SECTION T -- SYNCHRONIZATION

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TABLE T-1 – SUMMARY OF CHANGES IN SECTION T

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1. GENERAL

1.1. Introduction

1.1.1 The Installation Supplier shall ensure, as part of the evaluation of the installation, that all equipment added, rearranged or modified is properly installed and in conformance with AT&T installation specifications.

1.1.2 The Installation Supplier shall ensure, as part of the evaluation of the installation, that all work has been done in accordance with the detail specifications or approved changes to the detail specifications.

1.1.3 This section covers the requirements for wiring in a manner to assure compliance with the AT&T synchronization rules and policies.
1.1.4 Changes in this issue of Section T are summarized in Table T-1.

2. REQUIREMENTS

2.1. General

2.1.1 BITS record books shall be maintained only where they currently exist. BITS records books shall not be created for locations for which they do not currently exist. Where BITS record books are maintained, the Installation Supplier shall attach a BITS record book (approved 8 ½ x 11 size) to the bay upright at or near the BITS/TSG clock. The Installation Supplier shall perform all cable labeling operations per Section L, and match assignment updates in the regionally approved record keeping system (ex. TAB/db, SyncTrac, or GeoLink) for all installations, rearrangements and removals. Where BITS record books are maintained, the installation supplier shall update the BITS record book as described in Section L, paragraphs 2.6.5 and 2.6.10.

2.1.2 Refer to Section J, ATT-TP-76300 for cabling requirements.

2.1.3 Refer to Section L, ATT-TP-76300 for labeling requirements.

2.1.4 Refer to Section K, ATT-TP-76300 for connecting requirements.

2.2. Building Integrated Timing Supply (BITS)

2.2.1 Building Integrated Timing Supply (BITS) concept is the method of providing and sustaining intraoffice synchronization. The BITS plan specifies that each office shall have one master clock signal source called the BITS/TSG (TSG = Timing Signal Generator). Under the BITS concept, every externally timed digital Network Element (NE) in the office shall derive its timing DIRECTLY from that single source within the office. A timing capable Network Element is defined as any digital equipment piece that is able to conform to the BITS concept by accepting the appropriate timing signals from an external source. A Network Element is still timing capable although it may not be currently configured or equipped to accept external timing signals, but the option exists to allow it to be so equipped.

2.3. Synchronization Requirements

2.3.1 The installation supplier shall wire every timing capable network element within a building directly from the BITS clock, as directed by the ATT-CO interconnection drawing. This timing shall NOT be wired through any intervening devices, other than BITS clock equipment. The Installation Supplier shall NOT run DS1 or composite clock timing leads from BITS clock OUTPUTS to the network element inputs through DSX jacks unless specifically instructed to do so in the detailed specification. Fiber optic timing leads for Network Time Protocol or Precision Time Protocol sync signals may be connected through a fiber cross connect bay as directed by the AT&T sync equipment planner.

2.3.2 Any Network Primary Reference Source (PRS) shelf shall be mounted in the same or adjacent bay to the master shelf. The installation supplier shall contact the AT&T Sync Equipment Planner if the detailed engineering specifications contain instructions for mounting this equipment in any other manner.
2.3.3 The AT&T Sync Equipment Planner shall be contacted in writing in the event of BITS DS1 output signals, DS0/composite clock signals, or E1/2048 kHz clock signals (where used) approach 80-90% exhaustion.

2.4. Diversity And Redundancy

2.4.1 Effective 1-1-2012, there are no diversity requirements for routing timing cables on overhead cable racks, under raised floor installations, or for routing Precision Time Protocol & Network Time Protocol (PTP/NTP) fiber jumpers in fiber troughs.

2.4.2 Redundant 1175A timing leads within equipment frames shall be routed on opposite sides of the frames if the NE timing input ports are on opposite sides or in the middle of the NE. If the NE timing input ports are on the same side of the NE, the timing leads may be routed on that side of the frame. Where a timing interface panel is used, (e.g.; Nortel/Ciena MG9000, Ericsson BLM-1500, Alcatel-Lucent 7750) the 1175A timing leads shall be terminated at the panel. The timing interface panel and cables interconnecting the timing interface panel with the NE input ports are part of the NE, and are outside the scope of this section.

2.5. Output Cabling Requirements

2.5.1 DS1 and composite clock timing leads from BITS clock OUTPUT ports to a network element shall be run using the approved 1175A red-jacketed shielded cable. Red jacketed 735C coaxial cable shall be used for 2048 kHz analog sync signals. Single mode fiber jumpers or category 5e (or higher) unshielded Ethernet cable shall be used for Precision Time Protocol and Network Time Protocol timing signals as specified by the sync equipment planner.

2.5.2 The Installation Supplier shall connect (DC/hard grounded) the 1175A timing cable shield/drain wire at the clock source end only.

2.5.3 The 1175A timing cable shield/drain wire shall NOT be connected via a DC/hard grounded termination at the network element.

2.5.4 The Installation Supplier shall NOT run the timing leads from the BITS clock OUTPUTs to the network element input(s) through DSX jacks unless specifically instructed to do so in the detailed specification.

2.5.5 All Critical network element timing leads shall originate from BITS/TSG shelves that have phase holdover capabilities. This includes expansion shelves associated with the Master shelf or Remote Master shelves that are equipped with Remote Track and Hold Cards (RTHC) or oscillators capable of phase holdover. Examples of critical network elements include:

a) All CCS7 related equipment (STP’s, LPP’s, FLIS, LIM, and D4 bays serving SS7 Links).

b) Slave/Remote master clock shelves.

c) Any other equipment specified by the AT&T Sync Equipment Planner or detail engineer as being "critical."

2.5.6 The Installation Supplier shall wire all redundant timing signal leads from BITS clocks as mated pairs, odd-even or alternate group assignments within a shelf. Outputs shall be equally assigned between each matched set of cards such that both cards will be exhausted at the same time period.
2.5.7 Redundant output timing signal feeders from new or vacant card slots shall be routed from alternate sides of the BITS shelf.

2.5.8 At the rear of the BITS shelf, the Installation Supplier shall butt and strip the cable sheathing in such a manner as to not allow cable sheathing and/or heat shrink to be placed on the fanning strip or within the rear protective cover of this strip. The butts shall be protected with heat shrink tubing only and spaghetti sleeve shall be placed on the sleeve lead (ground wire). Tape shall not be used at any time for this application.

2.5.9 All alarm and alarm return leads shall be run as pairs as specified by the job documentation.

2.5.10 There shall be only one or a single termination per DS1, composite clock, or E1/2048 kHz clock port. No bridging allowed.

2.5.11 Alarms shall be wired per ATT-CO drawings, verified and tested as specified in the detailed specification and other sections of ATT-TP-76300 and ATT-TP-76900.

2.5.12 All 1175A cable terminations shall be dressed with heat shrink insulation at the butts of the cables.

2.6. Input Cabling Requirements

2.6.1 Wiring of the input timing reference shall be in accordance with the appropriate ATT-CO wiring interconnection drawing. Mini-DSX will be placed only for new master systems that employ SONET Derived DS1 signals as the input timing reference as directed by the sync equipment planner.

2.7. Power Requirements

2.7.1 Dedicated BITS fuse panel(s) shall serve only BITS/PRS equipment in the same or its adjacent bay.

2.7.2 “A” and “B” battery outputs of the fuse panel(s) shall be wired in a manner to correspond to the “A” and “B” battery inputs of the BITS equipment. This may require the mounting of two wire support brackets, one above and one below the fuse panel.

2.7.3 All battery and battery return connections from the fuse panel(s) to the BITS equipment shall be made with ring terminals at both ends.

2.7.4 Battery and battery return leads to the BITS dedicated fuse panel(s) that originates directly at the Power Plant shall be fused on different rows.

2.8. Grounding Requirements

2.8.1 Ground leads shall be individually run and properly terminated.

2.8.2 The sleeve/drain wire from the approved signal cable shall be insulated with a spaghetti-type sleeve.

2.8.3 If the timing lead to/from a network element within an isolated ground plane has an intermediate DSX appearance, the shield/drain shall be grounded at the network element and at the BITS clock wire wrap panel, but left un-terminated at the intermediate DSX. If the lead
2.8.4 When/where a shield/drain ground connection is required; verify that the ground termination pin/point is DC-grounded.

2.9. Cabling Requirements For Network Elements

2.9.1 Network element equipment configurations requiring BITS timing shall be individually timed from the office BITS, with primary and secondary reference signals from adjacent output cards, with odd-even or alternate group slot assignments per AT&T interconnect drawings. Timing connections at the network element shall be made per the AT&T interconnect drawings.

2.9.2 In the event of output card exhaustion, daisy-chaining to enable cascading of digital (DS1, CC, E1) synchronization reference signals to multiple network elements is NOT an AT&T option and shall not be permitted. Arrangements must be made with the AT&T synchronization planner to provide additional BITS outputs. This requirement does not apply to serial Time of Day connections when cabled as shown in AT&T interconnect drawings.

2.9.3 Each network element shall have the digital (DS1, CC, E1) "CLOCK IN" connections (PRIMARY and SECONDARY) cabled via 1175A red jacketed timing cable to the BITS. Red jacketed 735C coaxial cable shall be used for analog (2048 kHz) timing signals. Shield lead conductors of all 1175A timing input cables shall be DC-grounded at the BITS shelf wire wrap panel only and left insulated and un-terminated at the network element.

2.9.4 Network element “CLOCK OUT” connections (PRIMARY and SECONDARY) shall not be cabled, except when required for office BITS clock reference input as specified by the AT&T sync equipment planner.

2.9.5 Where a timing interface panel is used, the 1175A timing leads terminate at the panel. The interface panel and cables interconnecting the timing interface panel with the NE input ports are part of the NE, and are outside the scope of this section.

2.10. Removals

2.10.1 At the BITS/TSG, the Installation Supplier shall remove and lay back all terminations associated with removed and/or displaced network elements.

2.10.2 The Installation Supplier shall verify all input/output timing leads before they are disconnected as follows:

a) First, Installation Supplier shall make sure that a MOP was approved prior to any cable removal

b) Second, verify and confirm the presence of a far end ground on the un-terminated shield/drain wire at the network element.

c) Third, identify the cable at the BITS clock end and remove the shield/drain wire.
d) Next, confirm/verify loss of ground on the shield/drain wire at the network element being removed. If ground is lost, the cable shall be disconnected at the BITS clock and the network element, in that order.

e) If ground remains after the shield/drain wire is removed at the BITS clock, an incorrect cable has been identified and the shield lead shall be reconnected. To identify the correct leads, the Installation Supplier shall trace the timing leads from the network element to the BITS clock.

f) Complete all cable removal operations, update the sync record assignment book and assure all updates match and are reflected in the regionally approved record keeping system (ex. TABdB, SyncTrac, or GeoLink).

[END OF SECTION]