker earth EC retains PA (pulse cct)		EC	CD	A	A ER,EB	LS CR
ES homes via E3-1 arc. Relays operated awaiting attendant to answer:-		NA,NB EC	A B			BR,MH,CL H,LS,B,CA
8.8.3 Attendant operates KDO to answer Attendant is connected to extn via IN wires. LP extinguished		S			CR	CR,MF SA SB
8.8.4 Attendant may leave extn connected to trunk or take over trunk call						
8.8.4.1 Attendant clears from call by releasing KDO. Extn & exch caller reconnected	S				SB,SA	
8.8.4.2 Extn restores to allow attendant to take over call CR during slow rel period of B CO of extn rel & extn is normal Attendant may now key trunk caller to another extn. Relays operated:-		NA,NB S,EC			LS B H	CR BR,MH,CL MF,CA,CR SA,SB
(for details of extending call see section 6.3)						
8.9 Extn cannot transfer call before enquiry extn answers Position when enquiry extn is being rung:- (for earlier details see sections 8 - 8.3)		NA,NB		A,B,NR,H		BR,MH,CL MF,CA,H,B LS,ER,EB

Remarks	GBW.13270		GBW.13170		GBW.13220	
	rel	op	rel	op	rel	op
8.9.1 Extn restores before waiting for enquiry extn to answer					LS	A
B (enquiry cct) rel from S/C via A-1			A		—	
COs of extns rel & extns normal (NR slow to rel) EC retains PA (pulse cct))			B		B	
LP of trunk cct flashes on attendant's cabinet from flicker earth)			NR,H		H,CA	CR
Relays operated awaiting attendant to answer:-		EC			EB,ER,A	
		NA,NB				BR,MH,CL
		EC				CR,MF
8.9.2 Attendant operates KDC to answer						SA
Attendant is connected to exch caller via OUT wires		S				SB,CA
Relays operated:-		NA,NB				BR,MH,CL
		S,EC				CA,CR,MF
(position is now same as at conclusion of section 8.8.4.2)						SA,SB,

Remarks	GBW.13270		GBW.13220	
	rel	op	rel	op
9. Night Service.				
9.1 Attendant operates KNS to night switch N3K earth dis from exch line ccts; cct prep. to give busy tone if "0" dialled from enquiry cct; alternative earth dis from night service busy lead; dis CO,PG, LP14 & OLW wire ccts; prep extn bell cct.	NA,NB			MF
9.2 Incoming ring on exch line Exch line start re-route prep; pulse start LP on attendants cabinet will flash to flicker earth EC operating will also either - (i) ring a night service extn number (89) and/or (ii) ring night service bell(s).		EC		AC CR BR
9.2.1 Assume (i) night service extn number connected (tags 82 & 83 strapped drawing 13270) ECR from EC-1. Earth to ring start HT in series with CO (89) Cont. ring to extn 89 via bank strips conn. Relays operated awaiting extn to answer:-		ECR HT NE EC,ECR HT,NE		AC,CR BR,MF,MH
Extn answers AS dis; completes cct for marking J wire on EF Bank EF drives hunting for marked tab Tab picked. EF drive dis CO of 89 retained		F BS		ST ET H
Extn 89 extended to exch line cct	HT NE F BS		ET ST	LS B CA CL
Extn 89 connected to exch caller			AC,CR	
Pulse start cct dis Night service extn cct normal Relays operated during speech:- (same as after extension of incoming calls (section 6.8 - position before release	EC ECR			BR,MH,CL H,LS,B,CA MF

Remarks	GBW.13160		GBW.13270		GBW.13220	
	rel	op	rel	op	rel	op
9.2.2 Assume (ii) night service bell(s) connected. (tags 85-86 strapped & extn bell(s) to tag 83, drawing 13270) Relays operated:- (for details see section 9.2)				EC		AC,CR,BR MH,MF
Extn bell(s) ringing. Answering extn lifts receiver & gets D.T. - relays operated:- (for details see section 1)		A,B,FT,K LP1 glows				
Extn dials "2". A follows impulse train - CS to step 9. D.T. dis; B & CD hold during impulsing		CD N				
End of impulse trains	LP1 CD	E				
R9, 1150 ohm batt to J wire via LF2 ST via N/SW start earth. EF drives EF picks marked J tab. EF dis H retains CO of answering extn FT rel by S/C. Extn to LS.	FT K	G		BS		ST ET H LS B
Extn connected to exch caller CS homes via CS-1 & conn cct normal	G,E,A B N		BS		ST,ET AC,CR	CA CL
Pulse start cct dis			EC			
Relays left operated:- (same as at conclusion of section 9.2.1)						BR,MH,CL H,LS,B,CA MF
9.3 Attempt to transfer exchange call to attendant after night switching						
	GBW.13170					
Relays operated before transfer attempted:-		A,B				BR,MH,CL H,LS,B,CA ER,EB,MF
Extn has D.T. from enquiry cct. (for details see sections 8 to 8.1.2 incl.)						
Extn dials "0" - LS & A (exch cct) follow impulse train - A (enquiry cct) steps ES to contact 11.	A	CD			LS	A
CD on 1st releasal. B & CD hold during impulse train.						
End of impulse train (D.T. dis when ES stepped off normal)	CD	A			A	LS
Busy tone to calling extn. (CR of exch line cct does not operate because NA (misc cct) is released) (Ring start from NR-4)		NR				
If ext hang up call comes back the same as beginning.	GBW.13170		GBW.13270		GBW.13220	
	rel	op	rel	op	rel	op
Relays operated:-		A,B,NR				BR,MH,CL, H,LS,B,CA ER,EB,MF
Extn reverts to exch caller by momentarily depressing enquiry call button		Z			DR ER,EB	DR
	A B					
ES drives to normal via ES-1 arc. Ring start wire dis. Enquiry cct normal. Trunk cct is now same as before transfer to attendant was attempted.	Z,NR					

Remarks	GBW.13220 rel	GBW.13220 op
10. Mains fail.		
Normally MF relays in exch line ccts are retained in an operated condition. Selected extn lines are prewired to trunks so that while MFs are operated they function as normal extns but in the event of a mains failure the releasals of MFs route the extns directly to relative trunks via LBs so that they then function as individual telephone subscribers in a P.B.X. group. Mains fail - AC dis from trunk; extn direct to line via LB; MH 9000 ohm winding dis.	MF	
Calling IN or OUT. MF dis until call finished		LB
Call finished	LB	
Mains normal. Connections restored to normal		MF
11. Alarms.		
11.1 P.G. Alarm condition originates from conn cct when extn does not restore from dial tone (section 1) or release conn cct after use (sections 1.5.1 & 1.5.2) Under these circumstances P operates in pulse cct while LP1 (conn cct) lights.	GBW.13270 rel	GBW.13270 op
P (pulse cct). TH operates in approx. 30 secs.		TH
TH dis; PG locked; LP 13 green light on attendants cabinet glows (drawing GBW.13240) No audible alarm. Condition remains until clearance is made from conn cct.		PG
11.2 Auto. Alarm condition is signalled by the glowing of red light on attendant's cabinet and if the audible alarm cut-off key (KCO) is not operated an audible signal is also given. Auto alarms originate from fuse operations, ringing failures, and for mains failure alarms (if reqd) Reference should also be made to drawing 13280 sheet 1, Fig. 1A		
11.2.1 Fuse alarm. Fuse operates LP14 (red light) Buzzer also operates, KCO-AO-buzzer dis from fault condition. Faulty fuse removed - AL rel - AO rel - buzzer normally reconnected.		AL LP14
	AL LP14	
	GBW.13250 rel	GBW.13250 op
11.2.2 Ring fail alarm Position during ringing:-		RS,VB RR
(pulse cct also operating - see section 1.3) Ringing fails or is insufficient to maintain RR	RR	
R4 placed in series with TR1 for protective purposes.		RF
Rack alarm (if wired). Audible alarm controlled as indicated in section 11.2.1		LP1 AL LP14
When ringing again normal		RR
	RF LP1	
	AL LP14	
11.2.3 Mains fail. See drawing 13280 sheet 1, Fig. 1A. Mains failure connects earth to battery connected winding of AL. Alarm functions as described in section 11.2.1		
12. Attendant's cabinet - remaining features not already covered.	GBW.13220 rel	GBW.13220 op
12.1 Splitting keys (KSS & KSE) When an attendant enters an exch line cct by throwing KDO, attendant, extn, & exch caller are all connected - reference drawings GBW.13220 & 13240. Relays operated are:-		BR,MH,SA SB,CA,CL H,LS,B,MF

Remarks	GBW.13240		GBW.13220	
	rel	op	rel	op
KSS (speak extn) - attendant connected to extn only KSE (speak exch) - attendant connected to exch caller only				
12.2 Flash & cancel-key (KF) When attendant is across exch line outward calls can be cancelled (auto) or if trunk connected to a CB exch cancelled or flashed to exch operator. Position when attendant across cct:- (for earlier details see sections 7 to 7.3 incl)		S,LP		SA,SB,CA BR,MH,CL CR,MF
Pulse cct operating from CR-EC-PA Attendant operates KF - exch loop opened at KF1. CA rel from S/C on FK wire KF restored - exch loop reconnected NOTE During release of CA - CA5 makes contact before CA3 breaks thus retaining MH to exch on the A wire prior to CA3 disconnecting the original MH cct. Exch will be flashed for each operation of KF If exch cct is released:-			CA MH BR,CL CR	 CA
S (13240); SA & SB (13220) will rel if KDO restored If KDO left operated & KF restored, trunk will be re-engaged and dial tone received as described in section 7.2.	LP			

	GBW.13270	
	rel	op
12.3 KCO (alarm cut-off key) KCO - buzzer dis from fault alarm circuit		AO

Part 2, 35/49 line systems: description of circuits which differ from those used in 20-line systems, i.e., connecting and enquiry circuits.

Remarks	GBW.13210		GBW.13260		GBW.13190		GBW.13210	
	rel	op	rel	op	rel	op	rel	op
1. Local call EXTN to EXTN								
1.1 Extn loop - 1150 batt & CO to HF wire (LF), line start		LS						
PS held via R2				PA				
PS steps			PS,PA	PB,PS				
PA & PB interact to step PS			PB					
2½ steps per sec (E from LS1 earth via PS4)				PA		E		
LF drives and hunts for calling line						A		
Calling line picked; LF dis		CO				B		
Dial tone to A relay; start	LS					FT		
chain rerouted; line start dis						K		
Dial tone to extn. Relays operated:-		CO		P P	E	LP1 A,B,FT,K		
1.2 Extn dials 1st fig (5,6,7 or 8 for 35 lines; 4,5,6,7 or 8 for 49 lines								
A follows impulse train - VM to reqd level - LP1 & P dis when N, D.T. dis when N. B & CD hold. NPA						CD		
End of impulse train			P		CD,LP1			
Tone coil dis						E		
Relays operated awaiting 2nd fig:-		CO				A,B,FT,K E		
1.3 Extn dials 2nd fig - A						CD		
impulses - RM steps to called line. NR - ring start wire earthed				RS	CD	D		
End of impulse train, E dis but slow to rel - extn								
tested (assume free) Called extn busied						H		CO
Ring tone to caller, ringing to called extn					E			
Relays operated during ringing:-		CO		RS		A,B,FT,K D,H		CO
1.4 Called extn answers						F		
Ringing & ring tone dis; D			RS					
retained to called extn loop								
Relays operated while talking:-		CO				A,B,FT,K D,H,F		CO
1.5 Assume called extn was busy								
Relays operated while testing:-		CO				A,B,FT,K D,E		CO
(E dis but not yet rel)					E			
H does not op as called extn busy								
Busy tone to caller. Relays operated		CO		RS		A,B,FT,K D		
1.7 Release from talking								
1.7.1 Calling extn clears first						A		
	CO					B		
					FT,K			
P - alarm to attendant if called extn does not clear after a suitable period				P		LP1		
Called extn clears						D		
RM homes selector						H		
						F		
Connecting cct normal			P		LP1			

Remarks	GBW.13210		GBW.13260		GBW.13190		GBW.13210	
	rel	op	rel	op	rel	op	rel	op
1.7.2 Called extn clears first P-alarm to attendant if calling extn does not clear after a suitable period. Called extn released				P	D H	LP1		CO
Calling extn clears					A B			
RM homes selector	CO				K,F,FT			
Connecting cct normal			P		LP1			
2. Extn dials wrong first digit								
2.1 Position at dialling tone:- ~~PA & PB stepping PS~~ dial-~~tone~~ tone primary cct closed, ~~BT op & rel via PB 4~~		CO		P		A,B,FT,K LP1		
2.2 Extn dials (3,4, or 9, 35-line; 3 or 9, 49-line) VM to reqd level NPB; D.T. dis						CD		
End of impulse train			P		LP1,CD			
RM steps to 1st bank contacts via NPB						E		
D via G wire to earth on non working level contact						D		
RM dis; busy tone to caller (RS via NR1)				RS	E			
Relays operated after wrong 1st fig. dialled:-		CO		RS		A,B,FT,K		
(RS maintains pulse cct)						D		
2.3 Release - caller clears					A			
RM homes selector					B			
RS rel when NR normal	CO		RS		D,K,FT			
							GBW.13270	
3. Extn dial attendant (dial "0")								
3.1 Position at dialling tone:- ~~PA & PB stepping PS~~, dial tone primary closed		CO		P		A,B,FT,K LP1		NA,NB
3.2 Extn dials "0" VM to 0 level; D.T. dis						CD		
NPA, NPB								
End of impulse train			P		LP1,CD			
RM steps to 1st bank contact via NPB						E		
D via G wire; RS via NR-1				RS		D		
E dis but slow to rel - attendant's line tested (assume free) H via NPA						H		KA
Ring tone to caller. LP11 flashes from flicker earth					E			LP11
Relays operated awaiting attendant to answer:-		CO		RS		A,B,FT,K		NA,NB KA
LP11 flashing; alarm buzzer if KAA						D,H		LP11
3.3 Attendant answers (KO) RM via DM wire. RM dis when KA rel selector has stepped to 2nd contacts							KA LP11	SA S SB
(H holds on local cct) Attendant's +, -, & H OL wires to conn cct ring tone & ringing dis								CO
Talking. Relays operated:-		CO	RS			F D A,B,FT,K		NA,NB SA,SB
						D,H,F		CO,S

Remarks	GBW.13210		GBW.13260		GBW.13190		GBW.13270	
	rel	op	rel	op	rel	op	rel	op
3.4 Release. Attendant restores KO							S,SA SB	
Conn cct releases as indicated in section 1.7.2					D H			
Attendant's line normal							CO	
3.5 Attendant's line already talking								
Position when testing attendant's line (E dis but not yet rel) Selr on 1st contacts lev 0. Relays in drawing 13270 op from previous call H & KA via OLW wire; 09 line busied		CO		RS		A,B,FT,K D,E H		NA,NB SA,SB CO, S KA
LP12 flashes from flicker earth					E			LP12
Relays operated while awaiting attendant to restore. LP12 flashing. Ring tone to caller		CO		RS		A,B,FT,K D,H		NA,NB SA,SB, CO,S KA
3.5.1 If a third call is attempted while call 1 is talking & call 2 is waiting, caller 3 will receive busy tone since H in call 3 conn cct will not operate.								
3.5.2 Attendant restores KO							S,SA SB	
LP11 flashes to flicker earth								LP11
Attendant operates KO to answer call 2. RM steps sel to 08 term Attendants +,-,H OL wires to conn cct. LP11 dis; Ring tone & ringing dis						F	KA	SA S SB
Talking, relays operated:-		CO		RS		A,B,FT,K D,H,F		NA,NB SA,SB S,CO

Remarks	GBW.13210		GBW.13260		GBW.13270		GBW.13190		GBW.13220	
	rel	op	rel	op	rel	op	rel	op	rel	op
4 Extension calls main exchange (dial "1"). 4.1 Relays operated when extn hears D.T. (for details see section 1)		CO		P		NA,NB		A,B,FT,K LP1 glows		
4.2 Extn dials "1". VF to reqd level. NPB; D.T. dis								CD		
End of impulse train.			P				LP1,CD			
RM steps selector to 19 tab				RS				E		
E rel when NR							E			
1,50 ohm batt to J wire via LF3/LF4 wiper						AS		G		
PS (pulse cct) stepping - ST via PS-5										ST
EF hunts for calling extn (marked via J wire)										EF
Marked term picked; EF drive dis										ET
Extn to exch line cct										H
FT rel from S/C by H-7 (exch line); CO calling line retained							FT			LS
							K			B
Busy chain to next line cct closed. Main exch called					AS		G,A			BR,CA
RM homes selector. Conn cct normal							B		ST,ET	
			RS							
Exch line connected - earth from A wire operates MH										MH
Exch line looped. AC & MH dis from exch loop. MH held via MH-1										CL
Extn hears D.T. from main exch, relays operated:-		CO				NA,NB				BR,MH,LS
(For details of dialling speech & release see Part A sections 5.3 - 5.5 incl)										CA,H,B, CL,MF
4.3 All exchange lines busy										
Position after "1" has been dialled (E has not yet rel) RM steps selr to tab 19		CO		RS		NA,NB		A,B,FT,K E		
D operates via G wiper, LF1 & EB wire as all BRs operated in exch line ccts							E	D		
Caller hears busy tone. Relays operated:-		CD		RS				A,B,FT,K		
Extn must dial again								D		
4.4 Extn barred direct access has local terms E & BD strapped. This ensures operation of D in same manner as described in section 4.3. Calling extn therefore hears busy tone.										

Remarks.	GBW.13210		GBW.13260		GBW.13270		GBW.13190		GBW.13220	
	rel	op	rel	op	rel	op	rel	op	rel	op
5. Night service (dial "2")										
5.1 Relays operated on incoming call:- (for details see Part 1, Section 9.2) (extn bell(s) ringing)				PA		EC				AC,BR,CR MH,MF
5.2 Answering extn lifts receiver & gets D.T. Relays operated (for details see section 1)		CO						A,B,FT,K LP1 glows		
5.3 Extn dials "2". M to reqd level. NPB; D.T. dis								CD		
End of impulse train							LP1,CD			
RM steps selector to 2nd tab								E		
E rel when NR							E			
R10, 1150 ohm batt to J wire						BS		G		
ST via N/SW start earth. EF drives										ST
EF picks marked J tab. EF dis										ET
H retains CO of answering extn										H
FT rel from S/C. Extr to LS							FT			LS
							K			B
					BS		G,A			CA
RM homes selector. Com cct normal							B		ET,ST AC,CR	CL
					EC					
Pulse cct normal			PA							
Extn connected to exch caller. Relays operated:-		CO								BR,MH,CL H,LS,B,CA MF
6. Enquiry calls.							GBW.13200 rel	GBW.13200 op		
Extn connected to exchange call. Relays operated:-						NA,NB				BR,MH,CL H,LS,B,CA MF
6.1 Extn momentarily depresses enquiry call button on telephone thus earthing - ve wire										DR
6.1.1 Assume enquiry cct already engaged. CR via NSK wire EC operates PA (pulse cct) LP of trunk flashes on attendant's cabinet from flicker earth. Extn releases enquiry call button						EC			DR	CR LP

Remarks.	GBW.13270		GBW.13200		GBW.13220	
	rel	op	rel	op	rel	op
Attendant operates KDO to answer						SA
Position now is the same as when called extn answers with attendant across the connection (see part 1, section 6.4)	EC				CR LP	SB
6.1.2 Assume enquiry cct is free. ER via ST wire. Exch line looped to hold; MH & CL held for possible transfer conditions; EB cct prep						ER
Extn releases enquiry button					DR	
Extn dis from exch caller & connected via TR1 to enquiry cct						EB
RM (pulse cct) D.T. to calling extn				A B		
Relays operated when extn hears D.T.		NA,NB RS		A,B		BR,MH,CL H,LS,B,CA ER,EB,MF
6.2 Extn dials 1st fig. - on each break of dial LS rel - A op (trunk) - A rel (enquiry) - VM is stepped to reqd level - D.T. dis			A		LS	A
Batt S/C removed from VM				CD		
End of impulse train			CD	A E	A	LS
Relays operated awaiting 2nd fig.:-				A,B,E		BR,MH,CL H,LS,B,CA ER,EB,MF
6.3 Extn dials 2nd fig. - impulsing same as in section 6.2. RM to reqd line			A		LS	A
				CD BT		
End of impulse train] dis but not yet rel. Called extn line tested before E releases (assume free). CO (called extn) & extn busied			CD	A H	A	LS
Ring tone to caller; ringing to enquiry extn			E			
Relays operated while awaiting enquiry extn to answer:-				A,B,BT,H		BR,MH,CL H,LS,B,CA ER,EB,MF
6.4 Called extn answers. Ring tone & ringing dis; earth off ring start				F		
				D		
Extns talking. Relays operated:-				A,B,BT,H F,D		BR,MH,CL H,LS,B,CA ER,EB,MF
6.5 Assume called extn was busy - H does not operate, otherwise relays are the same as at conclusion of section 6.3. Busy tone is sent to caller.						
6.6 Calling extn reverts to original exch call						

Remarks.	GBW.13270		GBW.13200		GBW.13220	
	rel	op	rel	op	rel	op
6.6.1 Extn momentarily depresses enquiry call button Z via DR wire & locks independently RS (pulse cct) Extn dis from enquiry cct and reconnected to trunk			A	Z	DR ER,EB	DR
6.6.2 Called extn releases RM homes selector			D Z,B,H BT F			
Enquiry cct normal						
Note, if D does not rel, i.e. called extn does not restore immediately, B is rel from S/C from R/ pulse via PS-3. B would then rel enquiry cct similar to description in section 6.6.2. D rel when H rel.						
6.7 Extn transfers call to enquiry extn Relays operated before transfer commences:-				A,B,BT,H F,D		BR,MH,CL H,LS,B,CA ER,EB,MF
6.7.1 Extn replaces receiver					LS	A
CO of extn rel & extn normal. S/C of TR removed			A	CD	B H,CA	
RP wire dis; BF (exch line) does not op in series with TR (2000 ohms) 1050 ohm batt to J wire				TR		
CD rel from S/C by TR			CD			
EF hunts for marked tab on J wire						ST
Enquiry extn picked & drive dis						ET
Enquiry extn to exch line cct						H
					ST	LS
					A	B
				A		CA
				Z		
			H			
			D			
TR releases before Z which is slow to rel: this feature releases ER & EB			Z,TR		ET,EB,ER	
			A			
RM homes selector			B			
Enquiry cct normal			BT			
Relays left operated in exch line cct are same as for "1" calls (section 4) & extension of incoming calls (Part 1, section 6.8 - position before release)						BR,MH,CL H,LS,B,CA MF

Remarks	GBW.13270		GBW.13200		GBW.13220	
	rel	op	rel	op	rel	op
6.8 Extn recalls attendant						
6.8.1 Extn depresses enquiry call button and releases to engage enquiry cct - for details see section 6 to 6.1.2 incl Extn hears D.T. from enquiry cct. Relays operated are:-		RS		A,B		BR,MH,CL H,LS,B,CA ER,EB,MF
6.8.2 Extn dials "0" - LS & A (exch cct) follow impulse train - A (enquiry cct) steps VM to "0" level. CD on 1st releasal. NPA; D.T. dis End of impulse train CR via CR wire. IP of trunk cct flashes on attendant's cabinet from flicker earth EC retains PA (pulse cct) RM homes selector & enquiry cct is normal Relays operated awaiting attendant to answer		EC NA,NB EC	A CD CD A B	CD A	LS A EB,ER	A LS CR BR,MH,CL H,LS,B,CA CR,MF
6.8.3 Attendant operates KDO to answer Attendant is connected to extn via IN wires 6.8.4 Attendant may leave extn connected to trunk or take over trunk call		S				SA SB
6.8.4.1 Attendant clears from call by releasing KDO. Extn & exch caller STILL connected.	S				SB,SA	
6.8.4.2 Extn restores to allow attendant to take over call CR during slow rel period of B CO of extn rel & extn is normal attendant may now key trunk caller to another extn. Relays operated:- (for details of extending call see Part 1, section 6.3)		NA,NB S,EC			LS B H	CR BR,ML,CL,MF CA,CR,SA,SB
6.9 Extn cannot transfer call before enquiry extn answers Position when enquiry extn is being rung (for earlier details see sections 6 - 6.3 incl)		NA,NB		A,B,BT,H		BR,MH,CL H,LS,B,CA ER,EB,MF
6.9.1 Extn restores before waiting for enquiry extn to answer CO of extn rel & extn normal, B rel from S/C at TR6 CR slow to rel to allow operation of CR. EC - PA (pulse cct) CO of enquiry extn rel & extn normal. LP of trunk cct flashes from flicker earth. RM homes selector - enquiry cct normal		 EC	A B H,BT		LS B H,CA ER,EB A	A CR

Remarks.	GBW.13270		GBW.13200		GBW.13220	
	rel	op	rel	op	rel	op
Relays operated awaiting attendant to answer:-		NA,NB EC				BR,MH,CL CR,MF
6.9.2 Attendant operates KDO to answer		S NA,NB S,EC				SA SB,CA BR,MH,CL CR,CA,SA SB,MF
6.10 Attempt to transfer exchange call to attendant after night switching						
Relays operated before transfer attempted:- Extn hears D.T. from enquiry cct (for details see sections 6 to 6.1.2 incl) (NA & NB rel when attendant night switches)		RS		A,B .. .		BR,MH,CL H,LS,B,CA ER,EB,MF
Extn dials "0" - LS & A (exch cct) follow impulse train - A (enquiry cct) steps VM to "0" level. CD on 1st releasal. NPA; D.T. dis			A	CD	LS	A
End of impulse train			CD	A,BT	A	LS
Busy tone to extn, relays operated:-		RS		A,B,BT		BR,MH,CL H,LS,B,CA ER,EB,MF
Extn reverts to exchange caller by momentarily depressing enquiry call button				Z	DR ER,EB	DR
RM homes selector			A			
Enquiry cct normal	RS		B			
Extn reconnected to exchange caller. Relays operated:-			BT			BR,MH,CL H,LS,B,CA, MF
7. Release alarm.						
Release earth (drawings GBW.13190, 13200) is connected via HC coil - see drawing GBW.13300, sheet 1, fig. 2. If a selector is held on release with RM, HC heats and when operated closes a circuit for AL (drawing GBW.13270) which lights the auto alarm lamp and operates the audible alarm. (For further auto alarm details see Part 1, section 11.2)						