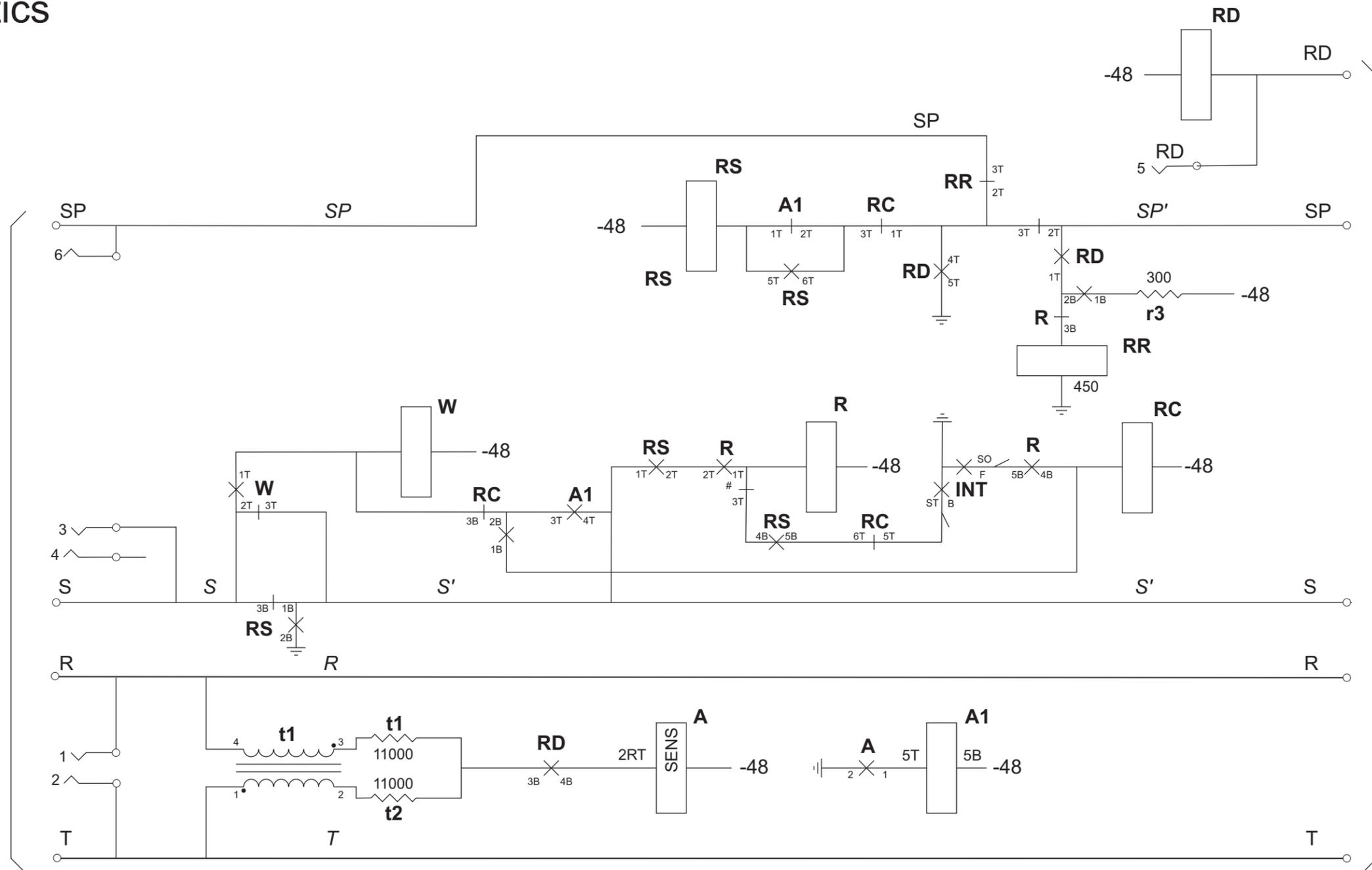# Functional schematics

FS 1

Wiring option Y (no associated timing circuit)

From bank terminals of preceding intertoll selector
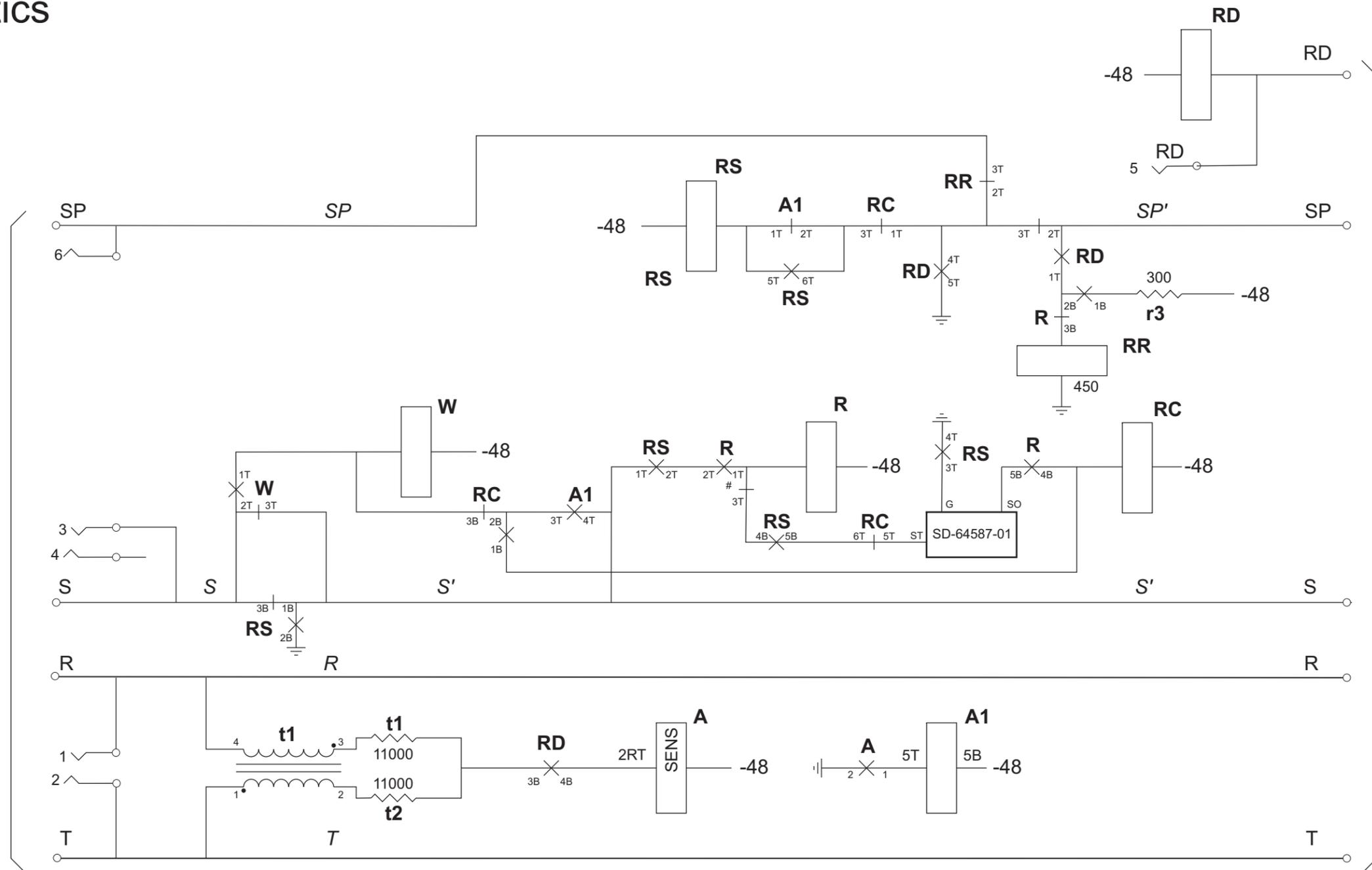
To associated intertoll selector

#: "Make before break"
*: Unused spring
SP: Supervisory lead (rearward supervision)
RD: Ringdown mode

Lead designations in italics are for reference, and may differ from the formal designations.

Relays with functions

A	Seizure detect
A	Seizure detect follower
R	Ring forward
RC	Ring stop
RD	Ringdown required
RR	Repeat supervision
RS	Ringing start
W	Sleeve control to rear

Options from SD
Figs 1, A
Wiring Y
(no associated intertoll dialing timing circuit)

Schematic labels (as shown in drawing):

RD, -48, SP, RS, A1, RC, RR, SP′, R, r3, 300, RR, 450, W, INT, SO, F, ST, B, t1, t2, 11000, SENS, A, 2RT, S, S′, R, T, 6, 5, 3, 4, 1, 2

Functional schematics
FS 2

Wiring option X
(Using associated
timing circuit)

RD

-48   RD

RD   5

SP   *SP*   **RS**   **A1**   **RC**   **RR**   3T / 2T   *SP'*   SP

6

-48   **RS**   1T 2T   3T 1T   3T 2T   **RD**

RS   5T 6T   **RS**   **RD** 4T 5T   1T   2B 1B   300   **r3**   -48

R   3B   **RR**   450

W   **R**   **RC**

From
bank terminals
of preceding
intertoll selector

3   **W** 1T 2T 3T   **RC** 3B 2B 1B   **A1** 3T 4T   **RS** 1T 2T   **R** 2T 1T # 3T   -48   4T **RS** 3T   **R** 5B 4B   -48

4   -48   **W**

S   *S*   *S'*   **RS** 4B 5B   **RC** 6T 5T ST   G SO   SD-64587-01   *S'*   S

RS 3B 1B 2B

R   *R*   R

1   **t1** 4 3   **t1** 11000   **RD** 3B 4B   2RT   SENS   **A**   -48   **A** 2 1 5T   **A1** 5B   -48

2   1 2   11000 **t2**

T   *T*   T

#: "Make before break"
*: Unused spring
SP: Supervisory lead
(rearward supervision)
RD: Ringdown mode

Lead designations in italics
are for reference, and may
differ from the formal
designations.

To
associated
intertoll
selector

Relays with functions
- A   Seizure detect
- A   Seizure detect follower
- R   Ring forward
- RC   Ring stop
- RD   Ringdown required
- RR   Repeat supervision
- RS   Ringing start
- W   Sleeve control to rear

Awaiting info on
SD-65478-01
timing circuit

Options from SD
Figs 1, A
Wiring X
(associated
intertoll dialing
timing circuit)

This figure shows the
SD-65487-01 timing circuit
as if embedded in this circuit
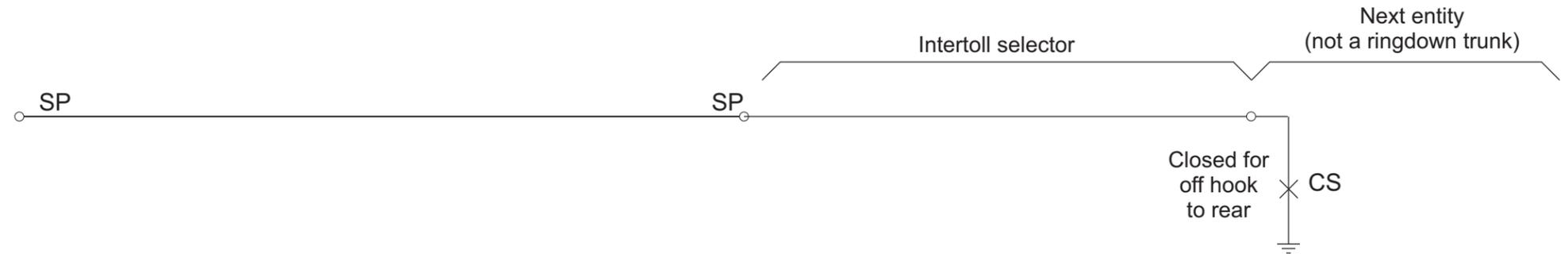
Step-by-step system SD-55232-01 Intertoll selector trunk			
num SXS-SD1058	iss 1	date 2020.03.01	sht 02
proj SXS study	type CDR	dwn DAK	of 02
laboratories dak scientific and technical undertakings Alamogordo, New Mexico			

Circuit principles

CP1
SP lead

a. Not ringdown mode

Next entity
(not a ringdown trunk)

Intertoll selector

SP

SP

Closed for
off hook
to rear ✕ CS

b. Ringdown mode–not ringing signal

Intertoll selector

Outgoing ringdown trunk

SP

SP

RR

Non-operated
for off hook
to rear RR

450

Closed for
off hook
to rear ✕ CS

RG

-48

c. Ringdown mode–ringing signal

Intertoll selector

Outgoing ringdown trunk

SP

SP

300

-48

Releases to
send ringing
forward

RG

-48

<table>
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SD-55232-01
Intertoll selector trunk</td></tr>
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SXS-SD1058</td><td>iss
1</td><td>date
2020.03.01</td><td colspan="2">sht
03</td></tr>
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CDR</td><td>dwn
DAK</td><td colspan="2">of
02</td></tr>
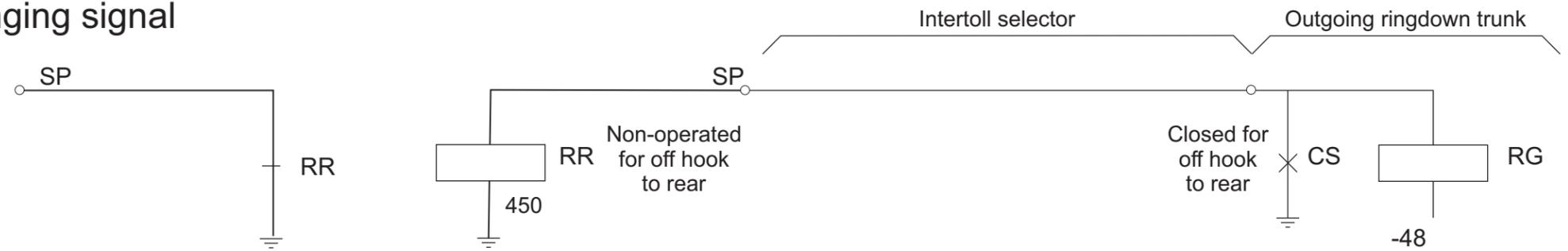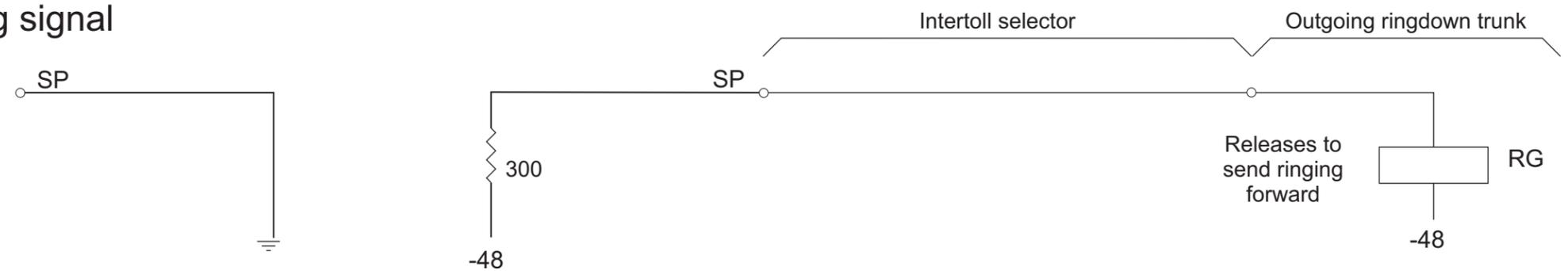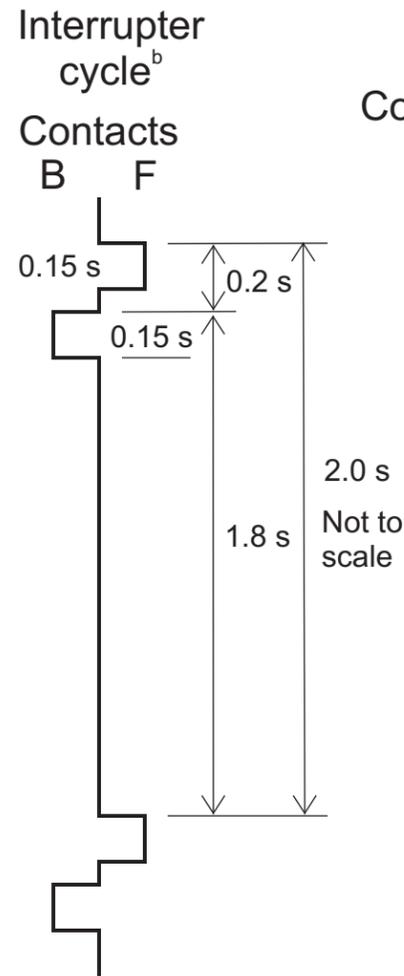<tr><td colspan="6">laboratories dak
scientific and technical undertakings
Alamogordo, New Mexico</td></tr>
</table>

Sequence charts

SC1
Sending of 2 second ring
forward to ringdown trunk
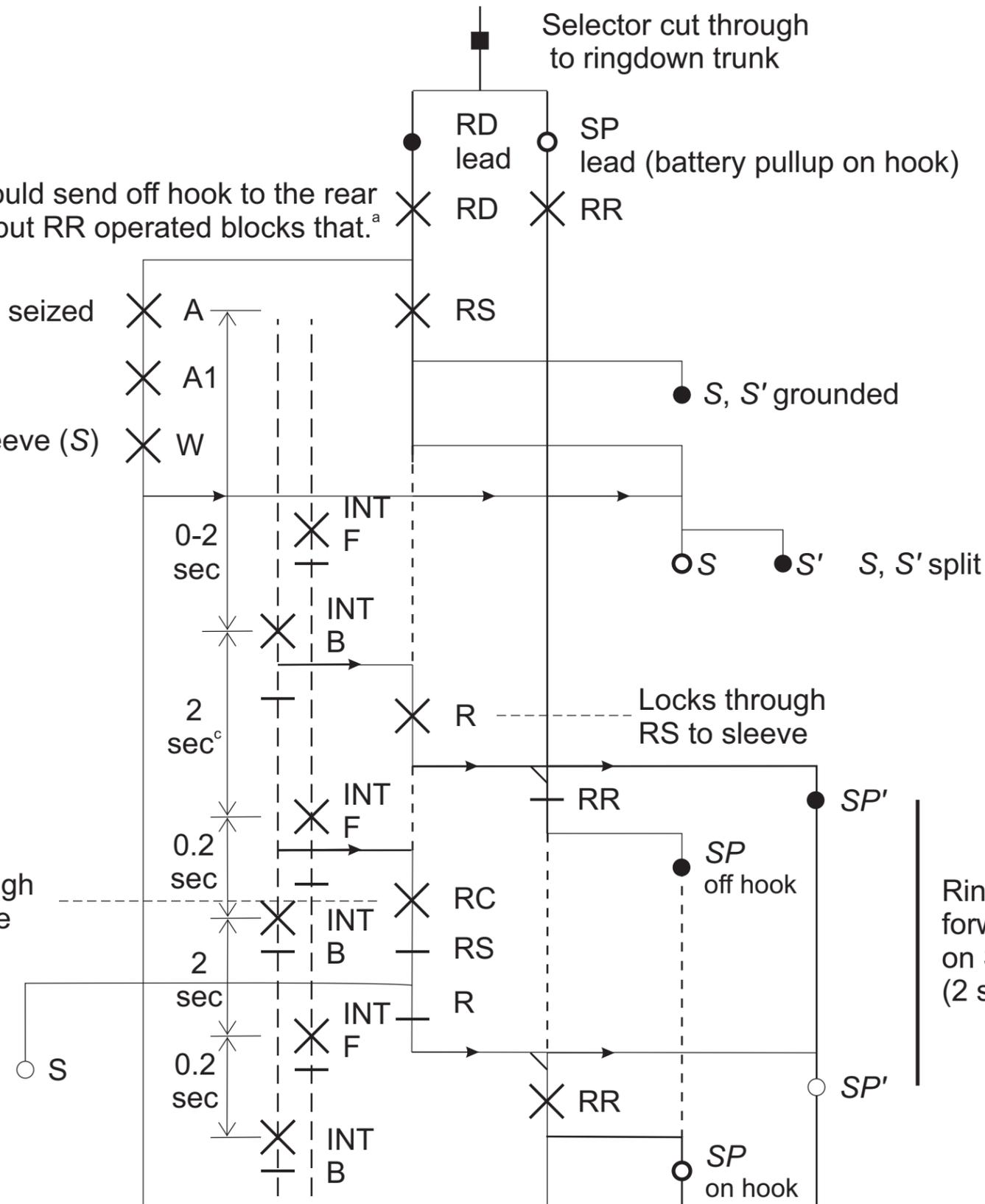(no timing circuit)
See FS1

Interrupter
cycle[b]

Contacts
B   F

0.15 s

0.2 s

0.15 s

2.0 s
Not to
scale

1.8 s

Selector cut through
to ringdown trunk

RD operated would send off hook to the rear
on the SP lead but RR operated blocks that.[a]

RD
lead   SP
              lead (battery pullup on hook)

RD   RR

Confirms that selector is seized   A   RS

A1   • S, S′ grounded

Locks to incoming sleeve (S)   W

0-2
sec   INT
                 F   ○ S   • S′   S, S′ split

                 INT
                 B

2
sec[c]   R   Locks through
                            RS to sleeve

                            ── RR   • SP′

                 INT   • SP
0.2   F   off hook
sec
Locks through
A1 to sleeve   INT   RC   Ringing
                 B   RS   forward
2   R   on SP lead
sec   INT   (2 sec)
0.2   F   ○ SP′
sec   ○ S
                          × RR
                 INT   ○ SP
0.2   B   on hook
sec

Symbols

✕ Relay operates

— Relay releases

■ Event

● Lead asserted

○ Lead normal

○ Lead through

SP, *SP′*: SP lead to rear, front

S, *S′*: sleeve to rear, front

Notes
a. There might be a
race condition here.
b. Time values illustrative;
actual values not known.
c. Could be up to 0.15 sec less
when RS operates while
interrupter B contact is operated.

On release of selector,
S′, SP, and RD leads open and
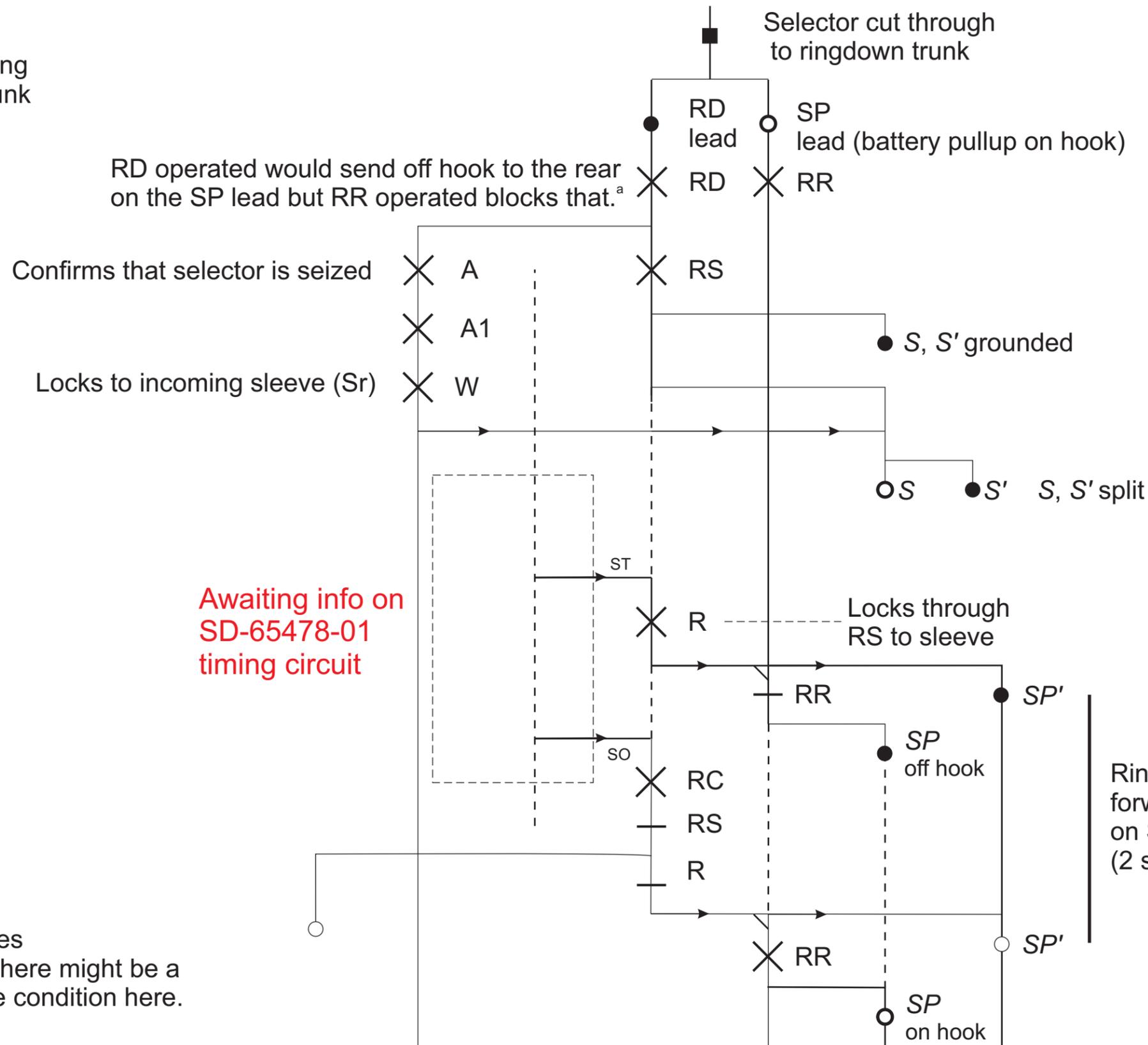all relays here release.

Sequence charts

SC1
Sending of 2 second ring
forward to ringdown trunk
(with timing circuit)
See FS2

Symbols

$\times$ Relay operates

— Relay releases

■ Event

● Lead asserted

○ Lead normal

○ Lead through

SP, *SP'*: SP lead to rear, front

S, *S'*: sleeve to rear, front

Selector cut through
to ringdown trunk

RD lead

SP lead (battery pullup on hook)

RD operated would send off hook to the rear
on the SP lead but RR operated blocks that.[a]

RD

RR

Confirms that selector is seized — A

RS

A1

S, *S'* grounded

Locks to incoming sleeve (Sr) — W

○*S* ●*S'* *S*, *S'* split

ST

Awaiting info on
SD-65478-01
timing circuit

R

Locks through
RS to sleeve

RR

SP'

SO

SP off hook

RC

RS

R

Ringing
forward
on SP lead
(2 sec)

SP'

RR

SP on hook

Notes
a. There might be a
race condition here.

On release of selector,
S', SP, and RD leads open and
all relays here release.

Step-by-step system			
SD-55232-01			
Intertoll selector trunk			

num	iss	date	sht
SXS-SD1058	1	2020.03.01	05
proj	type	dwn	of
SXS study	CDR	DAK	02

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Alamogordo, New Mexico