AHG25 DS-1 TIMING DISTRIBUTOR
DATA SHEET
CLOCK DISTRIBUTION UNIT
SYNCHRONIZATION DISTRIBUTION EXPANDER

GENERAL

The DS-1 timing distributor plug-in unit, AHG25, is used in either the SDE (Synchronization Distribution Expander) or the CDU (Clock Distribution Unit) to provide an 'all ones' framed DS-1 signal with selectable D4 or ESF (Extended Super Frame) type framing. The plug-in unit can be inserted into any TD (timing distributor) card slot and is compatible with current backplane wiring.

FEATURES

The DS-1 output Timing Distributor, AHG25 has:

- Phase coherent outputs (CDU operation only)
- Ten framed DS-1 outputs
- Selectable D4 or ESF format
- Cutoff capability.

DESCRIPTION

The input signal to the plug-in unit is a dual-rail unipolar composite clock signal received from the TI (timing interface) plug-in units. This signal is recovered and the signal quality is monitored by single-rail failure detectors. A 64-KHz square wave is derived from the input and then multiplied by a phase-locked loop to a frequency of 4.096 MHz. The 4.096 MHz is used to synchronize the DS-1 signal generating circuitry. The DS-1 generator has an option selector for ESF or D4 type framing on the 'all ones' DS-1 output. The output of the DS-1 generator is fed to the output driver circuitry consisting of ten individual transformer coupled outputs. Each output is equalized to meet the DS-X cross-connect specification of 655 feet. The maximum cabling distance from the SDE/CDU to the NE (network elements) being timed is 1140 feet [400 feet (from the SDE/CDU to the DS-X cross-connect) + 85 feet (at the DS-X cross-connect) + 655 feet (from the DS-X to the NE (network elements) needing timing)].

Besides the D4 or ESF format select switch, an output "cutoff" switch is also available on the new TD. In the event of a dual-TI input failure (for SDE operation) or a single-TI input failure (for CDU operation), the TD disables its outputs and allows the synchronized equipment to hold-over at its prescribed stratum level.

OPTIONS

There are two options available on the AHG25 plug-in unit. The first option selects the framing pattern type, either D4 or ESF. The option selection switch is shown in Figure 1. The switch section labeled "1" is used for framing selection. The switch in the "D4" position selects the D4 framing format and in the "ESF" position selects the ESF framing format.

The second option selects a "cutoff" which is used when supplying timing signals to the network elements of a higher stratum. The rules for stratum timing state that the network elements may only receive timing from a source of equal or higher stratum. The outputs of the AHG25 TD are inhibited if one of the inputs to the SDE/CDU become invalid. In this way, the network elements receiving timing from the SDE/CDU recognize that the input has failed and rely on their own internal clocks for holdover during this outage. Upon restoration of at least one input to the SDE/CDU,

the outputs of the AHG25 plug-in unit are again activated and provide a valid output. If the "cutoff" option is not selected (for SDE operation only), the AHG25 plug-in unit outputs provide a signal as accurate as the inputs from the timing interfaces during a dual-input failure.

The "cutoff" option is selected by choosing the proper position of the switch shown in Figure 1. The switch section labeled "2" is used to select or inhibit the "cutoff" option. The switch in the "IN" position selects the "cutoff" option and in the "OUT" position, inhibits the "cutoff" option. **The "cutoff" option should always be used for CDU operation**. To use the "cutoff" option, control wiring from the timing interface plug-in units may be necessary and is shown in Table A.

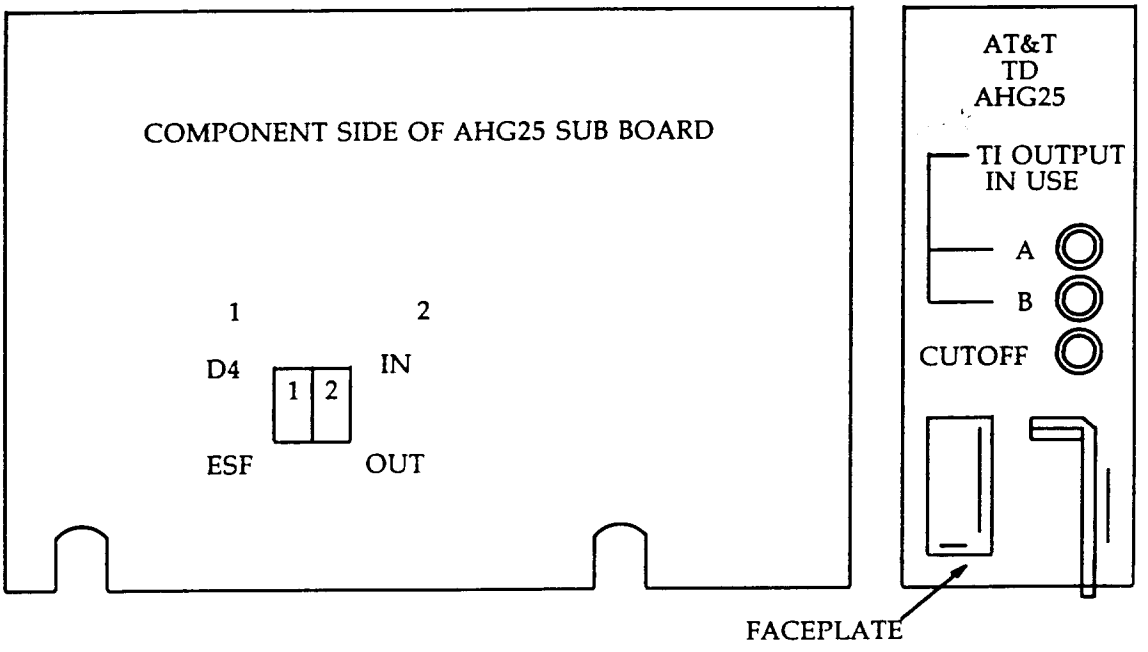

Figure 1. Location of Option Switches on AHG25 Timing Distributor Plug-In Unit

Warning: This plug-in unit contains devices that are subject to damage or decreased reliability from static discharges. When handling this unit, proper anti- static measures should be taken, such as wearing grounding bracelets and handling by the faceplate only.

INSTALLATION

Before the AHG25 plug-in unit may be inserted into the SDE shelf, the proper options must be set as previously described. Also, the addition of a series of grounding wires may be needed for J98726W-1 and J98726W-2 panels only. These wires connect the shield row on the SDE terminal blocks to frame ground as described in Table B. These wires are attached to frame ground via via backplane screws with wire-wrap lugs.

Once the options are set, the AHG25 plug-in unit may be inserted in any primary TD slot (1, 2, 3, 4). Two additional operations must also be performed:

(1) All unused AHG25 plug-in unit outputs must be terminated with a 100-ohm resistor across tip and ring at the appropriate SDE terminal block location. The resistors should be wire wrapped to the terminals.

(2) Input and output shield connections should be made as short as possible.

(3) The 100-ohm resistor must be removed before previously unused output may be used.

Output signal redundancy is easily achieved for equipment requiring multiple DS-1 input timing signals. The DS-1 timing signals should be taken from more than one AHG25 plug-in unit located in an adjacent TD slot. This arrangement ensures that any one AHG25 plug-in unit or TI may be removed at a time without disrupting service to any network element receiving timing.

REPLACEMENT

The AHG25 plug-in unit can be replaced by simply removing the particular AHG25 plug-in unit and inserting the replacement AHG25 plug-in unit in the same slot. The PCS (Parallel Changeover System) cannot be used for AHG25 plug-in unit change. Therefore, the adjacent TD_S slots should not be used in panel J98726W-2, L3 or J98726Z-1, L1, 2.

TABLE A (Note)
CUTOFF OPTION WIRING

PACK POSITION	FROM		TO	
	Slot	Terminal	Slot	Terminal
TI A	J2	16	J2	43,44,45
TI B	J3	16	J3	43,44,45
TD 1	J4	44	J4	42
TD 1	J4	45	J4	43
TD 2	J5	44	J5	42
TD 2	J5	45	J5	43
TD 3	J6	44	J6	42
TD 3	J6	45	J6	43
TD 4	J7	44	J7	42
TD 4	J7	45	J7	43

Note
This wiring is required on the J98726W-1, L1, L2 and J98726W-2, L3 panels only.

TABLE B (Note)
SHIELD GROUNDING MODIFICATIONS

Wire Position	FROM	TO
1	Lug No. 1	SDE A, A5
2	Lug No. 1	SDE A, A10
3	Lug No. 1	SDE A, A15
4	SDE A, A20	SDE B, A1
5	Lug No. 2	SDE B, A5
6	Lug No. 2	SDE B, A10
7	Lug No. 2	SDE B, A15

Note
This wiring is required on the J98726W-1, L1, L2 and J98726W-2, L3 panels only. Lug screws are in sequential order starting with Lug No. 1, located at the top backplane screw between J5 and J6; lug 2 is located above J8. All wires should maintain between 0.5 and 0.75 inches of slack from point-to-point.

SPECIFICATIONS

The acceptable limits are as follows:

General:

Max. Output Distance = 1140 feet (400+85+655) per Compatibility Bulletin 119.
Output Equalization = 655 feet
Output Range from DSX = 0 to 655 feet
Output Impedance = 100 Ohm nominal
Output Framing Format = D4/ESF selectable

Temperature:

+40 to +100 degrees F - long term
+4.4 to +37.8 degrees C

+35 to +120 degrees F - short term
+1.6 to +49 degrees C

Humidity:
Min. Relative Humidity Range

20 to 80 percent - short term
20 to 55 percent - operating

ORDERING INFORMATION

The AHG25 TD may be ordered as a single plug-in unit using the code given below:

PLUG-IN UNIT	CLEI CODE
AHG25	D4PQ115AXX

REFERENCES

The following publications provide more information on the SDE/CDU.

- SD-7C389-01
- SD-7C389-02
- AT&T Practice 314-813-101 - CDU - Description and Operation
- 314-813-102 - Data Sheet - AHG16 Timing Interface (CDU)
- AT&T Practice 314-913-220 - SDE -Description and Operation
- AT&T Practice 314-913-221 - SDE -Installation and Maintenance Procedures
- 314-913-222 - Data Sheet - AHG1 Timing Alarm
- 314-913-223 - Data Sheet - AHG4 Timing Distributor (CDU/SDE)
- 314-913-224 - Data Sheet - AHG10 Timing Interface
- 314-913-227 - Data Sheet - AHG5 DS-1 Timing Distributor.

GLOSSARY

The acronyms used in this data sheet are listed and defined below.

CDU	Clock Distribution Unit
D4	D4 Framing Format
ESF	Extended Superframe Format
NE	Network Element
PCS	Parallel Changeover System
SDE	Synchronization Distribution Expander
TA	Timing Alarm
TD	Timing Distributor
TI	Timing Interface.