DIMENSION® 2000
AND CUSTOM PBX

PAM AMPLIFIER TEST (PART 1)
(PROC 508)

CONTENTS

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1.   GENERAL

1.1   This section provides information for interrogating
            PROC 508 in the event that the craftsperson is
            directed to this procedure due to a NETWORK PAM
            failure. Whenever this type of alarm occurs, the
            ALARM PANEL-PAM and MINOR lamps will be lit.

2.   RECORDS

2.1   Form SD-97-1313 is required for the recording the
            results of this test.

[handwritten note]: tech talk Vol 2 #3 when using the new flat cables with the aluminum sheathing you have to upgrade the return clock to "LC/2/C's or you will get Pam & return alarms

PRIVATE

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3.   MAAP DISPLAY FIELDS

3.1   The following describes each of the display fields for
the Network - PAM Amplifier Tests (PROC 508) format:

FIELD	DESCRIPTION
1	TEST NO - Displays active test number (Maximum of 4) per the following encodes:

ENCODE	DESCRIPTION
1	Displays failure history per each unit type, as detected by on-line maintenance.
2	Tests all circuits per a unit type (Displays failure summary only).
3	Tests all circuits per a unit type (Displays each failure).
4	Tests a particular circuit per a unit type.

FIELD	DESCRIPTION
2	UNIT TYPE - Displays unit type under test per the following encodes:

ENCODE	DESCRIPTION
0	MAINTENANCE CIRCUIT (LC105)
1	Amplifiers and Bus Select Switches (LC101, LC102, LC103 and LC104).
2	Amplifier Cables. (Intercabinet)
3	Port Transmit switch stuck closed.

FIELD	DESCRIPTION
3	MTCE CKT EQPT LOC - MODULE displays module under test.
4,5	MTCE CKT EQPT LOC - SOURCE - CAB/CARR - displays cabinet and carrier containing LC101 that a LC105 source signal is connected.

FIELD	DESCRIPTION
6,7	MTCE CKT EQPT LOC - RECEIVER - CAB/CARR - Displays cabinet and carrier containing LC101 that a LC105 receiver is connected.
8	MTCE CKT EQPT LOC - TIME SLOT BUS - Displays time slot bus under test (0 = Bus 0, 1 = Bus 1).
9	MTCE BUSY STAT OF BUS - displays maintenance busy status of bus (displayed in field 8) under test, (0 = bus not busied out, 1 = all time slots busied out).
10	FAILURE CODE - displays failure code for circuit path displayed in fields 4-7.
11	NTWK GAIN - displays network gain for circuits under test. Encodes for normal gains per types of connections should be as follows:

CONNECTION	ENCODE
LINE TO LINE	1
LINE TO TRUNK	2
LINE TO LINK	2
LINK TO TRUNK	2
TRUNK TO LINK	2
TRUNK TO TRUNK	2
LINK TO TRUNK	3
TRUNK TO LINE	3

NOTE: When a failure is detected, the encodes will be different from what is displayed above. (Higher or lower).

FIELD	DESCRIPTION
12	NUMBER OF FAILURES (test 1) - displays total number of failures detected by on-line maintenance. (Maximum of 6).
	TOTAL CIRCUITS TESTED (Tests 2 and 3) - displays total number of circuits tested.

FIELD	DESCRIPTION
13	FAILING CIRCUIT INDEX (Test 1) - displays one index, which indicates a display of the totals of all failing circuits detected by on-line maintenance (index = 0) or the failure history for a particular circuit (index = 1 to 6).
	TOTAL CIRCUITS FAILED - (Tests 2 and 3) - displays total number of all failed circuits.
14	FAILURES PER HOUR - (test 1) - displays average failure rate per every two hours. (Maximum of 99).
15	FAILURES BEGAN (Hours Ago) - displays number of hours since failures began to the nearest hour (17 hours maximum).

4.   MAAP CONTROL KEY SEQUENCES

4.1   PROC NO., 5, 0, 8, ENTR - Causes program to be
           loaded from the tape to the memory.

4.2   BUSY OUT - (Tests 3 and 4), busies out displayed
           time slot bus in a module for unit type 1 only.

4.3   NEXT CIRCUIT - (Tests 1, 3 and 4), in test 1 and 3,
           causes display of next failing circuit. In test
           4, increments to next equipped LC105 circuit or
           PAM network path.

4.4   NEXT TEST - (Tests 1, 2, 3 and 4) causes procedure
           to advance to the next test number. (Field 1)

4.5   NEXT UNIT - (Tests 1, 2, 3 and 4), causes procedure
           to advance to the next unit. (Field 2).

4.6   RELEASE BUSY OUT - (Tests 3 and 4), causes displayed
           time slot bus to be released from a busied out condition.

4.7   RESET - (Tests 1, 2, 3 and 4), causes procedure to be
           reset to the beginning.

4.8   STOP - (Tests 2, 3 and 4), causes a test that is
           executing to be stopped.

4.9   CLEAR DATA, EXECUTE - (Test 1 only), causes on-line
           maintenance failure history, for the displayed unit
           type to be cleared.

5.   PROCEDURES

5.1   The following describes the repair procedures that should be
           used in the event of a NETWORK PAM ALARM.

5.2   Execute Test 1 for each unit type and record the on-line maintenance
           failure history. NOTE: Presently there are now on-line maintenance
           tests for type "2" units.

5.3   UNIT TYPE O FAILURES

5.31   If failures (failure codes 1-20) were recorded for unit type "0",
           execute test 3. If no failures are detected, use test 4 to test the
           circuits recorded in step 5.2.   If failures are detected either
           during test 3 or 4, use the repair procedures listed below and
           re-execute test 4 for the failing circuit. If the test passes, go
           to step 5.5; otherwise go to the next repair procedure.

           a) Replace LC105

           b) Replace LC49 in the same carrier as LC105

           c) Replace LC101 in the same carrier as LC105

           d) Replace LC46

           e) See paragraph 6 of this section

5.4   UNIT TYPE 1 FAILURES

5.41   If failures (failure codes 31-35) were recorded for
             unit type "1", execute test 3. If no failures are
             detected, use test 4 to test the circuits recorded
             in step 5.2.   If failures are detected either
             during test 3 or 4, use the repair procedures listed
             below and then re-execute test 4 for the failing
             circuit. If the test passes, go to step 5.5; other-
             wise go to the next repair procedure.

5.411   FAILURE CODE 31 ONLY.
             NOTE: This type of failure indicates an invalid
             network gain was detected.

             a) Single carrier, single bus.

                 aa) Replace LC101 in carrier displayed in fields
                      4 and 5.

                 ab) Replace LC102 for the indicated bus.

                 ac) Check cables, especially the cables for
                      the CFC --, CTC --, TTS - and TTR - leads.
                      Check also for pulsing on associated GOS --,
                      CIS -- leads. Refer to cabling tables and
                      diagrams at end of this section.

             b) Single carrier, both buses.

                 ba) Replace LC101 for carrier displayed in
                      fields 4 and 5, (should be same as displayed
                      in fields 6 and 7).

                 bb) Check cables, see step ac.

                 bc) Replace LC105 for the indicated cabinet.

             c) Single bus, carriers of the same type (line,
                 trunk, or link) in a cabinet.

                 ca) Replace LC102 for the indicated bus.

                 cb) Replace LC103 (line or trunk failures)
                      or LC104 (link failures).

cc) Check cables, especially the CFG --, CTG -- cables.
See diagrams and tables at end of this section.

d) Both buses, carriers of the same type (line, trunk, or link)
in a cabinet.

da) Check cables, especially CFG --, CTG -- cables and
cables for CBI -- leads. See diagrams and tables at
end of this section.

db) Replace each LC103 (line or trunk failures) or LC104
(link failures) within a module.

dc) Replace each LC102, especially for the group indicated.

e) Carriers of the same type (line, trunk, or link) in a module,
single bus.

ea) Replace LC103 (line or trunk failures) or LC104 (link
failures).

eb) Check cables, especially CFG --, CTG -- cables. See
diagrams and tables at end of this section.

5.412   FAILURE CODES 31 AND 32.
NOTE: This type of failure indicates a select stuck sum bus
switch which can cause gain failures on same bus in other groups.

a) Fail code 32 in a single carrier, single bus.

aa) Replace LC102 for indicated bus.

ab) Replace LC101 in indicated carrier.

5.413   FAILURE CODES 31, 32 and 33.
NOTE: This type of failure indicates a stuck distribute select
switch which can cause gain failures and sum bus failures in some
group.

a) Fail code 33 on one bus and fail code 32 on opposite bus
for a single carrier.

aa) Replace LC101 in carrier associated with the failure
code 33.

b) Fail code 33 on one bus and fail code 31 on opposite bus
for a single carrier.

     ba) Replace LC101 in carrier with failure
         code 33.

     bb) Unplug port circuits one at a time until
         failure is cleared; replace defective
         port circuit.

5.414   FAILURE CODE 35

NOTE: This type of failure indicates a 3-Way Pad
switch stuck open.

a) All carriers in a group, single bus.

    aa) Replace LC102 for indicated bus.

    ab) Check cabling, especially WT3 --*, SRD3C- leads.

5.415   FAILURE CODE 98

NOTE: This type of failure indicates a failure to complete
a Network command.

a) Use PROC's 501, 505, 506 to trouble-shoot this problem.

5.416   FAILURE CODE 99

NOTE: This type of failure indicates a failure to find
a time slot that is idle on both buses.

a) This fault code may occur during heavy traffic,
    re-execute procedure until fault code doesn't reappear.

5.5   If problem is cleared, go to TEST 1 and clear on-line
maintenance records. (Operate MAAP-CLEAR DATA, EXECUTE
keys).

6.   TROUBLE-SHOOTING AIDS

6.1   GENERAL TEST INFORMATION

6.11   TEST 1 - Test 1 is the default test when procedure 508 is first
            read in from the tape, or when the MAAP-RESET key is operated.
            In either case, field 1 will display a 1, field 2 will flash, and
            fields 3 through 15 will be dashed. When the MAAP-EXECUTE key
            is operated, the failure history for the unit type displayed in
            field 2 is displayed. Initially the failure history will display
            the totals (failure index = 0) of all failures for a particular
            unit type. Operation of the MAAP-NEXT CIRCUIT key causes a
            failure history display for particular equipment locations. If
            the MAAP-NEXT UNIT key is operated, field 2 will be incremented
            to the next unit type.

            Operation of the MAAP-CLEAR DATA, EXECUTE keys clears the on-line
            maintenance records for the unit type displayed in field 2.

6.12   TEST 2 - Tests all circuits per a unit type, displays a testing
            summary and controls the PAM alarm. When the MAAP-EXECUTE key
            is operated, the MAAP-WAIT lamp turns on, fields 3 through 8
            displays the PAM circuit equipment locations under test and
            fields 12 ans 13 display the testing progress. When the test is
            finished, the MAAP-WAIT lamp is turned off and fields 12 and 13
            display the test results. If no failures were detected, the PAM
            and MINOR alarm indicators are turned off. The test may be
            stopped at any time by operating the MAAP-STOP key.

6.13   TEST 3 - Test 3 does the same thing as test 2, except that it will
            stop on the first failure detected. To continue testing, operate
            the MAAP-NEXT CIRCUIT key.

6.14   TEST 4 - Tests a particular PAM circuit as displayed in fields 3
            thru 8. If a default PAM circuit is not displayed, the craftsperson
            must enter one. When the MAAP-EXECUTE key is operated, the MAAP-
            LAMP is not turned on (since the test is continuous); however,
            field 10 will flash the failure code. The test must be stopped
            before the MAAP-NEXT CIRCUIT key is operated.

if there are any tone plants fussied out you will get a pam alarm after a while showing a unit trouble which will clear every time you test it. we also reseted the Pam amp cards and cleared a unit 2 (cable) trouble

6.2   GENERAL TROUBLE-SHOOTING INFORMATION

6.21   PROC 508 is used to test the LC105 maintenance
            circuits (UNIT 0) and to test the PAM circuits
            (UNIT 1) within each cabinet.   To test intercabinet
            cables and 'to check for stuck port circuit switches,
            PROC 580 must be used.

6.22   LC105 Maintenance Circuit Functions

6.221   The LC105 - Maintenance Circuit consists of two parts,
            (1) circuitry to test the PAM network and (2) circuitry
            to serve as a maintenance monitor.

            The maintenance monitor detects the presence of
            temperature, fuse, network clock and power interrupt
            alarms. When the BBS15* is enabled, the status of
            the following leads is returned via the scan leads
            as follows:

ALARM LEAD	SCAN LEAD
APMJ, ANMJ*	SS0*
TEMP*	SS1*
NCKSCN	SS2*
+5V,-9V Power	SS3*

            The PAM test circuitry consists of a time slot shift
            register, receiver, source (tone generator), threshold
            detector, group output selector, carrier input selector
            and internal test circuitry.

            When a PAM test is performed, an idle time slot is found and
            the LC105 shift register is set to that time slot.
            The receiver is then enabled and a particular group
            output select and carrier input select is chosen.
            Next the source is enabled, and the threshold detector
            decades the level of the signal received. A scan
            (BBS14$\emptyset$ enabled) is made of threshold detector outputs
            (SS0*-SS3*) to determine if the level is correct.

            The internal test circuitry allows the LC105 to be
            tested at both high and low gain levels. The test to
            perform a self test is the same as a regular PAM test
            except that the group output and carrier input selectors
            select internal LC105 time slot switches.

The group output selector, carrier input selector, source
and receiver are all under control of the LC105 time slot
shift register so that signals are sent and received only
during a time slot that is not used by the rest of the
PAM circuits under test.

The following tables show the port address available on
the LC105 and also the data required to perform LC105
functions.

LC105 PORT SELECTS

BBS15*	BBS14*	BAD10*	BPS3*	BPS2*	BPS1*	BPS0*	D E S C R I P T I O N
*	-	-	-	-	-	-	PWR, NETWORK CLOCK, TEMP, FUSE AND SHIFT REGISTER B1I STATUS
-	*	-	-	-	-	-	THRESHOLD DETECTOR STATUS
*	-	*	-	-	-	*	SOURCE FF PORT SELECT (1)
*	-	*	-	-	*	-	RECEIVER FF PORT SELECT (2)
*	-	*	-	*	-	-	TIME SLOT SHIFT REGISTER SELECT
*	-	*	*	-	-	-	POWER RETURN PORT SELECT (3)
-	*	*	-	-	-	*	GROUP OUTPUT SELECT (1st HALF)
-	*	*	-	-	*	-	GROUP OUTPUT SELECT (2nd HALF)
-	*	*	-	*	-	-	CARRIER INPUT SELECT (1st HALF)
-	*	*	*	-	-	-	CARRIER INPUT SELECT (2nd HALF)

NOTE (1) - Source is enabled when BRBS3 is active, when BKRB3 is active,
the source is set to low (977HZ) frequency and when BKRB3 is
inactive, the high (1954HZ) frequency is set.

(2) - Receiver is enabled, when BRBS3 is active.

(3) - Power return flip flop is set when BKRB3 is active.

* = Lead is active
- = Lead is inactive

THIS PAGE IS RESERVED FOR FUTURE USE.

BKRB3 AND BRBS3 DATA INPUT
LC105 GROUP OUTPUT AND CARRIER INPUT SELECT

GOS --	BPS1*,		BPS0*,	
CIS --	BPS3*		BPS2*	
SELECT	BKRB3	BRBS3	BKRB3	BRBS3
00	0	0	0	0
01	0	0	0	1
02	0	0	1	0
03	0	0	1	1
04	0	1	0	0
05	0	1	0	1
INT., LOW GAIN	0	1	1	0
06	0	1	1	1
16	1	0	0	0
INT., HIGH GAIN	1	0	0	1
10	1	0	1	0
11	1	0	1	1
12	1	1	0	0
13	1	1	0	1
14	1	1	1	0
15	1	1	1	1

6.3   LC105 SELF TESTS (UNIT 0)

6.31   The following describes the steps used to self test the
             LC105 circuit packs.

6.311   Initialize Maintenance Circuit. The LC105 time slot shift
             register, receiver and source flip flops are cleared. The
             failure code returned during this is a 98, which means that
             the network failed to complete the commands sent to it.

6.312   Write Time Slot into Maintenance circuit:

             a) A search is made for two idle time slots, one in each
                 bus. The time slot found for one bus must match the
                 one in the other bus. The time slot # is then written
                 into the LC105 shift register. If two time slots cannot
                 be found, failure code "99" is indicated.

             b) The time slot written into the LC105 is then checked.
                 If it is not correct, failure code "1" is indicated.

             c) The LC105 receiver is then enabled, and the LC105 threshold
                 detector is neutralized, and checked. If the detector
                 cannot neutralize, a failure code of "2" is indicated.

6.313   High Frequency, Low gain loop around test:

             The Group Select and Carrier Select are set to the internal
             low gain loop around test. The tone source is set to high
             frequency and then the threshold detector is checked for a
             correct response. An incorrect threshold response is indicated
             by failure code "3".

6.314   Low Frequency, Low gain loop around test:

             First the threshold detector is neutralized and the source is
             set to a low frequency. The threshold detector is then
             checked for a correct response. If the level is incorrect,
             failure code "4" is indicated.

6.315   High Frequency, High Gain loop around test:

The Group Select and Carrier Select are set to
internal high gain loop around test. The source
is set to high frequency and then the threshold
detector is checked. If the threshold is in-
correct, a failure code of "6" is indicated.

6.316   Low Frequency, High gain loop around test:

First the threshold detector is neutralized and
the source is set to a low frequency. The
threshold detector is checked for a correct response;
and if it is incorrect, a failure code of "10" is
indicated.

6.317   Power Return Flip Flop and Network Clock Gate Tests:

a) First the LC105 maintenance FF outputs are
scanned, and the power return flip flop is
checked to see what state it is in. It is
then set to the opposite state and checked to
see that it did change state. Finally, it is
then set to the original state. If the flip-
flop fails to switch states, a failure code
of 18 is indicated.

b) The network clock scan lead (NCKSCN) is then
checked; if it is for a line group control
carrier and the scan lead indicates a clock
failure, a failure code of 19 is indicated.

6.318   Release Time Slot and Connection Number:

The LC105 maintenance circuit is reinitialized,
(time slot shift register is cleared, receiver is
disabled, and source is disabled), and the
routine clears record of time slot from memory
tables.

6.4   AMPLIFIERS AND BUS SELECT SWITCHES

6.41   The following describes the steps used to perform
the unit 1 type tests.

6.411   Initialize Maintenance Ckt. Initialize LC105,
clear the time slot shift register, disable receiver
and disable the source.

6.412   Write Time into Maintenance Circuit

        a)   Get two time slots - one in bus "0" and one in bus
            "1". Both time slots must be the same number. If
            matching time slots cannot be found, a failure code
            of "99" is indicated.

        b)   Check the time slot written into the LC105 time slot
            register. If an error is found, a failure code of
            "1" is indicated.

        c)   Enable the receiver and neutralize the LC105 threshold
            level detector. Check the scan leads to verify that
            the threshold detector is neutralized. If the thres-
            hold detector is not neutralized, a failure code of
            "2" is indicated.

6.413   Amplifier and Bus Select Switch Transmission Test

        a)   Enable the LC105 receiver.

        b)   Starting with Bus "0" and 1st Group (Line or Trunk)
            Control Carrier, select the Group Select (GOS00*) and
            Carrier Input (CIS00*) leads for that carrier.

        c)   Enable the LC105 source, wait 130 usec, and then disable
            the source. Check that the threshold level matches
            the expected threshold level. If threshold level does
            not match, indicate failure code of "31" and gain detected.

6.414   Carrier Input Bus Select Switch Test

        Disable the Carrier Input select and enable the Group Output
        select. Check the scan leads for a detectable level; and
        if anything is detected, indicate a failure code of "33".

6.415   Group Output Bus Select Switch Test

        Disable the Group Select by choosing the opposite bus for
        the carrier under test and enable the Carrier Input select.
        Check for no detectable output; and if anything is detected,
        indicate a failure code of "32".

6.416   3 Way Pad Switch Test

        a)   Insert the three way pad. Enable source and receiver and
            check that the level detected is not at the normal level,

(i.e. when the 3 way pad is not inserted).
If the threshold level is still at the
normal level, then a failure code of 35
is indicated.

6.417   Repeat steps 6.411 thru 6.416 for Bus 1.

6.418   Go back to Bus "0" and next carrier, (if all
           carriers have been tested, go to next cabinet),
           and repeat steps 6.411 thru 6.417.

6.419   After all carriers within the cabinet have been
           tested, go to the next module and repeat steps
           6.411 thru 6.418.

CABLE TO GROUP (CTG--) CONNECTIONS FOR BUS "0"

LEAD DESIGN.	FROM					TO				COAX CABLE TERM	COMMENTS
	CAB.	CARR. LEVEL	CONN (CABLE)	LC103 TERM	LC104 TERM	CAB.	CARR. LEVEL	CONN (CABLE)	LC102 TERM		
CTG00	0	0	MC11	94	-	2	0	LG08	59	2	Line Group
CTG01	0	0	MC13	95	-	3	0	LG08	59	2	
CTG02	0	0	MC07	96	-	1	1	LG08	59	2	
						4	0				
CTG03	0	0	MC14	97	-	0	1	LG08	59	2	
CTG04	0	0	-	65	-	0	0	-	59	-	Trunk Group
CTG05	0	0	MC19	66	-	1	0	MC20	59	7	
CTG06	0	0	MC10	-	96	0	2-4	L01	59	2	1st Link Carrier
CTG07	0	0	MC16	-	97	1	2-4	L01	59	5	2nd Link Carrier

CABLE TO GROUP (CTG--) CONNECTIONS FOR BUS "1"

LEAD DESIGN.	FROM					TO				COAX CABLE TERM	COMMENTS
	CAB.	CARR. LEVEL	CONN (CABLE)	LC103 TERM	LC104 TERM	CAB.	CARR LEVEL	CONN (CABLE)	LC102 TERM		
CTG10	1	0	MC11	94	-	2	0	LG10	59	2	Line Group
CTG11	1	0	MC13	95	-	3	0	LG10	59	2	
CTG12	1	0	MC07	96	-	1	1	LG10	59	2	
						4	0				
CTG13	1	0	MC14	97	-	0	1	LC10	59	2	
CTG14	1	0	MC19	65	-	0	0	MC20	59	3	Trunk Group
CTG15	1	0	-	66	-	1	-	-	59	-	
CTG16	1	0	MC10	-	96	0	2-4	L03	59	2	1st Link Carrier
CTG17	1	0	MC16	-	97	1	2-4	L03	59	2	2nd Link Carrier

TABLE A

CABLE FROM GROUP (CFG--) FOR BUS "0" CONNECTIONS

LEAD DESIG.	F R O M				T O					COAX CABLE TERM	COMMENTS
	CAB.	CARR. LEVEL	CONN (CABLE)	LC102 TERM	CAB.	CARR. LEVEL	CONN (CABLE)	LC103 TERM	LC104 TERM		
CFG00	2	0	LG08	99	0	0	MC11	81	81	4	Line Group to
CFG01	3	0	LG08	99	0	0	MC13	82	82	4	Module Control
CFG02	1	1	LG08	99	0	0	MC07	83	83	4	Connections.
	4	0									
CFG03	0	1	LG08	99	0	0	MC14	88	88	4	
CFG04	0	0	-	99	0	0	-	89	89	-	Trunk Group
CFG05	1	0	MC20	99	0	0	MC19	90	90	9	
CFG06	0	2-4	L01	99	0	0	MC10	91	-	4	1st Link Carrier
CFG07	1	2-4	L01	99	0	0	MC16	92	-	4	2nd Link Carrier

CABLE FROM GROUP (CFG--) FOR BUS "1" CONNECTIONS

LEAD DESIG.	F R O M				T O					COAX CABLE TERM	COMMENTS
	CAB.	CARR. LEVEL	CONN (CABLE)	LC102 TERM	CAB.	CARR. LEVEL	CONN (CABLE)	LC103 TERM	LC104 TERM		
CFG10	2	0	LG10	99	1	0	MC11	81	81	4	Line Group to
CFG11	3	0	LG10	99	1	0	MC13	82	82	4	Module Control
CFG12	1	1	LG10	99	1	0	MC07	83	83	4	Connections.
	4	0									
CFG13	0	1	LG10	99	1	0	MC14	88	88	4	
CFG14	0	0	MC20	99	1	0	MC19	89	89	5	Trunk Group
CFG15	1	0	-	99	1	0	-	90	90	-	
CFG16	0	2-4	L03	99	1	0	MC10	91	-	4	1st Link Group
CFG17	1	2-4	L03	99	1	0	MC16	92	-	4	2nd Link Group

TABLE B

MODULE CONTROL CABINET
CFC --, CTC --- PAM COAX CABLE CONNECTIONS

LEAD DESIG.	FROM LC101 TERM	TO BUS "0" LC102 TERM	TO BUS "1" LC102 TERM	CO-AX CABLE TERM	FROM CONN	TO LEVEL	TO CONN	COMMENTS
CFCAO	68	93	93			0		ALL WIRING INTERNAL
CTCOAO	92	64						TO MODULE CONTROL
CTC1AO	95		64					CARRIER
CFCBO	68	94		8	MC09	1	TO1	-TRUNK PORT CARRIER
CTCOBO	92	65		14				
CTC1BO	95		65	9				
CFCCO	68	95		8	MC12	2	TO1	-TRUNK PORT CARRIER
CTCOCO	92	66		14				
CTC1CO	95		66	9				
CFCDO	68	96		8	MC03	3	TO1	-TRUNK PORT CARRIER
CTCODO	92	67		14				
CTC1DO	95		67	9				
CFCEO	68	97		8	MC05	4	TO1	-TRUNK PORT CARRIER
CTCOEO	92	68		14				
CTC1EO	95		68	9				

TABLE C

LINK CARRIERS
CFC --, CTC --- PAM COAX CABLE CONNECTIONS

LEAD DESIG.	FROM LC101 TERM	TO BUS "0" LC102 TERM	TO BUS "1" LC102 TERM	COAX CABLE TERM	FROM CONN (CABLE)	TO LEVEL	TO CONN (CABLE)	COMMENTS
CFCA2	68	93	-					
CTCOA2	92	64	-					
CTC1A2	95	-	64					
CFCB2	68	94	-					
CTCOB2	92	65	-					
CTC1B2	95	-	65					
CFCC2	68	95	-	3	L04	3	L05	2nd LINK CARRIER
CTCOC2	92	66	-	7		or		
CTC1C2	95	-	66	9		4		
CFCD2	68	96	-	13	L04	3	L05	2nd LINK CARRIER
CTCOD2	92	67	-	17		or		
CTC1D2	95	-	67	19		4		

TABLE C (Cont'd)

LINE GROUP CONTROL CARRIER
CFC --, CTC ---, PAM CABLE CONNECTIONS

LEAD DESIG.	FROM LC101 TERM	TO BUS "0" LC102 TERM	TO BUS "1" LC102 TERM	COAX CABLE TERM	FROM CONN (CABLE)	TO LEVEL	TO CONN (CABLE)	COMMENTS
CFCA1	68	93	93			0		Internally Wired
CTCOA1	92	64						Within Line Group
CTC1A1	95		64					Control Carrier
CFCB1	68	94	94	2	LG09	1	LK01	LINE PORT CARRIER
CTCOB1	92	4 65		15				
CTC1B1	95		65	3				
CFCC1	68	95	95	2	LG07	2	LK01	LINE PORT CARRIER
CTCOC1	92	66		15				
CTC1C1	95		66	3				
CFCD1	68	96	96	2	LG06	3	LK01	LINE PORT CARRIER
CTCOD1	92	67		15				
CTC1D1	95		67	3				
CFCE1	68	97	97	2	LG05	4	LK01	LINE PORT CARRIER
CTCOE1	92	68		15				
CTC1E1	95		68	3				

TABLE C (Cont'd)

MODULE CONTROL CABINET
GOS- -, CIS - - FLAT CABLE CONNECTIONS

LEAD DESIGN.	FROM LC105 TERM	TO LC101 TERM	FLAT CABLE TERM.	FROM CONN	TO LEVEL	TO CONN	COMMENTS
GOS00	100	2			0		All Wiring Within
GOS10	99	3					Module Control Carrier
CIS00	50	66					
CIS10	49	74					
GOS01	98	2	3	MC15	1	LG11	-Line Group Control Carrier
GOS11	97	3	2			Or	Or
CIS01	48	66	12			T09	-Trunk Port Carrier
CIS11	47	74	16				
GOS02	96	2	3	MC08	2	L06	-Link Carrier Or
GOS12	95	3	2			T09	-Trunk Port Carrier Or
CIS02	46	66	12			or	
CIS12	45	74	16			LK09	-Line Port Carrier
GOS03	94	2	3	MC02	3	L06	-Link Carrier Or
GOS13	93	3	2			T09	-Trunk Port Carrier Or
CIS03	44	66	12			or	
CIS13	43	74	16			LK09	-Line Port Carrier
GOS04	92	2	3	MC01	4	L06	-Link Carrier Or
GOS14	91	3	2			T09	-Trunk Port Carrier Or
CIS04	42	66	12			or	
CIS14	41	74	16			LK09	-Line Port Carrier
GOS05	90	2	3	MC04	3	L11	Link Carrier
GOS15	89	3	2		or		
CIS05	40	66	12		4		
CIS15	39	74	16				
GOS06	88	2	3	MC18	2	L11	Link Carrier
GOS16	87	3	2				
CIS06	36	66	12				
CIS16	84	74	16				

TABLE D

LINE GROUP CONTROL CABINET
GOS --, CIS --, FLAT CABLE CONNECTIONS

LEAD DESIGN.	FROM LC105 TERM	TO LC101 TERM	FLAT CABLE TERM	FROM CONN (CABLE)	TO LEVEL	TO CONN (CABLE)	COMMENTS
GOS00	100	2			0		Internally wired within
GOS10	99	3					Line Group Control Carrier
CIS00	50	66					
CIS10	49	74					
GOS01	98	2	3	LG12	1	LK09	To First Line Port Carrier
GOS11	97	3	2				
CIS01	48	66	12				
CIS11	47	74	16				
GOS02	96	2	3	LG03	2	LK09	To 2nd Line Port Carrier
GOS12	95	3	2				
CIS02	46	66	12				
CIS12	45	74	16				
GOS03	94	2	3	LG04	3	LK09	To 3rd Line Port Carrier
GOS13	93	3	2				
CIS03	44	66	12				
CIS13	43	74	16				
GOS04	92	2	3	LG01	4	LK09	To 4th Line Port Carrier
GOS14	91	3	2				
CIS04	42	66	12				
CIS14	41	74	16				

TABLE D (Cont'd)

PAM CO-AX CABLE CONNECTIONS
MODULE CONTROL CABINET

LEAD DESIGN.	LC105 TERM	LC101 TERM	CO-AX CABLE TERM	FROM CONN	TO LEVEL	TO CONN	COMMENTS
TTS0	80	67	-		0		Internally Wired
TTR0	30	38	-				
TTS1	79	67	2	MC09	1	TO1	-Trunk Port Carrier
TTR1	29	38	13				See Line Group Carrier Below
TTS2	78	67	2	MC12	2	LO2	-Link Carrier or
TTR2	28	38	13			TO1	-Trunk Port Carrier
TTS3	77	67	2	MC03	3	LO2	-Link Carrier or
TTR3	27	38	13			TO1	-Trunk Port Carrier
TTS4	76	67	2	MC05	4	LO2	-Link Carrier or
TTR4	26	38	13			TO1	-Trunk Port Carrier
TTS5	75	67	5	MC03	3 or 4	LO2	-Link Carrier or
TTR5	25	·38	19	MC05		TO1	Trunk Port Carrier
TTS6	74	67	5	MC12	2	LO2	-Link Carrier or
TTR6	24	38	19			TO1	Trunk Port Carrier

LEAD DESIGN.	LC105 TERM	LC105 TERM	CO-AX CABLE TERM	FROM CONN	TO LEVEL	TO CONN	
TTS1	79	80	2	MC06	1	LG02	Line Group Control Carrier.
TTR1	29	30	12				
TTS2	78	67	6				NOTE: Connections to Line Port Carriers Made Via This Carrier.
TTR2	28	38	16				
TTS3	77	77	8				
TTR3	27	27	18				
TTS4	76	76	4				
TTR4 ·	26	26	14				

TABLE E

LINE GROUP CONTROL CARRIER
TTS -, TTR - COAX PAM CABLE CONNECTIONS

LEAD DESIGN.	FROM LC105 TERM	TO LC101 TERM	COAX CABLE TERM	FROM CONN (CABLE)	TO LEVEL	TO CONN TERM	COMMENTS
TTS0	80	67	-		0		Internally Wired
TTR0	30	38	-				
TTS1	79	67	5	LG09	1	LK01	Line Port Carrier
TTR1	29	38	12				
TTS2	78	67	5	LG07	2	LK01	Line Port Carrier
TTR2	28	38	12				
TTS3	77	67	5	LG06	3	LK01	Line Port Carrier
TTR3	27	38	12				
TTS4	76	67	5	LG05	4	LK01	Line Port Carrier
TTR4	26	38	12				

TABLE E (Cont'd)

MODULE CONTROL CARRIERS
CBI_ _ _*. GBI_ _*, LCP_ _*, FLAT CABLE CONNECTIONS

LEAD DESIG.	FROM				VIA CABLE			TO				COMM-ENTS
	CAB.	LC-	SLOT	TERM.	CONN.	CONN. TERM.	CONN.	CAB.	LC-	SLOT	TERM.	
CBI0A0*	0/1	101	--	96	---	--	---	0/1	102	03	83	Bus 0
CBI0B0*	0/1	101	01	96	T09	18	MC15	0/1	102	03	82	Bus 0
CBI0C0*	0/1	101	01	96	T09	18	MC08	0/1	102	03	81	Bus 0
CBI0D0*	0/1	101	01	96	T09	18	MC02	0/1	102	03	89	Bus 0
CBI0E0*	0/1	101	01	96	T09	18	MC01	0/1	102	03	88.	Bus 0
CBI1A0*	0/1	101	--	76	---	--	---	0/1	102	04	83	Bus 1
CBI1B0*	0/1	101	01	76	T09	13	MC15	0/1	102	04	82	Bus 1
CBI1C0*	0/1	101	01	76	T09	13	MC08	0/1	102	04	81	Bus 1
CBI1D0*	0/1	101	01	76	T09	13	MC02	0/1	102	04	89	Bus 1
CBI1E0*	0/1	101	01	76	T09	13	MC01	0/1	102	04	88	Bus 1

NOTE: When a line group control carrier is in a Module Control Cabinet, see Line Group Control Carrier in cabinets "0" and "1".

LEAD DESIG.	CAB.	LC-	SLOT	TERM.	CONN.	CONN. TERM.	CONN.	CAB.	LC-	SLOT	TERM.	COMM-ENTS
GBI04*	0	121	27	57	---	--	---	0	102	03	80	Bus 0
GBI05*	0	121	27	56	MC27	2	MC21	1	102	03	80	Bus 0
GBI14*	1	121	27	57	MC28	6	MC22	0	102	04	80	Bus 1
GBI15*	1	121	27	56	---	--	---	1	102	04	80	Bus 1
LCP04*	0	121	27	5	---	--	---	0	102	03	56	Bus 0
LCP05*	0	121	27	4	MC27	4	MC21	1	102	03	56	Bus 0
LCP14*	1	121	27	5	MC28	8	MC22	0	102	04	56	Bus 1
LCP15*	1	121	27	4	---	--	---	1	102	04	56	Bus 1

TABLE F

LINK CARRIER CABLING
CBI_ _ _*, GBI_ _*, FLAT CABLE CONNECTIONS

LEAD DESIG.	FROM				VIA CABLE			TO				COMMENTS
	CAB.	LC-	SLOT	TERM.	CONN.	CONN. TERM.	CONN.	CAB.	LC-	SLOT	TERM.	
CBI0A2*	0/1	101	03	96	---	--	---	0/1	102	01	83	Bus 0
CBI0B2*	0/1	101	16	96	---	--	---	0/1	102	01	82	Bus 0
CBI0C2*	0/1	101	03	96	L10	2	L08	0/1	102	01	81	Bus 0
CBI0D2*	0/1	101	16	96	L10	6	L08	0/1	102	01	89	Bus 0
CBI1A2*	0/1	101	03	76	---	--	---	0/1	102	02	83	Bus 1
CBI1B2*	0/1	101	16	76	---	--	---	0/1	102	02	82	Bus 1
CBI1C2*	0/1	101	03	76	L10	4	L08	0/1	102	02	81	Bus 1
CBI1D2*	0/1	101	16	76	L10	8	L08	0/1	102	02	89	Bus 1
GBI06*	0	121	27	55	MC10	9	L01	0	102	01	80	Bus 0
GBI07*	0	121	27	54	MC16	9	L01	1	102	01	80	Bus 0
GBI16*	1	121	27	55	MC10	9	L03	0	102	02	80	Bus 1
GBI17*	1	121	27	54	MC16	9	L03	1	102	02	80	Bus 1

TABLE F (Cont'd)

LINE GROUP CONTROL CARRIER IN CABINETS "0" OR "1"
CBI_ _ _*, GBI_ _*, LCP_ _*, FLAT CABLE CONNECTIONS

LEAD DESIG.	FROM				VIA CABLE			TO				COMM-ENTS
	CAB.	LC-	SLOT	TERM.	CONN.	CONN. TERM.	CONN.	CAB.	LC-	SLOT	TERM.	
CBI0A1*	0/1	101	--	96	----	--	---	0/1	102	02	83	Bus 0
CBI0B1*	--	--	--	--	----	--	---	--	--	--	--	--
CBI0C1*	0/1	101	01	96	2LK09	96	MC08	0/1	102	02	81	Bus 0
CBI0D1*	0/1	101	01	96	3LK09	96	MC02	0/1	102	02	89	Bus 0
CBI0E1*	0/1	101	01	96	4LK09	96	MC01	0/1	102	02	88	Bus 0
CBI1A1*	0/1	101	--	76	----	--	---	0/1	102	02	83	Bus 1
CBI1B1*	--	--	--	--	----	--	---	--	--	--	--	--
CBI1C1*	0/1	101	01	76	2LK09	76	MC08	0/1	102	03	81	Bus 1
CBI1D1*	0/1	101	01	76	3LK09	76	MC02	0/1	102	03	89	Bus 1
CBI1E1*	0/1	101	01	76	4LK09	76	MC01	0/1	102	03	88	Bus 1

NOTE: CABLING LG13 to MC17 routes CBI(0-1) (C-E) 1* leads from Module Control Carrier to line group control carrier.

| LEAD DESIG.	FROM				VIA CABLE			TO				COMM-ENTS
GBI03*	0	121	27	58	MC31	3	LG23	0	102	02	80	Bus 0
GBI02*	0	121	27	59	MC33	3	LG23	1	102	02	80	Bus 0
GBI13*	1	121	27	58	MC31	3	LG26	0	102	03	80	Bus 1
GBI12*	1	121	27	59	MC33	3	LG26	1	102	03	80	Bus 1
LCP03*	0	121	27	7	MC31	2	LG23	0	102	02	56	Bus 0
LCP02*	0	121	27	6	MC33	2	LG23	1	102	02	56	Bus 0
LCP13*	1	121	27	7	MC31	2	LG26	0	102	03	56	Bus 1
LCP12*	1	121	27	6	MC33	2	LG26	1	102	03	56	Bus 1

TABLE F (Cont'd)

LINE GROUP CONTROL CARRIER IN CABINETS 2 THROUGH 4
## CBI___*, GBI__*, LCP__*, FLAT CABLE CONNECTIONS

LEAD DESIG.	FROM				VIA CABLE			TO				COMMENTS
	CAB.	LC-	SLOT	TERM.	CONN.	CONN. TERM.	CONN.	CAB.	LC-	SLOT	TERM.	
CBI0A1*	2-4	101	--	96	----	--	---	2-4	102	02	83	Bus 0
CBI0B1*	2-4	101	01	96	1LK09	19	LG12	2-4	102	02	82	Bus 0
CBI0C1*	2-4	101	01	96	2LK09	19	LG03	2-4	102	02	81	Bus 0
CBI0D1*	2-4	101	01	96	3LK09	19	LG04	2-4	102	02	89	Bus 0
CBI0E1*	2-4	101	01	96	4LK09	19	LG01	2-4	102	02	88	Bus 0
CBI1A1*	2-4	101	--	76	----	--	---	2-4	102	03	83	Bus 1
CBI1B1*	2-4	101	01	76	1LK09	14	LG12	2-4	102	03	82	Bus 1
CBI1C1*	2-4	101	01	76	2LK09	14	LG03	2-4	102	03	81	Bus 1
CBI1D1*	2-4	101	01	76	3LK09	14	LG04	2-4	102	03	89	Bus 1
CBI1E1*	2-4	101	01	76	4LK09	14	LG01	2-4	102	03	88	Bus 1
GBI00*	0	121	27	61	MC32	3	LG23	2	102	02	80	Bus 0
GBI01*	0	121	27	60	MC30	3	LG23	3	102	02	80	Bus 0
GBI02*	0	121	27	59	MC33	3	LG23	4	102	02	80	Bus 0
GBI10*	1	121	27	61	MC32	3	LG26	2	102	03	80	Bus 1
GBI11*	1	121	27	60	MC30	3	LG26	3	102	03	80	Bus 1
GBI12*	1	121	27	59	MC33	3	LG26	4	102	03	80	Bus 1
LCP00*	0	121	27	9	MC32	2	LG23	2	102	02	36	Bus 0
LCP01*	0	121	27	8	MC30	2	LG23	3	102	02	36	Bus 0
LCP02*	0	121	27	7	MC33	2	LG23	4	102	02	36	Bus 0
LCP10*	1	121	27	9	MC32	2	LG26	2	102	03	36	Bus 1
LCP11*	1	121	27	8	MC30	2	LG26	3	102	03	36	Bus 1
LCP12*	1	121	27	7	MC33	2	LG26	4	102	03	36	Bus 1

TABLE F (Cont'd)

SIMPLIFIED PAM TEST DIAGRAM
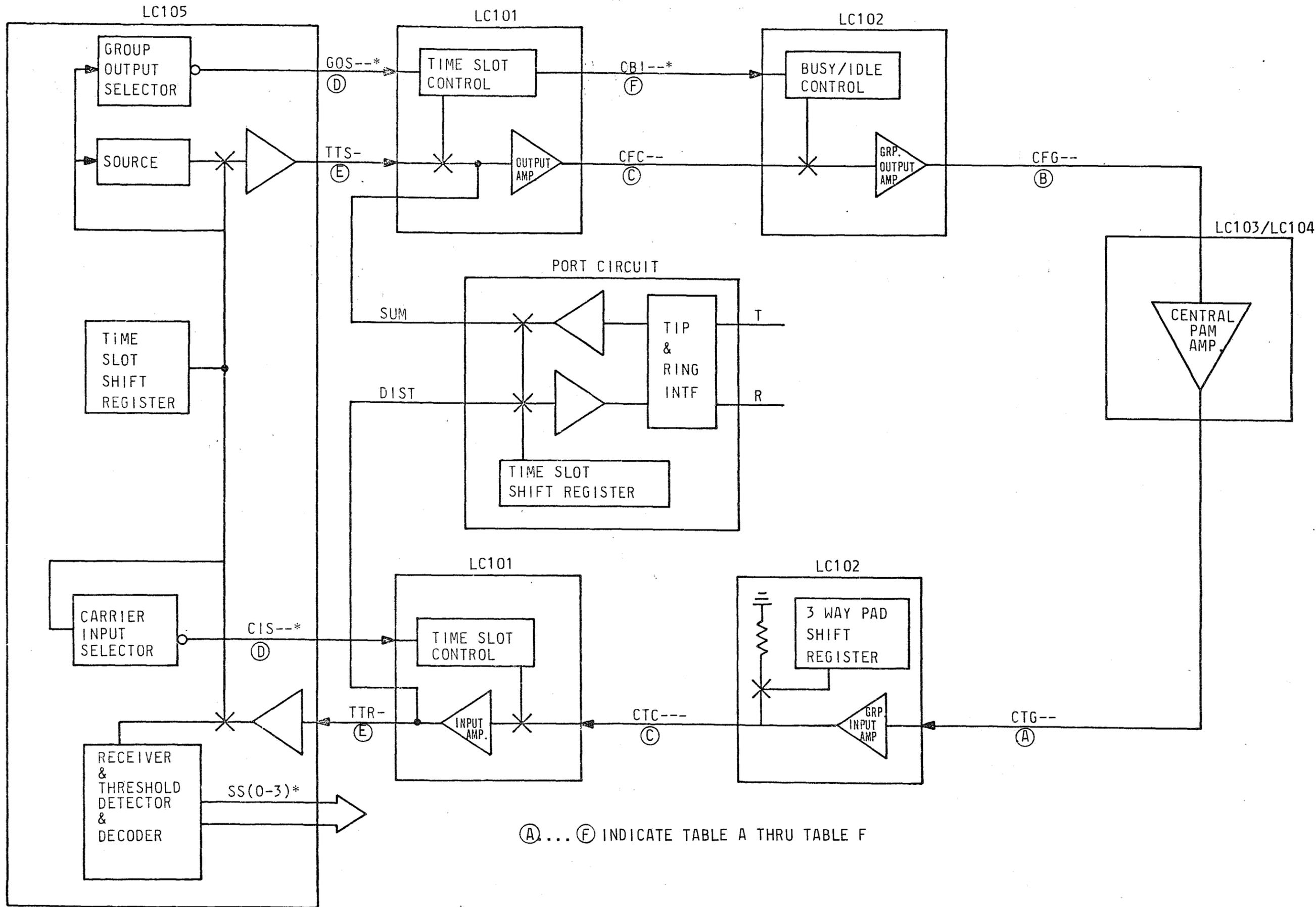
Ⓐ ... Ⓕ INDICATE TABLE A THRU TABLE F

CSS 201L NETWORK MODULE TRANSMISSION BLOCK DIAGRAM
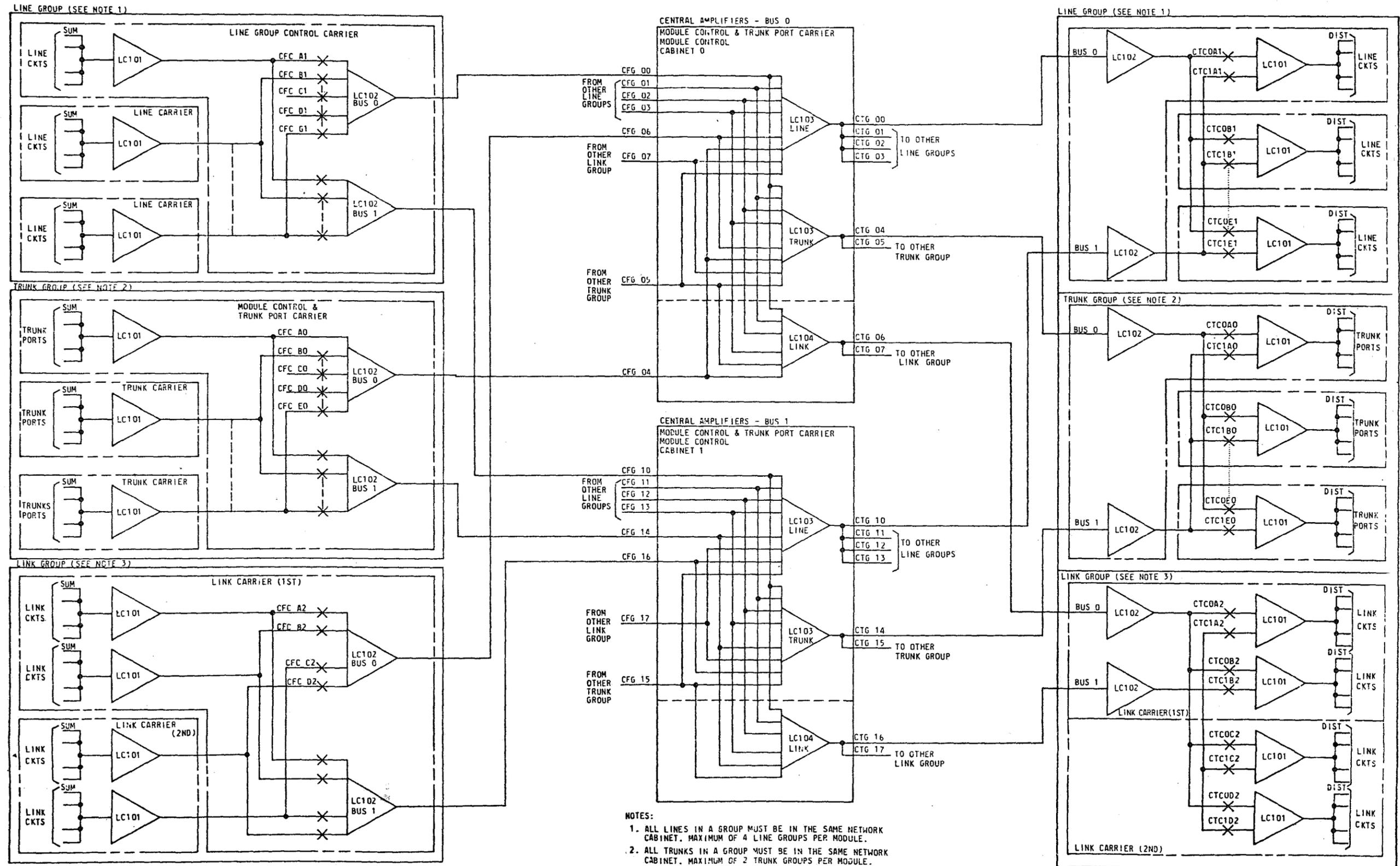
NOTES:

1. ALL LINES IN A GROUP MUST BE IN THE SAME NETWORK CABINET. MAXIMUM OF 4 LINE GROUPS PER MODULE.

2. ALL TRUNKS IN A GROUP MUST BE IN THE SAME NETWORK CABINET. MAXIMUM OF 2 TRUNK GROUPS PER MODULE.

3. ALL LINKS IN A GROUP MUST BE IN THE SAME NETWORK CABINET. MAXIMUM OF 2 LINK CARRIERS PER GROUP. MAXIMUM OF 2 GROUPS PER MODULE.

Reason for Issue:
New section

MANAGER, DENVER PBX PECC