TYPE O AND ON CARRIER TELEPHONE SYSTEMS—TERMINALS AND JUNCTIONS

MODIFICATION PROCEDURE FOR O-H AND ON-H OPERATION

This section contains information for field modification of O and ON terminals and ON1 junctions to operation using hybrid integrated network (HIN) devices. HIN devices are solid state devices designed as a direct replacement for electron tubes. HIN-modified O and ON equipment is designated O-H and ON-H, respectively.

▶This section is reissued to provide surge (lightning) protection for HIN devices of the OA-H terminal and the ON1-H Junctions. Arrows are used to indicate changes. This reissue does not affect the Equipment Test List.◀

Note 1: When significant amounts of equipment in an office are to be HIN-modified, periodic checks of the -48 volt battery potential should be made to maintain potential within the desired range. This is due to a reduction in the total power consumption by eliminating the -48 volt filament requirement.

The section is divided into three parts, giving complete modification requirements for out-of-service modification for O and ON terminals and ON1 junctions.

All terminal or junction units associated with the same -48 volt filament fuse must be converted to HIN devices. That is, for a 4-channel group of ON-H carrier, all applicable tubes in all units mounted in the same J98705A frame must be converted to HIN devices.

Material requirements for modification are shown in Table A for O and ON terminals and in Table B for ON1 junctions.

▶All WE HIN devices may be tested on a KS-21697 HIN Tester per Section 103-469-100.◀

Caution: Do not test HIN devices on a KS-type tube tester. The reverse voltage, plate-to-ground, will damage the devices when they are inserted into the tube tester.

APPARATUS:

Modification kits (see requirements per Tables A and B)

STEP	PROCEDURE

A. Preliminary (O and ON Terminals and ON1 Junctions)

Caution: This procedure must be performed with the terminal or junction group patched out-of-service and power removed.

1 Transfer service from the terminal group or junction to be modified to alternate facilities per local practice. Only one terminal or junction group need be placed out of service at one time for modification.

2 Remove the +130 and -48 volt fuses from the terminal or junction group fuse panel.

3 Remove all tube shields, tubes, and 393A shorting plugs (used on ON1 junction group transmitters). Discard the tube shields.

Caution: Reuse of tube shields on sockets equipped with HIN devices can cause improper equipment operation.

Note: The 393A shorting plugs are not to be used in any HIN-modified terminal or junction application since filament continuity is not required for HIN-modified equipment.

B. Modification of ON-H and O-H Terminals and Units

1 Complete all preliminary steps listed in Part A.

Caution: Before installing networks, ensure that insulator discs, supplied with the devices, are in place on the base of the 7-pin HIN devices. Failure to do so may result in improper operation of the terminal.

2 Using Fig. 1 to match the HIN codes to the appropriate tube sockets, insert HIN devices for the modification kits listed in Table A. Fig. 1 illustrates an O-H or ON-H terminal with all available channel units.

Note 1: If a 4-channel group is equipped with only channel units without built-in signaling, the V2 socket, 3700-Hz oscillator, of the group oscillator may be left vacant. However, the 3700-Hz alarm relay circuit must be disabled. Follow the local procedure for disabling normally operated alarm relay circuits. If, at a later date, one or more J98705D channel units with built-in signaling are used in the group, a 3700-Hz oscillator HIN (KS-21700, List 1) would be required and the 3700-Hz alarm circuit would have to be restored.

Note 2: For ON1-H or ON2-H groups, only one carrier oscillator is used; therefore, V1 or V3 of the group oscillator may be left vacant depending on whether CARR-L or CARR-H is in use.

Note 3: A HIN replacement for the V1 noise amplifier in the group transmitting unit is not required since the noise amplifier is to be disabled to prevent noise injection. The V1 socket, therefore, will be left vacant.

STEP	PROCEDURE
3	When the ON terminal group being modified is associated with a level control oscillator, remove the 408A electron tube and insert the KS-21066 HIN in the V1 socket.
4	Affix decal on fuse panel as shown in Fig. 1 for O-H and ON-H terminals. Surface should be sufficiently cleaned to ensure proper adhesion of the decal.
5	For ON-H terminals, stamp each unit "L40" next to the J code and stamp "G20" on each subassembly next to the ED number.
6	For O-H terminals, stamp the group receiving unit "L42" next to the J code and stamp "L40" on the remaining units.
7	▶Install one 521B diode, surge protection device between terminals 1 and 13 of jack J2 of the OA-H group receive unit (J98705AA, L40 and L41, SD-95174-01, Option DJ), for protection of HIN devices. ***Note:*** The mounting direction of the 521B diode is not critical, as it is a bipolar device.◀
8	Replace the fuses with the following changes: a. Change the -48 volt fuse, 70C 3 amperes, to 70A 1-1/3 amperes. Change the fuse indicator pin from blue to white. b. Replace the -48 volt fuse, 70B 2 ampere, without change. c. Replace the +130 volt fuse, 70B 2 ampere, without change.
9	The heater (HTR) potentiometer does not require any adjustment after HIN modification.
10	Modified equipment will require a realignment routining, much the same as when new tubes are added. Refer to Section 362-110-510 for summary of lineup and maintenance tests to be performed prior to service restoral.
11	Repeat Parts A and B for remaining terminal groups.

C. Modification of ON1 Junctions

1	Complete all preliminary steps listed in Part A. ***Caution: Before installing networks, ensure that insulator discs supplied are in place on the base of the 7-pin HIN devices. Failure to do so may result in improper operation of the junction.***
2	Using Fig. 2 to match the HIN codes to the appropriate tube sockets, insert HIN devices for the modification kits listed in Table B. Figure 2 illustrates an ON1-H junction, Group 1 configuration. Other system layouts follow the same HIN placement information.

STEP	PROCEDURE
	Note 1: A HIN replacement for the shorting plug in the V1 socket of the OW and CA group transmitting units is not required in any group of the ON1-H junction. The socket will be left vacant. ***Note 2:*** The 3700-Hz oscillator is not required for the ON1-H junction application. Therefore, the V2 socket of the OW group oscillator unit will remain vacant in all ON1-H junctions.
3	When the junction group being modified is equipped with a level control oscillator, remove the 408A electron tube and insert the KS-21066 HIN in the V1 socket per Fig. 2.
4	Stamp each group receiving unit "L42" next to the J code and stamp "L40" on the remaining group transmitters and associated oscillators.
5	▶Install one 521B diode, surge protection device between terminals 1 and 13 of jack J2 of the ON1-H group receive unit (J98705AA, L40, and L41, SD-95174-01, Option DJ), for protection of HIN devices. ***Note:*** The mounting direction of the 521B diode is not critical, as it is a bipolar device.◀
6	Restore the fuses with the following changes: a. Remove the -48V fuse indicator pin. b. The -48 volt fuse shall not be replaced. c. Replace the +130 volt fuses, 70G 1/2-ampere, without change.
7	The HTR potentiometer does not require any adjustment after HIN modification.
8	Modified equipment will require a realignment routining, much the same as when new tubes are added. Refer to Section 362-110-510 for summary of lineup and maintenance tests to be performed prior to service restoral.
9	Repeat Parts A and C for remaining junction groups.

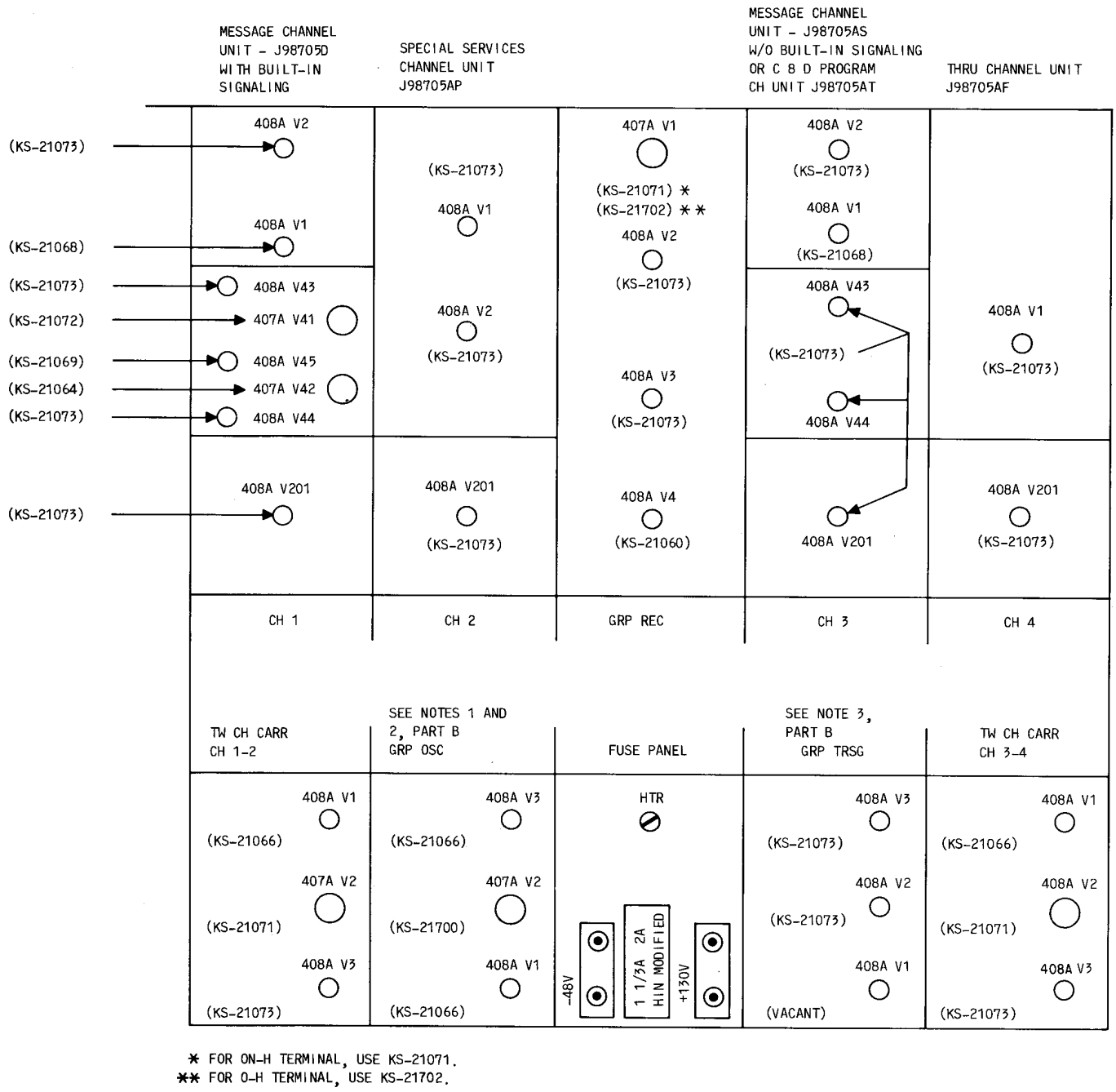
TABLE A

MODIFICATION LISTS	UNITS
	O GROUP EQUIPMENT
J98705HN, L1	All HIN devices required to modify the O group equipment including: 1 — Group Transmitting Unit 1 — Group Receiving Unit 2 — Twin Channel Units 1 — Group Oscillator Unit This list includes the new fuse and fuse indicator pin.
	ON GROUP EQUIPMENT
J98705HN, L2	All HIN devices required to modify the ON group equipment including: 1 — Group Transmitting Unit 1 — Group Receiving Unit 2 — Twin Channel Units 1 — Group Oscillator Unit This list includes the new fuse and fuse indicator pin.
	O AND ON CHANNEL EQUIPMENT
J98705HN, L3	HIN devices required to modify four J98705D Channel Units with Signaling
J98705HN, L4	HIN devices required to modify four J98705AS Channel Units without Signaling
J98705HN, L5	HIN devices required to modify four J98705AF Thru Channel Units
J98705J, L40	HIN required to modify one J98705J Miscellaneous Oscillator Unit (ON1-H)
J98705W, L40	HIN required to modify one J98705W Miscellaneous Oscillator Unit (ON-H)
J98705AP, L40	HIN devices required to modify one J98705AP Special Services Channel Unit
J98705AT, L40	HIN devices required to modify one J98705AT C and D Program Channel Unit

TABLE B

ON1 JUNCTION

MODIFICATION LISTS	UNITS
J98705F, L40	HIN devices required to modify one J98705F Group Transmitting Unit
J98705G, L42	HIN devices required to modify one J98705G Group Receiving Unit
J98705H, L40	HIN devices required to modify one J98705H Group Oscillator Unit
J98705J, L40	HIN required to modify one Miscellaneous Oscillator Unit
J98705W, L40	HIN required to modify one Miscellaneous Oscillator Unit



* FOR ON-H TERMINAL, USE KS-21071.
** FOR O-H TERMINAL, USE KS-21702.

Fig. 1—O-H or ON-H Terminal—Socket Identification, Tube Type, Equivalent HIN Device Codes

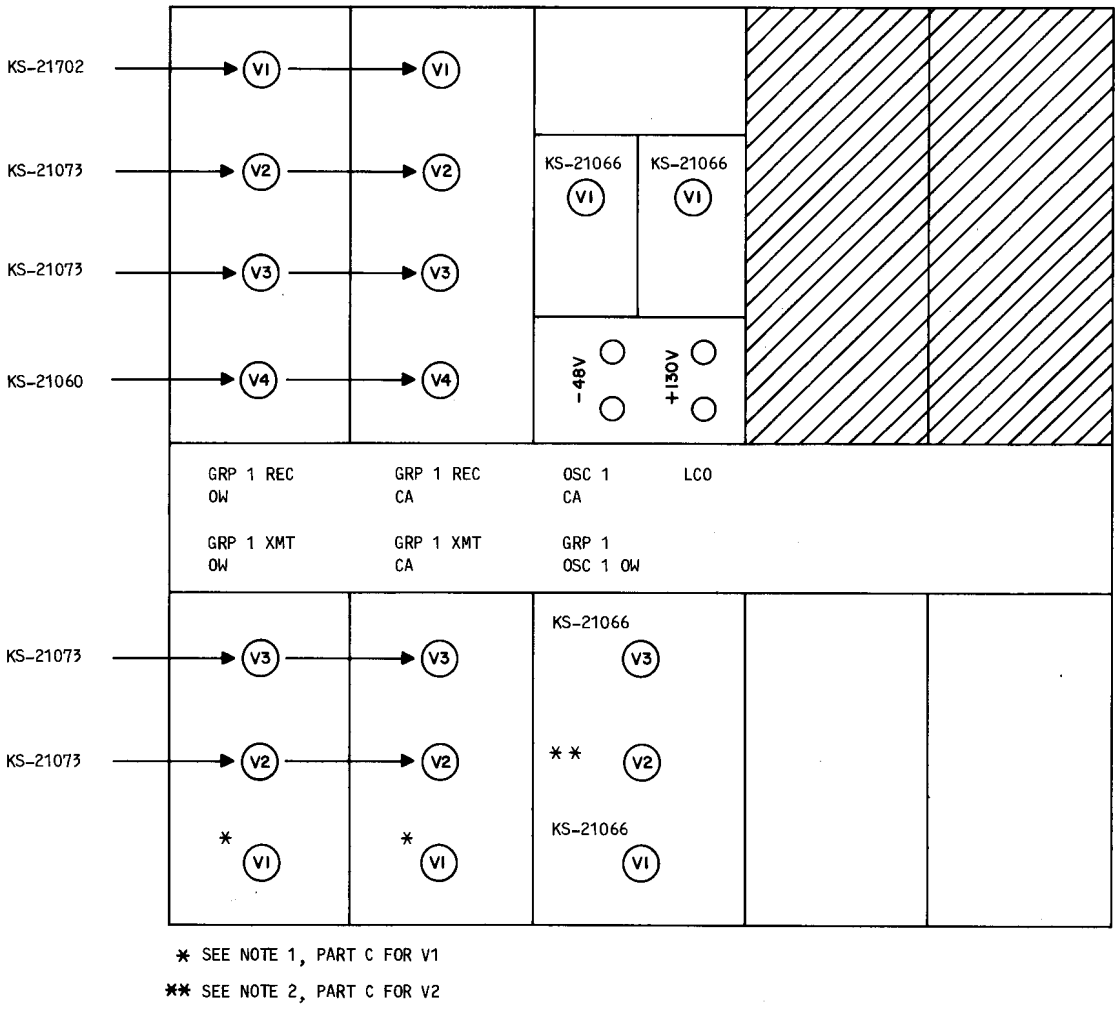


Fig. 2—ON1-H Junctor Group 1, Socket Identification and Equivalent HIN Device Codes