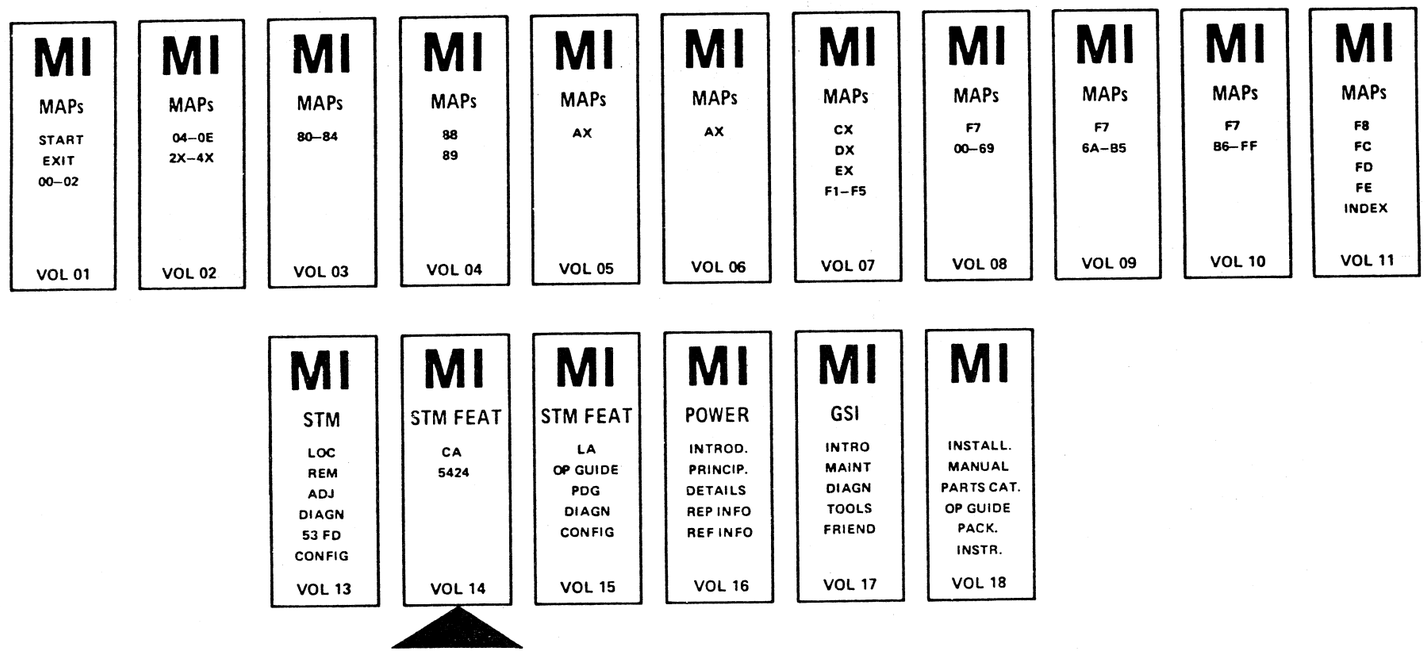
IBM Maintenance Information



IBM 4331 Processor Supplement to MAPs Features

EC 366493
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P/N 4687036
Page 1 of 2
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STM Features

Preface

This manual contains supplementary information to the MAPs, and must not be used as a stand-alone maintenance document. The PT-CE should use this manual only under guidance of the MAPs or of FSC-personnel.

Volume Table of Contents

Volume: 14
Title: MI STM Features CA, 5424
Machine Type: 4331-2
Power Design Level: 4/5
B/M Number: 8481398 + 8481396 and/or 8481397

Safety

Personal Safety

Personal safety cannot be over-emphasized. To ensure your safety and that of co-workers, always observe the safety precautions given during your safety training and adhere to the following:

General Safety Practices

Observe the general safety practices and the procedure for performing artificial respiration that are outlined in CE Safety Practices card, Order No. S229-1264 (shown here).

Machine Warning Labels

Pay attention to the warning labels placed in hazardous areas of the machines.

Danger

Before switching on power, ensure that no person is exposed to risk and that all equipment covers for hazardous areas are closed.

SAFETY NOTICES

CE SAFETY PRACTICES

All Customer Engineers are expected to take every safety precaution possible and observe the following safety practices while maintaining IBM equipment.

1. You should not work alone under hazardous conditions or around equipment with dangerous voltage. Always advise your manager if you MUST work alone.
2. Remove all power AC and DC when removing or assembling major components, working in immediate area of power supplies, performing mechanical inspection of power supplies and installing changes in machine circuitry.
3. Wall box power switch when turned off should be locked or tagged in off position. "Do not Operate" tags, form 229-1266, affixed when applicable. Pull power supply cord whenever possible.
4. When it is absolutely necessary to work on equipment having exposed operating mechanical parts or exposed live electrical circuitry anywhere in the machine, the following precautions must be followed.
   a. Another person familiar with power off controls must be in immediate vicinity.
   b. Rings, wrist watches, chains, bracelets, metal cuff links, shall not be worn.
   c. Only insulated pliers and screwdrivers shall be used.
   d. Keep one hand in pocket.
   e. When using test instruments be certain controls are set correctly and proper capacity, insulated probes are used.
   f. Avoid contacting ground potential (metal floor strips, machine frames, etc.—use suitable rubber mats purchased locally if necessary).
5. Safety Glasses must be worn when:
   a. Using a hammer to drive pins, riveting, staking, etc.
   b. Power hand drilling, reaming, grinding, etc.
   c. Using spring hooks, attaching springs.
   d. Soldering, wire cutting, removing steel bands.
   e. Parts cleaning, using solvents, sprays, cleaners, chemicals, etc.
   f. All other conditions that may be hazardous to your eyes. REMEMBER, THEY ARE YOUR EYES.
6. Special safety instructions such as handling Cathode Ray Tubes and extreme high voltages, must be followed as outlined in CEM's and Safety Section of the Maintenance Manuals.
7. Do not use solvents, chemicals, greases or oils that have not been approved by IBM.
8. Avoid using tools or test equipment that have not been approved by IBM.
9. Replace worn or broken tools and test equipment.
10. The maximum load to be lifted is that which in the opinion of you and management does not jeopardize your own health or well-being or that of other employees.
11. All safety devices such as guards, shields, signs, ground wires, etc., shall be restored after maintenance.
12. Each Customer Engineer is responsible to be certain that no action on his part renders product unsafe or exposes hazards to customer personnel.
13. Place removed machine covers in a safe out-of-the-way place where no one can trip over them.
14. All machine covers must be in place before machine is returned to customer.
15. Always place CE tool kit away from walk areas where no one can trip over it (i.e., under desk or table).
16. Avoid touching mechanical moving parts (i.e., when lubricating, checking for play, etc.).
17. When using stroboscope — do not touch ANYTHING — it may be moving.
18. Avoid wearing loose clothing that may be caught in machinery. Shirt sleeves must be left buttoned or rolled above the elbow.
19. Ties must be tucked in shirt or have a tie clasp (preferably non-conductive) approximately 3 inches from end. Tie chains are not recommended.
20. Before starting equipment, make certain fellow CE's and customer personnal are not in a hazardous position.
21. Maintain good housekeeping in area of machines while performing and after completing maintenance.

ARTIFICIAL RESPIRATION

General Considerations

1. Start Immediately, Seconds Count
   Do not move victim unless absolutely necessary to remove from danger. Do not wait or look for help or stop to loosen clothing, warm the victim or apply stimulants.
2. Check Mouth for Obstructions
   Remove foreign objects — Pull tongue forward.
3. Loosen Clothing — Keep Warm
   Take care of these items after victim is breathing by himself or when help is available.
4. Remain in Position
   After victim revives, be ready to resume respiration if necessary.
5. Call a Doctor
   Have someone summon medical aid.
6. Don't Give Up
   Continue without interruption until victim is breathing without help or is certainly dead.

Rescue Breathing for Adults
Victim on His Back Immediately

1. Clear throat of water, food, or foreign matter.
2. Tilt head back to open air passage.
3. Lift jaw up to keep tongue out of air passage.
4. Pinch nostrils to prevent air leakage when you blow.
5. Blow until you see chest rise.
6. Remove your lips and allow lungs to empty.
7. Listen for snoring and gurgling, signs of throat obstruction.
8. Repeat mouth to mouth breathings 10-20 times a minute.
   Continue rescue breathing until he breathes for himself.

Thumb and finger positions

Final mouth to mouth position

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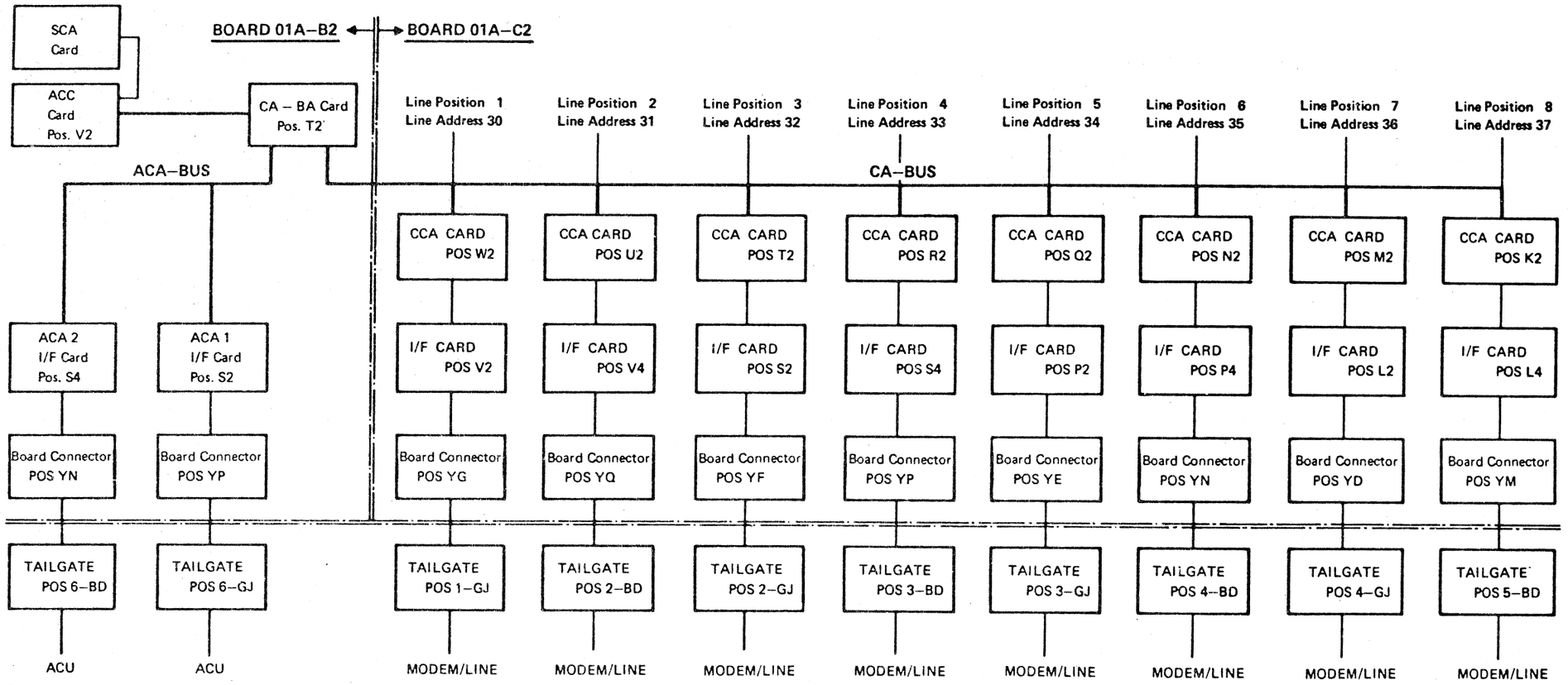
Table of Contents

Table of Contents (continued)

CA Data Flow (Boards 01A-B2/C2, Tailgate)



Only two ACA's can be connected.

This chart shows the data flow, and the board, card, and connector positions for the Communications Adapter (CA).

Depending on the line type and line speed, different types of CCA and I/F cards may be installed. All possible configurations are shown on page page 0004.

The functions of the ACA, CCA and I/F cards are described on page 0002 and 0003.

Legend:

	ACC	Adapter Common Card
	CA–BA	CA Bus Adapter
	ACA	Auto Call Adapter
	ACU	Auto Call Unit
	CCA	Communication Common Adapter
	I/F	Line Inter Face
	SCA	Standard Channel Adapter

CA Data Flow (continued)

CA Bus

The CA Bus is a parallel data bus (8 bits + Parity bit) which transfers (transmits and receives) data between the CA Bus Adapter (CA BA) and the Communication Common Adapter (CCA) Cards. The CCA contains a Serializer/Deserializer Register (SERDES). The data transfer between the CCA and the Line Interface Card (I/F) is in serial form. The I/F card converts the signal levels from VTL to EIA/CCITT and vice versa.

Auto Call Adapter Bus (ACA Bus)

The Auto Call Adapter Bus (ACA-BUS) is a parallel data bus (4 bits) which transfers the 'Dial Data'(4 bits) and Control Data, i.e. the number to be dialed, from the CA-BA card to the Auto Call Adapter Interface Card (ACA Card). The ACA Interface card converts the signal levels from VTL to EIA/CCITT and vice verse. The actual dialing and switching of the line to the modem is done by the ACU box.

CCA Card

The microcode controls the line operation via the CCA card. Some of the functions are general, and some are special for this type of operation (S/S, BSC or SDLC).

General Functions

- Buffers one transmit/receive byte.
- Establishes bit timing.
- Performs parallel to serial conversion and vice versa using a Serialize/Deserialize Register (SERDES).
- Controls the modem using the Modem Status (M-Stat) and Modem Control (M-Ctrl) Registers, (including the modem function Auto Answer).
- Interval timing. The interval timer can be set by the microcode.

Special BSC Function

- Recognition of SYNC bytes when not in SYNC.

Special S/S Functions

- Appends start and stop bits onto each transmitted byte
- Removes start and stop bits from each received byte
- Checks for a stop bit for each received byte
- Checks parity of each received byte
- Detects break sequence
- Break sequence transmission
- Clocking (optional)

Special SDLC Functions

- Flag detection
- Zero insertion
- Invalid sequence detection
- Sending contineous flags

CA Data Flow

Adapter Interface Card Overview

The general function of the I/F card is signal level conversion.
One of the following types of I/F card is used:

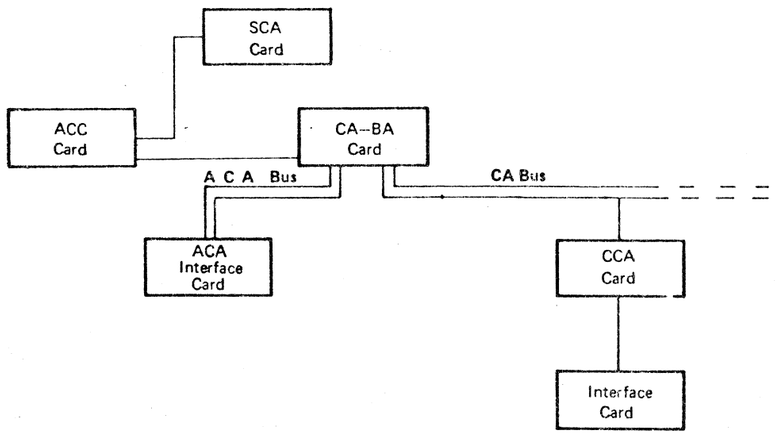
1. EIA--for details, see page 0060
2. V35--for details, see page 0078
3. DDS--for details, see page 0080
4. Local attachment -for details, see page 0082
5. Integrated modem -for details, see page 0062
6. US SNAA
7. US LLSB
8. US LLSM
9. WT SNAA
10. WT LL

   } see page 0064-0074

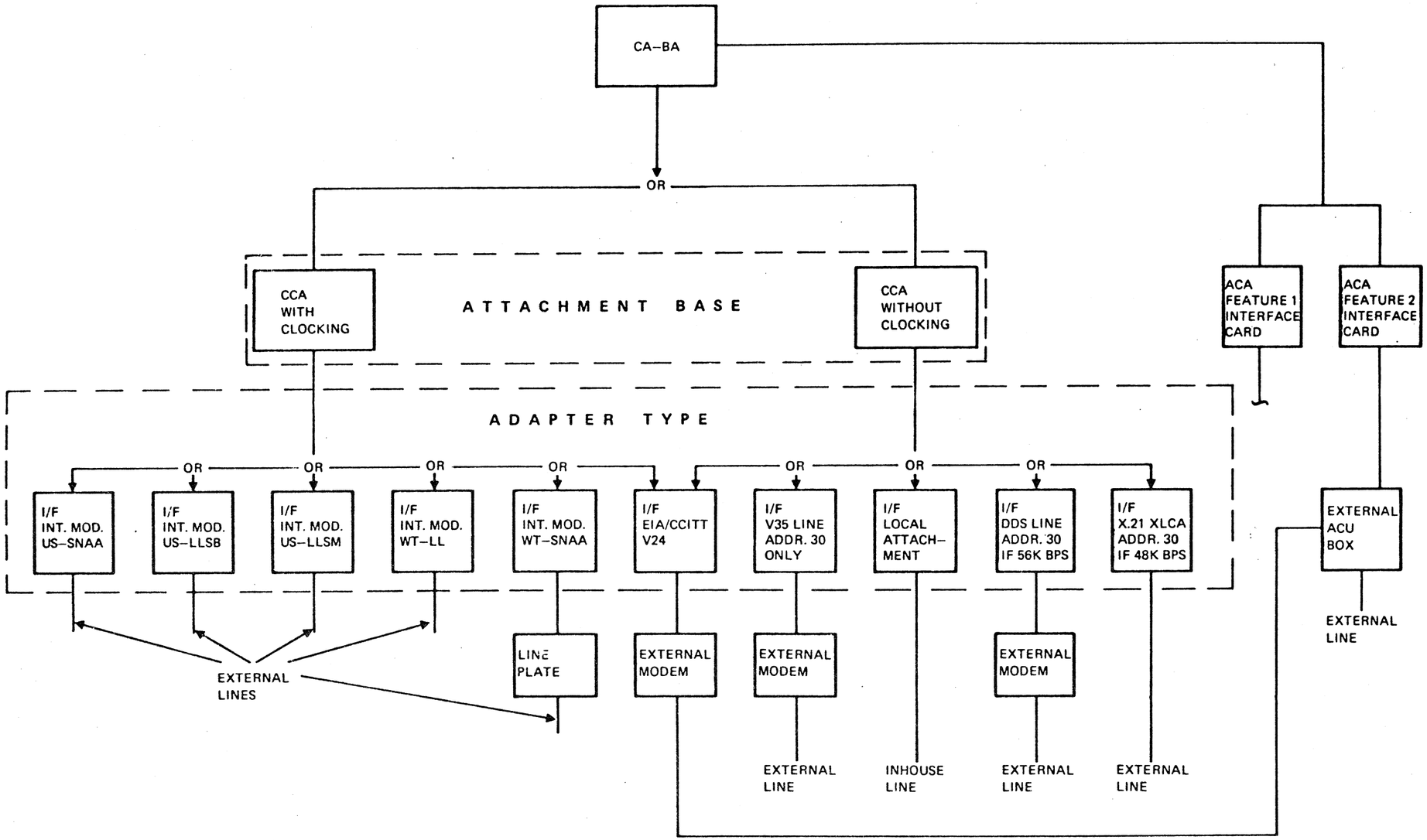
11. X.21 XLCA (see page 0086)

ACA Card

The ACA card is the same card type as the EIA Interface Card. Its only function in the ACA interface is level conversion. For details, see page 0060.



CCA-I/F Hardware Configuration



CCA-I/F Hardware Configuration (continued)

Adapter Types

- INT. MOD : Integrated Modem, for details see page 0062
- US-LL : Leased Line, US
- US-SNAA : Switched Network Auto Answer, US
- US-LLSB : Leased Line, Switched Network Backup with Auto Answer, US
- US-LLSM : Leased Line, Switched Network Backup with Manual Answer, US
- WT-LL : Leased Line, WT
- WT-SNAA : Public Switched Network Auto Answer, WT
- EIA/CCITT, V24 : Interface for External Modem, Low and Medium Speed, for details, see page 0060
- V35 : Interface for External Modem High Speed, for details, see page 0078
- DDS : Dataphone® Digital Service Adapter for External Modem, Medium and High Speed, for details, see page 0080
- X.21 XLCA : Interface for general purpose data network, see page 0086
- Local Attachment : Direct connection to a terminal with EIA/CCITT, V24 interface without modem, see page 082.

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This chart shows all possible configurations of a CA line.

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intentionally left blank

CA Adapter Interface Chart

This chart is used to install the 4331 Communications Adapter. For each line interface installed, refer to the appropriate pages to configure and test the line.

Interface Type	Go To Binder	Interface Card Jumpers	Notes:	Board 01A-C2 Wiring	Notes:	Diagnostics	Configuration	Ext. Cables
External Modem EIA, CCITT, V24	Vol 14, Page Vol 30, Page	0060 PC202	1 8	0090 PC202	5 6 8	3102	4100 Vol 04, MAP88FF	0100 Vol 18, Page 2052
Integrated Modem 38LS	Vol 14, Page Vol 30, Page	0062-0076 PC202	2 3 8	0090 PC202	5 6 7 8	3102	4100 Vol 04, MAP88FF	0100 Vol 18, Page 2052
V35	Vol 14, Page Vol 30, Page	0078 PC202	1 3 8	0090 PC202	5 8	3102	4100 Vol 04, MAP88FF	0100 Vol 18, Page 2052
DDSA	Vol 14, Page Vol 30, Page	0080 PC202	4 8	0090 PC201	5	3102	4100 Vol 04, MAP88FF	0100 Vol 18, Page 2052
Local Attachment	Vol 14, Page Vol 30, Page	0082-0084 PC202	4 8	0090 PC201	5	3102	4100 Vol 04, MAP88FF	0100 Vol 18, Page 2052
Autocall (ACA)	Vol 14, Page Vol 30, Page	0060 PC202	3 8	Not Applicable		3102	4100 Vol 04, MAP88FF	0100 Vol 18, Page 2052
X.21 XLCA	Vol 14, Page Vol 30, Page	0086 PC202	8	Not Applicable		3102	4100 Vol 04, MAP88FF	0100 Vol 18, Page 2052

Notes:

1 Wrap Test Jumper Required

2 Transmit Level Jumpers Required

3 Personalization Jumpers Required

4 Transmission Rate Jumpers Required

5 Transmission Mode Wiring Required

6 Transmission Rate Wiring Required If CCA Card Provides Clock

7 2W/4W Wiring Required If Leased Line

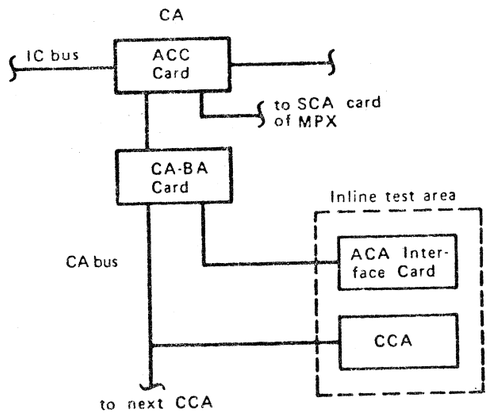
8 Page PC 202 shows the factory setup for the I/F cards. This page is shipped once as part of the initial shipment and will not be updated.

CA-BA Test

Purpose

There are basically four tests available:
1. ACC card test
2. CA static test
3. CA dynamic test
4. CA-bus/CCA interface test.

These tests check the circuitry of the CA-BA and ACC, and the CA-bus which connects the CA-BA with the CCA's.



Description

Normally the four tests run together as one test, since the successful execution of one test depends on the error-free run of the previous one. However, the tests can be run individually.
Each test consists of several routines which can be run separately or in sequential groups, whereby the successful execution of routines does not depend on the result of other routines.

Exception:

Group 1 = X'29'-X'2B'
Group 2 = X'2D'-X'35'
Group 3 = X'36'-X'39'
must be used in sequential groups to avoid invalid results.

ACC Card Test

This test consists of routines X '01'-X '09', which test the ACC circuitry to make sure that the ACC works properly before the CA-BA circuitry is tested.

CA BA Static Test

This test consists of routines X'0A'-X'12', which test the following functions of the CA-BA registers:

- Addressing
- Set and reset by different bit patterns

CA Dynamic Test

This test consists of routines X'13'-X'26', which test the following functions of CA-BA operations:

- Tag handling
- Addressing
- Trap handling
- Check handling

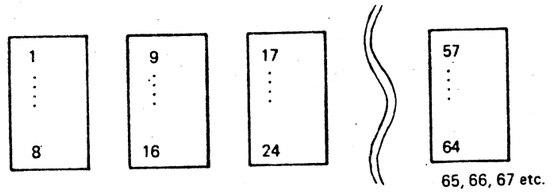
CA Bus/CCA Interface Test

This test consists of routines X'27'-X'39', which test the following functions:
- CCA addressing
- Static register operation
- Tag handling
- Valid/invalid command handling

Successful execution of this test ensures that the CA bus and the CCA work properly to the extent that the PU can be loaded and further testing by inline tests can be done.

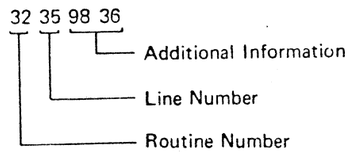
Test Result Display

Symptom Codes:
If ANALYSIS is enabled, each error generates an eight-digit symptom code. The symptom codes are displayed in groups of eight.



If more than 64 codes are generated, code 64 is overwritten.

Meaning of Sympton Code



Reference Code:
When at least one symptom code is shown, a reference code is displayed on line 23 and is used as the entry point to the MAP's.

CA-BA Test

Test Handling - Actions

Prerequisites:

1. Power complete
2. IML
3. Diagnostic diskette inserted
4. PU/BSM test, IC-bus test run

How to Select the Test

1. Call M/S PROGRAM SELECTION.
   Hold down ALT key and press DIAG key. [A]
2. Key in selection for 'CENTRAL COMPLEX', press ENTER [B]
3. Select CA/BA TEST, press ENTER. [C]
4. Press ENTER to start test.

- Max. run time (8 lines installed) about 2 minutes.
- Test stops at test end, displaying STOPPED in. (B)
- If an error is detected the test also runs to the end and in addition to the message STOPPED, a reference code and at least 1 symptom code is shown (A) and (C)
  By pressing ENTER a running test or routine can be stopped. Stop occurs always at routine end.

Run modes

The following parameters (D) can be specified

LOOP (Y/N)
N=default. If Y selected, the test or routine will loop until stopped.

RTN: 01 TO:..
a. 01 TO..= default if no TO-routine is specified. Test runs from routine 01 to last routine.

b. To run or loop a complete test, not starting with RTN01:
Enter start routine number in the RTN-field, and start routine number minus 1 in the TO-field:
RTN: 08 TO: 07

c. To run or loop a specific routine:
Enter the routine number in both fields:
RTN: 05 TO: 05

Note: Routine 00 must not be entered. This is an auxiliary routine for special purposes.

ANALYSIS (Y/N):
Y=Default. If analysis is enabled (Y), symptom codes and a reference code are displayed in (C) and (A) in case of error.
Enter 'N' to suppress error analysis. This can be useful if 'loop a routine' is specified. In this case the routine loops under real-time conditions, that means, the analysis phase does not always interrupt the test execution.

ADAPT:X
The adapter number is displayed automatically. Do not change the adapter number. To test another adapter select the appropriate test from the CENTRAL COMPLEX menu.
If a valid adapter number would be entered, the test starts but generates false reference codes.
If an invalid number is entered, the message INV. INPUT is shown in (B)

What to Do in Case of Error

If the test stops with a reference code displayed in A, use this reference code as an entry to the Reference Code Directory to find the appropriate MAP.

How to Terminate the Test

If you want to run another test return to M/S PROGRAM SELECTION. Select new test, otherwise perform the following steps:
1. Press ENTER, to stop the test
2. Insert control diskette
3. Perform re-IML
4. Return machine

CA

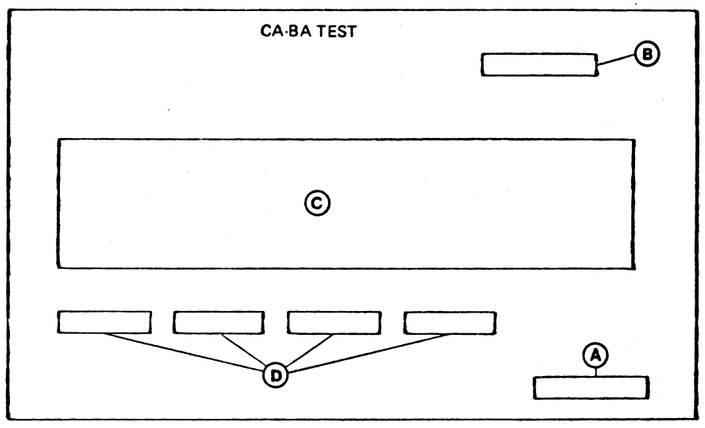
Test Handling - Results

Screen displays:

[A] 'IBM MAINTENANCE AND SERVICE PROGRAM SELECTION'

[B] 'CENTRAL COMPLEX TEST SELECTION'

[C]



(A) Reference code
(B) Status of test
(C) Symptom code display field
(D) Run mode selection field

CA Channel Check log-layout

	BA-Status REGISTER	BA-Sense Reg.	CA-Bus Sense Reg.	BA-DIAGNOSTIC Sense Reg.	BA Logic Sense Reg.
	↓	↓	↓	↓	↓
88 EX	XX 01	SS	TT	VV	WW

1 - Tag Timeout on CA-Bus
2 - Parity Check on CA-Bus Out
3 - Parity Check on CA Bus In
4 - ACC-BA Sense Bus Check
5 - ACC-BA Common Bus Check
6 - TRD Function not working
7 - Invalid BA Exception Trap
8 - Unexpected TRD Trap
9 - Unexpected BA Exception Timer Trap
A - CCA Output Request (NOR) when Input Request (NIR) was expected
B - CCA Input Request (NIR) when Output Request (NOR) was expected
C - Invalid BA-status Trap code

XX-(BA-Status Reg.)

Bit 0 - Check Trap
1, 2, 3 } coded →
4 - ----
5, 6, 7 } PIO Address

Bit 1	2	3	
0	0	1	TRD Trap
0	1	0	CA-Bus Instruction complete Trap
0	1	1	----
1	0	0	Normal Input Request (NIR)
1	0	1	Normal Output Request (NOR)
1	1	0	B-Stat available Trap
1	1	1	---

SS-(BA Sense Reg.)

Bit 0 - Sense Bus Check
1 - IRM Operation
2 - Read Command
3 - ACU Trap
4 - Interval Timer Trap
5 - IC Trap Request
6 - CA-Bus Parity Check
7 - Tag Time out

TT-(CA-Bus Sense Reg.)

CA-Bus Address
or Command
or Data

VV-(BA-Diagnostic Sense Reg.)

Bit 0 - Tag IO
1 - Tag TA
2 - Tag TC
3 - Tag TD
4 - Tag IRR
5 - Tag PV
6 - Tag Valid
7 - Diagnostic Mode

WW-(BA Logic Sense Reg.)

Bit 0 - Address Time
1 - Command Time
2 - Data Time
3 - High Speed Data Time
4 - Idle State
5 - First IOI
6 - Second IOI Prepare
7 - Normal Input Request

CA Unit Check Log and Sense Byte Analysis

Use the CA Unit Check log display function to get the CA log entries displayed on the Operator's Console.

- Data checks and time outs are not logged for SS and BSC. For SDLC, only equipment checks and overruns are logged. Use the appropriate tool (e.g. EREP) - provided by the operation system being used - to get information about not logged unit checks (the operating system may have logged them).

Format of log entry:

LINE NBR	2nd SENSE BYTE	CMD	CHECK COUNT	TIME OF LAST ENTRY MO DY HR MI	CONFIG BYTE 2-3
XX	XX	XX	XXX	XX XX XX XX	XX XX

How to use the table on page 0042, 0043:

1. Compare second sense byte value with value in table in column named: 'second sense byte'.
2. Go from matching number to the right until a one is found in one of the six rows. The column head (Ⓐ-Ⓕ) is used to pick up (on facing page) the reason for the failure.
3. Do recommended actions
4. If error not found go to number 2 (next time to 3), use column header to pick up (on facing page) the next failure reasons.
5. Do recommended actions.

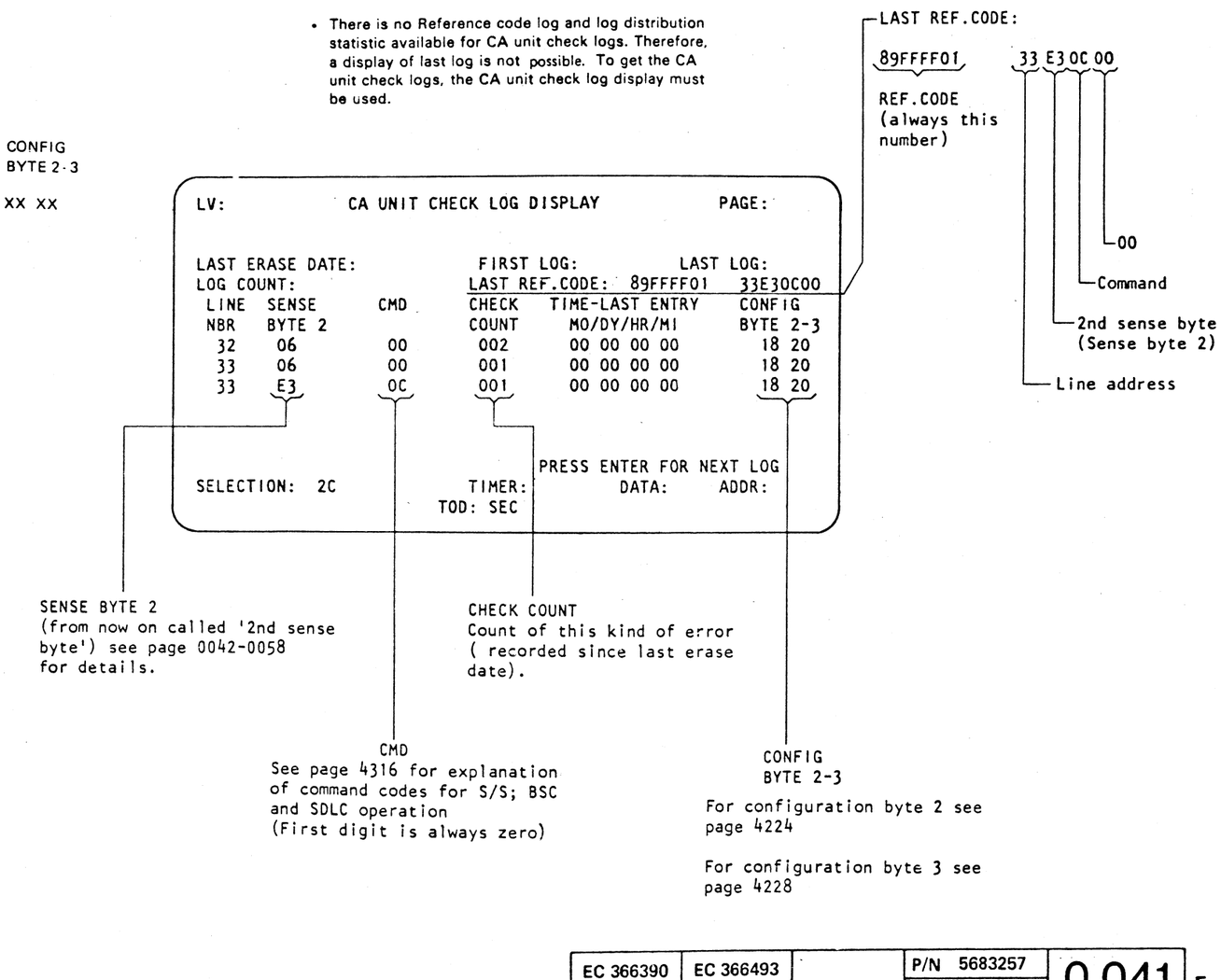
Example:

- 2nd sense byte shows 'C5'
- C5 shows as failure reason with highest probability (1) the column header Ⓒ
- On the facing page (Problem Categories) the Ⓒ shows 'modem interface' as reason for failure.
- Do recommended actions.
- If error not found, now 'C5' gives as next priority (2) column header Ⓔ. On facing page Ⓔ shows 'CA circuitry'
- Do recommended actions.

  If failure is still existing after handling of lowest priority, call for assistance

NOTES:

- Check Unit check description, starting with page 0044, for detailed error explanation.
- There is no Reference code log and log distribution statistic available for CA unit check logs. Therefore, a display of last log is not possible. To get the CA unit check logs, the CA unit check log display must be used.



CA Unit Check Log Table

1st Sense byte	BSC 2nd Sense byte	BSC Ⓐ	BSC Ⓑ	BSC Ⓒ	BSC Ⓓ	BSC Ⓔ	BSC Ⓕ	S/S 2nd Sense byte	S/S Ⓐ	S/S Ⓑ	S/S Ⓒ	S/S Ⓓ	S/S Ⓔ	S/S Ⓕ	SDLC 2nd Sense byte	SDLC Ⓐ	SDLC Ⓑ	SDLC Ⓒ	SDLC Ⓓ	SDLC Ⓔ	SDLC Ⓕ
Command reject 80	04	1						01	1						04	1					
	05	1						04	1						05	1					
	06	1						05	1						06	1					
	07	1						08	1						07	1					
	08	1						09	1						08	1					
	09	1													↓ to ↓	↓					
	0A	1													19	1					
Intervention required 40	20ns			1		2		20ns			1		2		20ns			1		2	
	20 s			2	1	3		20 s			2	1	3		20 s			2	1	3	
	21ns			1		2		21ns			1		2		21ns			1		2	
	21 s			2	1	3		21 s			2	1	3		21 s			2	1	3	
	22			1		2		22			1		2		22			1		2	
	23			1		2		23			1		2		23			1		2	
	24			1		2		25			1		2		24			1		2	
Note 2 :	25			1		2		26 ← Note 1:							25			1		2	
	29			2	1	3		27			2	1	3		29			2	1	3	
	2A			1		2		28 ← Note 1:							2A			1		2	
	2C			1		2		29			2	1	3		2C			1		2	
	2D			1		2		2A			1		2		2D			1		2	
	2E			1		2		2C			1		2		2E			1		2	
	31ns			1		2		2D			1		2		31ns			1		2	
	31 s			2	1	3		2E			1		2		31 s			2	1	3	
								30	1												
								31ns			1		2								
								31 s			2	1	3								
Equipment check 10	61	2				1		61					1		60					1	
	62					1		62					1		61	2				1	
	63					1		63					1		62					1	
	64					1		64					1		63					1	
															64					1	
															70ns					1	
Note 2 :															70 s			1		2	
															71ns					1	
															71 s			1		2	
															72					1	
															↓ 76					↓ 1	
Data check 08	80			2	1	3		80			2	1	3		90			2	1	3	
	84				1			82	1						91	1					
								84			2	1	3		92				1		
								85		2		1			93			2	1	3	
								86			2	1	3								
															95	1					
															96				1		
Overrun 04	A0			3		2	1	A0					2	1	A0			3		2	1
	A1			3		2	1								A1			3		2	1
															A2	1					
															A3	1					
Lost data 02	C0	1	2				3	C0	1	2				3	C0	1	2				3
	C2			1		2		C2			1		2		C1	2			1		
	C4			1		2		C4			1		2		C2			1		2	
	C5			1		2		C5			1		2		C4			1		2	
	C6	3		2	1			C6	2			1			C5			1		2	
	C7	1						C7 ← Note 1:							C7	1					
Timeout complete 01	E3		1	3	2	4		E2			2	1			E6			2	1	3	
	E4			2	1	3		E5		1	3	2	4		E7			2	1	3	
	E6			2	1	3		E6			2	1	3		EC			1		2	
	E7			2	1	3		E7			2	1	3		F0		1	3	2	4	
	EA	1	2	4	3	5		E8			1		2		F1		1	3	2	4	
	EB	1						E9			2	1	3		F2	1					
	EC			1		2		ED			1		2		F3	1					

Note 1: This represents a normal function.
Note 2: ns = non – switched line, s = switched line.

CA Unit Check Problem Categories

(A) Program

The usual reason is a wrong channel program, such as a wrong command or wrong sequence of commands. An error may also occur when the hardware configuration does not match the configuration assumed by the channel program (e. g. a DIAL command is given to a non/switched line).

Action:

1. Correct program
2. Change configuration by using 'Update Configuration Table' tool.
3. Provide correct configuration by new installation.

(B) Operator Handling

This kind of error can occur at both ends of the line. Typical errors are:
Mismatch in configuration, different speed selections (Board Modem Terminal), no matching line protocols etc. Another type of error is caused by handling errors during a setup which leads to a situation that no read type command is active at one end when the other end starts transmitting a message.

Actions:

1. Check local and remote modems and stations for matching strapping options. In case of mismatch repair and restart.
2. Check with remote operator what handling is required at both ends and restart in correct sequence.

(C) Modem Interface

These errors show malfunctions on the protocol between the system and the modem (or auto call unit). The most common reason for this kind of problem is an unpowered modem.

Actions:

1. Power modem (or auto call unit) up.
2. For standalone modems and auto call units follow the appropriate modem checkout procedure.
3. Run ILT22 and 23 if possible for equipment and follow MAP if an error is indicated. The ILT in loop mode may give a reference code for intermittend failures. If ILT 22 is not available, follow MAP 8880 (Board or Cable error).

(D) Line and Network

These errors are normally recovered by the operating system and do not represent a problem in general. The line quality determines the probability and frequency of these errors. In case of a DIAL command to an occupied line, the operator or operating system must do a retry. When - for switched lines - an already established connection is disconnected, the operator or operating system must retry.

Actions: None

(E) CA Circuitry

These errors are caused by malfunctions in the CA circuitry (in case of integrated modems the modem interface problems are circuitry errors as defined for this category).

Actions: Run ILT's. If failure is intermittend, run ILT's in loop mode. If no error indication is given replace the CA circuitry in the following sequence: CCA, Interface card, External cable, Internal cable, Board C2.

(F) System Load

These errors are normally retried by the operating system. If they occur frequantly check whether either the CA data rate exceeds the maximum allowed data rate and if so, change the configuration. Check also the rest of the I/O configuration whether it may cause overruns on the CA.

Unit Check Condition for BSC Lines Description

Sense Byte 2

Command Reject

04 A 'Dial' command has been issued and autocall adapter or switched network is not specified in the configurator table for the CA.

05 The line attachment is not in disable condition at 'dial' command initiate: the 'data terminal ready' modem I/F signal is on.

06 A 'read', 'write', 'autopoll' or 'prepare' command is initiated when the line attachment is in a disable condition, i.e. 'data terminal ready' modem I/F signal is off.

07 The line attachment is in disable condition during command chaining to a 'read', 'write', 'autopoll' or 'prepare' command.

08 Eight immediate operation type of commands have been executed consecutively (e.g. no-op or sense command).

09 The command code in CCW is invalid for this line control.

0A A command other than 'write', 'sense' or 'no-op' has been issued when the line attachment is in 'transparent wait state'.

Intervention Required

20 The 'data set ready' modem I/F signal is inactive during execution of a 'read', 'prepare', 'write' or 'autopoll' command.

21 The 'data set ready' modem I/F signal is inactive at command initiation of a 'read', 'prepare', 'write' or 'autopoll' command.

22 The 'clear to send' modem I/F signal has not been activated by the modem before the 3 second timeout ends during 'write' command initiation, or an autopoll read to autopoll write turnaround.

23 The 'clear to send' modem I/F signal is inactive during execution of a 'write' command, or (in the autopoll write state) during execution of an 'autopoll' command when there is no permanent 'Request to Send' specified.

24 A clock check has been detected for a line attachment, using modem clock during execution of a 'write' command or an 'autopoll' command in the autopoll write state.

25 In half-duplex operations (not 'permanent request to send'), the 'clear to send' modem I/F signal is not de-activated by the modem before the one-second timeout occurs either at 'write ' command termination, or at 'autopoll' write-to-read turnaround.

29 The ACU's 'data line occupied' (DLO) signal is active when a 'dial' command is initiated or has been found off during execution.

2A The ACU's 'power indicator' signal was inactive at initiation or during execution of a 'dial' command.

2C The ACU has not turned on or off the 'Present Next Digit' (PND) signal or does not turn on 'Abandon Call and Retry' within 25 seconds in the following cases during execution of a 'dial' command:

1. Call Request (CRQ) on to the ACU and 'PND on' not presented.
2. Digit Present (DPR) on to the ACU and 'PND off' not presented.
3. DPR off to the ACU and 'PND on' not present by the ACU.

2D The ACU and/or modem has not presented 'Distant Station Connected' (DSC) and/or 'Data Set Ready' (DSR) signals nor 'Abandon Call and Retry' (ACR) within 60 seconds after all dialling digits have been presented to the ACU and the 'Digit Present' signal has been turned off during the execution of a 'dial' command.

2E The 'data set ready' modem I/F signal is not activated by the modem within three seconds after the 'data terminal ready' signal was presented to the modem during the execution of an 'enable' command on a non-switched line configuration.

31 An 'enable' command is given to an already enabled line ('data terminal ready' modem signal active), but the 'data set ready' modem signal is not active, or line was disabled but the 'data set ready' is active (valid for switched line only).

Equipment Check

61 Overflow on the 'CCA B-STAT AVAILABLE' trap-counter. Cause: Noise on modem signals or a hanging situation in the CCA so that traps are continously generated.

62 A CCA Machine Check has been detected indicating an error on the CA Bus between BA and CCA.

63 The loss of the CCA-internal clock signal has been detected during the execution of a 'write' or 'autopoll' command.

64 No valid 'CCA B-STAT AVAILABLE' trap has been detected.

Unit Check Condition for BSC Lines Description (continued)

Data Check (not logged)

80 A BCC error (EBCDIC) or a LRC/VRC error (ASCII) is detected during the execution of a 'read' command. The command is allowed to continue to its normal end.
Cause: This failure is normally caused by noise on the transmission line. It can also be caused by an overrun condition.
The data check condition may also occur in ASCII as VRC check during execution of a 'poll' command but the unit check and data check sense bits will not appear until the succeeding 'read' command.

84 A DLE character in transparent read operation is not followed by an ETB, ETX, ENQ, DLE, or SYN control character.

Overrun

A0 An overrun condition has been detected during execution of a 'read' command.

A1 An underrun condition, has been detected during execution of a 'write' command. Intervention required is set together with overrun.

Lost Data

C0 A 'lost data' condition has been detected during 'read' command initiation, indicating that at least one full character was received and lost before the command was given. The command is allowed to continue to its normal end.

C2 The ACU's 'present next digit' signal is active during initiation of a 'dial' command.

C4 The ACU's 'distant station connected' signal is active during initiation of a 'dial' command.

C5 The 'data set ready' or 'Distant Station Connected' modem I/F signal becomes active before all dial digits have been presented to the ACU during a 'dial' command execution.

C6 'Channel Stop', Program Check, or Protection Check has occurred during the execution of a 'read' command or an 'autopoll' in read state. The command is terminated immediately.

Note: 'Channel stop' is set during data transfer when the length count has been reduced to zero, without having received an ending character (assuming that chain data is not specified).

C7 A 'halt I/O' instruction has been issued when the line attachment is executing a 'read command'.
Note: This is not an error condition.

Timeout Complete (not logged)

E3 The line attachment is executing a 'read' command and has not received two consecutive SYN characters within 3 seconds after the beginning of the command.
Cause: Failure in program or operator handling resulting in an out of sequence situation with the remote station.

E4 The line attachment is executing a 'read' command and has not received SYN/non-SYN sequence within 3 seconds of the previous SYN/non-SYN while in text mode; or has not received DLE/SYN/non-DLE within 3 seconds from the previous DLE/SYN/non-DLE while in transparent text mode.

E6 The ACU's 'abandon call and retry' (ACR) signal has become active during initiation of a 'dial' command.

E7 The ACU's 'abandon call retry' (ACR) signal has become active during execution of a 'dial' command.
Cause: The remote station has not answered the call.

EA The line attachment is operating as a control station on a data link and has been executed a 'poll' command. After the transmission of an autopoll sequence to the tributary station, the control station (in the autopoll receive state) waits for 3 seconds for an answer from the tributary station. If no answer has been received within 3 seconds, the 'poll' command is ended and chained to a 'read' command. During initiation of the 'read' command, the index byte is transferred to main storage and the 'read' command is then immediately ended with the timeout complete bit set in the sense byte.

EB A second 'write' command has been issued later than 3 seconds after the termination of the 'write' command that placed the line attachment in transparent wait state. This second 'write' ends immediately with the timeout complete bit set.

EC The 'data set ready' modem I/F signal is not de-activated by the modem within one second (not modems with CDSTL procedure), or 25 seconds (modems with CDSTL procedure) after the 'data terminal ready' modem signal has been dropped, during execution of a 'disable' command for a switched line.

CA

Unit Check Condition for Start/Stop Line Description

Sense Byte 2

Command Reject

01 The 'break' command has been issued to a line attachment that does not have the 'read interruption' configuration parameter set.

04 A 'dial' command has been issued and autocall adapter or switched network is not specified in the configurator table for the CA.

05 The line attachment is not in disable condition at 'dial' command initiate: the 'data terminal ready' modem I/F signal is on.

08 Eight immediate operation type of commands have been executed consecutively (e.g. no-op or sense command).

09 The command code in CCW is invalid for this line control.

Intervention Required

20 The 'data set ready' modem I/F signal is inactive during execution of a 'read', 'prepare', 'write', 'break', inhibit', or 'autopoll' command, or the 'receive line signal detect' modem I/F signal is inactive during execution of a 'read', 'inhibit', 'prepare' or 'autopoll' command in read state.

21 The 'data set ready' modem I/F signal is inactive at command initiation of a 'read', 'prepare', 'write', 'break', 'inhibit', or 'autopoll' command.

22 The 'clear to send' modem I/F signal has not been activated by the modem before the three seconds timeout ends during 'write' or 'autopoll' command initiation, or an autopoll read to autopoll write turnaround.

23 The 'clear to send' modem I/F signal is inactive during execution of a 'write' or 'break' command, or (in the autopoll write state) during execution of an 'autopoll' command.

25 In half-duplex operations (not 'permanent request to send'), the 'clear to send' modem I/F signal is not de-activated by the modem before the three-second timeout occurs either at 'write ' command termination, or at 'autopoll' write-to-read turnaround.

26 A continuous space signal has been received for one character time or longer during a 'read', 'inhibit', 'prepare', or 'poll' command.
Note: This is not an error condition and not logged.

27 A timeout occurred on a switched line with 'permanent request to send' on, and no 'receive line signal detect' modem signal active.

28 A break signal has been received when a 'write' command is active. A break signal is defined as a continous space condition which lasts for a time equivalent to two character cycles. Intervention required is only set if the 'write interruption' configuration parameter is selected.
Cause: A break signal has been generated by the remote station to terminate the data transmission from the CA to remote station.
Note: This is not an error condition and not logged.

29 The ACU's 'data line occupied' (DLO) signal is active when a 'dial' command is initiated (or has been found off during execution).

2A The ACU's 'power indicator' signal was inactive at initiation or during execution of a 'dial' command.

2C The ACU has not turned on or off the 'Present Next Digit' (PND) signal and does not turn on 'Abandon call and retry' within 25 seconds in the following cases during execution of a 'dial' command:

1. Call Request (CRQ) on to the ACU and 'PND on' not presented.
2. Digit Present (DPR) on to the ACU and 'PND off' not presented.
3. DPR off to the ACU and 'PND on' not present by the ACU.

2D The ACU and/or modem has not presented 'distant station connected' (DSC) and/or 'data set ready' (DSR) signals nor 'abandon call and retry' (ACR) within 60 seconds after all dialing digits have been presented to the ACU and the 'digit present' signal has been turned off during the execution of a 'dial' command.

2E The 'data set ready' modem I/F signal is not activated by the modem within three seconds after the 'data terminal ready' signal was presented to the modem during the execution of an 'enable' command on a non-switched line configuration, or the 'data set ready' modem I/F signal has dropped after 50 milliseconds when a call is received during the execution of an ENABLE command on a switched line configuration.

30 The line attachment was not enabled ('data terminal ready' bit was off in the UCW) during command initiation of a 'write', autopoll', break', 'read', 'inhibit', or 'prepare' command.

31 An 'enable' command is given in one of the following cases:

1. The line is already enabled ('data terminal ready' modem signal active), but the 'data set ready' modem signal is not active.
2. The line is disabled but the 'data set ready' modem signal is active in the case of a switched line.

Unit Check Condition for Start/Stop Line Description (continued)

Equipment Check

61 Overflow on the 'CCA B-STAT AVAILABLE' trap-counter.
Cause: Noise on modem signals or a hanging situation in the CCA so that traps are continuously generated.

62 A CCA Machine Check has been detected indicating an error on the Processor Bus between BA and CCA.

63 The loss of the CCA-internal clock signal has been detected during the execution of a write or autopoll command.

64 No valid 'CCA B-STAT AVAILABLE' trap has been detected.

Data Check (not logged)

80 An LRC error has been detected during execution of a 'read' or 'inhibit' command. The command continues until its normal end.
Cause: This failure is normally caused by noise on the transmission line. If failure rate is too high check the transmission facilities. It can also be caused by an overrun condition.

82 A VRC error has been detected in a character fetched from program storage during execution of a 'write' or 'autopoll' command. The command is allowed to continue to its normal end.

84 A VRC error has been detected or the line was found to be at space level at stop bit time while receiving during a 'read', 'inhibit', or 'autopoll' command. The 'autopoll' command is terminated immediately but the other commands are allowed to continue to their normal ends.

85 The response to polling characters in an 'autopoll' command was neither circle N nor circle D. The command is terminated immediately.

86 Circle N was received in text-out mode, indicating that the remote terminal received data with incorrect parity or an LRC error. The command is terminated immediately.

Overrun

A0 A character overrun condition has been detected in the line attachment at stop bit time during execution of a 'read' or 'inhibit' command.

Lost Data

C0 A 'lost data' condition has been detected during 'read' or 'inhibit' command initiation, indicating that at least one full character was received and lost before the command was given. The command is allowed to continue to its normal end.

C2 The ACU's 'present next digit' signal is active during initiation of a 'dial' command.

C4 The ACU's 'distant station connected' signal is active during initiation of a 'dial' command.

C5 The 'data set ready' modem I/F signal becomes active before all dial digits have been presented to the ACU during a 'dial' command execution.

C6 'Channel Stop', Program Check, or Protection Check has occurred during the execution of a 'read', 'inhibit' command or an 'autopoll' in read state. The command is terminated immediately.

Note: Channel stop is set during data transfer when the length count has been reduced to zero, without having received an ending character (assuming that chain data is not specified).

C7 A 'halt I/O' instruction has been issued when the line attachment is executing a 'read' or 'inhibit' command. Note: This is not an error condition and not logged.

Timeout Complete (not logged)

E2 The 'received data' modem signal was not stable (no level change) for the duration of one or two data characters before the end of the 28 second timeout. The timeout was started in 'read end sequence' during execution of a 'read' command.

E5 The following cases apply:

1. A three second timeout occurs during execution of a 'read' or 'autopoll' command while still in control mode.
2. A 25 to 50 second timeout occurs during execution of a 'read' command while in text mode.
Timeout is not set if 'data set ready' modem signal drops; intervention required is set instead. Similarly, if 'receive line signal detect' drops on a line which is connected to a switched network with 'permanent request to send' on, (that is, a duplex facility) intervention required is set, not timeout.
Cause: Failure in program or operator handling resulting in out of sequence situation with the remote terminal.

E6 The ACU's 'abandon call and retry (ACR)' signal turns on during initiation of a 'dial' command.

E7 The ACU's 'abandon call and retry (ACR)' signal turns on during execution of a 'dial' command.
Cause: The remote terminal has not answered the call.

E8 The 'data set ready' modem signal did not fall before the end of 25 second timeout during execution of the 'disable' command on a line connected to a switched network.

E9 The 'line signal detect' or 'clear to send' modem signal activated by the modem before the end of 25 second timeout initiated after 'data set ready' was activated during execution of a 'enable' command on a line connected to switched network with 'permanent request to send'.

ED Space (break signal) received for more than 25 seconds and prepare command active.

CA

Unit Check Condition for SDLC-Line Description

Command Reject (Bit 0)

This bit is set during command initiation if an invalid command is issued to a CA line or if the line is in such a state that the command cannot be executed. The command is terminated immediately with Unit Check status being set in the CSW when stored. No logging will be performed. The conditions causing command rejection follow:

'04' The DIAL command has been issued and there is no autocall adapter with switched network associated with the addressed line.

'05' The Data Terminal Ready signal (DTR) was found on when a DIAL command was initiated, i.e. the addressed line was not in disabled state when the DIAL command was initiated.

'06' DTR found off at command initiation for READ type cmd or WRITE type cmd on a SDLC line, i.e. the line has not been enabled.

'07' DTR found off during chaining to a READ type cmd or WRITE type cmd.

'08' Eight immediate operation type (NOOP or SENSE or SENSE I/O or SET MODE or SENSE SCB or CONTROL SCB) commands have been executed consecutively.

'09' The command code in the CCW did not match any of the valid SDLC-CA commands.

'10' Line direction is outbound during READ type cmd.

'11' Line direction is inbound during WRITE type cmd.

'12' The first two bytes of the data area of a READ PIU or WRITE PIU cross a page boundary.

'13' Seven outstanding not acknowledged I-frames in WRITE-PIU.

'14' In READ PIU OR WRITE PIU: offset exceeds the CCW length count, or
in WRITE PIU: frame length field exceeds CCW length count and data spanning is not specified.

'15' No current SCB defined on READ-PIU, WRITE-PIU, or POLL.

'16' CCW length count less than 12 in CONTROL SCB command, or less than 20 in SENSE SCB, or not between 12 and 2K in case of AUTOPOLL.

'17' The data address is not on a fullword address in AUTOPOLL, CONTROL SCB or SENSE SCB.

'18' More than 127 commands have been flushed consecutively.

'19' CCW length count of WRITE less than two.

Intervention Required (Bit 1)

A detected intervention required condition normally causes immediate termination of the current command. Channel End, Device End, and Unit Check status are set in the CSW when stored at I/O interruption. No logging will be performed. In case of modem errors this bit is set for external modems, or for the CSU in case of a DDS attachment. Otherwise an equipment check will be raised. The conditions causing intervention required to be set are the following:

'20' Data Set Ready (DSR) was found off during the execution of a READ type or WRITE type command. The line will be disabled.

'21' Data Set Ready (DSR) has been found off at command initiation of a READ type or WRITE type command. The line will be disabled.

'22' Clear To Send (CTS) has not been activated by the modem as a response to RTS on before the 3-second timeout ends either in WRITE type command initiation or an AUTOPOLL READ to AUTOPOLL WRITE turnaround. The line will be disabled.

'23' Clear To Send (CTS) was found off during execution of a WRITE type command or in the AUTOPOLL WRITE state (provided Not Permanent Request to Send). The line will be disabled.

'24' The loss of the external clock signal (modem clock) has been detected during the execution of a WRITE type command. The line will be disabled.

'25' In 'Switched Request To Send' operation (Not Permanent Request to Send), Clear To Send (CTS) has not been de-activated as a response to RTS off by the modem before the 1 second timeout expires either at WRITE/WRITE-PIU command termination or at AUTOPOLL WRITE to READ turnaround. The line will be disabled.

'29' The ACU's data line occupied (DLO) signal is active when a DIAL command is initiated or has been found off during execution.

'2A' The ACU's Power Indicator (PWI) lead has been found off at DIAL command initiation or during its execution.

'2C' The ACU has not turned on or off the Present Next Digit (PND) or turned on the Abandon Call and Retry (ACR) signal within 25 seconds in the following cases during execution of a DIAL command:

1. Call Request (CRQ) on to the ACU and 'PND on' not present.
2. Digit Present (DPR) on the ACU 'PND off' not present.
3. DPR off to the ACU and 'PND on' not presented by the ACU.

'2D' The ACU and modem has not presented Distant Station Connected (DSC) and Data Set Ready (DSR) nor Abandon Call and Retry (ACR) within 60 s after all dialling digits and the signal 'Not Digit Present' have been presented to the ACU during the execution of a dial command.

Unit Check Condition for SDLC-Line Description (continued)

'2E' Data Set Ready (DSR) not found on within 3 seconds after Data Terminal Ready (DTR) was presented during execution of ENABLE on a leased line.

'31' An ENABLE command was issued to an already enabled line (DTR found on), but the Data Set Ready (DSR) signal was not active, or DSR was found on during ENABLE to a switched line and DTR was found off.

Equipment Check (Bit 3)

This bit is set when an error is detected in the communication adapter, the integrated modem or local attachment hardware. A detected equipment check causes immediate termination of the current command and Channel End, Device End, and Unit Check to be set in the CSW when stored at I/O interruptions. Logging will be performed. The conditions causing equipment check to be set are as follows:

'60' Unexpected trap occurred.

'61' If carry on B-STAT trapcounter, i.e a hanging situation has occured so that B-STAT available traps are continously generated for a line. The line will be disabled.

'62' A CCA Machine Check has been detected indicating an error on the PIO-bus. The line will be disabled.

'63' The loss of the internal clock signal has been detected during the execution of a READ type command or WRITE type command. The line will be disabled.

'64' No valid CCA-BSTAT. The line will be disabled.

'70' Data Set Ready (DSR) has been found off during the execution of a READ type or WRITE type command or during the line is idle after enabled. The line will be disabled.

'71' Data Set Ready (DSR) has been found off at command initiation of a READ type or WRITE type command. The line will be disabled.

'72' Clear To Send (CTS) has not been activated by the modem as a response to RTS on before the 3-second timeout ends either in WRITE type command initiation or an AUTOPOLL READ to AUTOPOLL WRITE turnaround. The line will be disabled.

'73' Clear To Send (CTS) has been found off during execution of a WRITE type command or in the AUTOPOLL WRITE state (provided Not Permanent Request to Send). The line will be disabled.

'74' In 'Switched Request To Send' operation (Not Permanent Request to Send), Clear To Send (CTS) has not been de-activated by the modem as a response to RTS off before the 1 second timeout expires either at WRITE/WRITE-PIU command termination or at AUTOPOLL WRITE to READ turnaround. The line will be disabled.

'75' Request To Send (RTS) down during line in outbound in spite of Permanent Request To Send (PRTS). The line will be disabled.

'76' Data Terminal Ready (DTR) found off during line enabled. The line will be disabled.

Data Check (Bit 4)

This bit is set in receive mode when commands are executed and FCS errors or format errors occur. No logging will be performed.

'90' An FCS error was detected during the execution of a READ command. The FCS check applies to both primary and secondary lines.

'91' Offset value in an SCB transferred to the line attachment is specified as 0 or 1 or any reserved fields are not zero.

'92' Any line received invalid frame (too short) or abort sequence during execution of a READ command. The invalid frame check applies to both primary and secondary lines.

'93' Invalid 'SDLC sequence' on inbound if READ cmd is active.

'95' Any reserved fields in the information provided by a 'SET MODE' command are not zero, or the line was specified as secondary station and the secondary station address was not provided.

'96' An 'NR out of range' was received.

Overrun (Bit 5)

The overrun bit is set if the line attachment is too late to serve a request for data transfer from the associated hardware. Logging will be performed. The conditions under which this bit is set are as follows:

'A0' An overrun condition has been detected during execution of a READ type command.

'A1' An underrun condition has been detected during execution of a WRITE type command. Intervention Required is set together with overrun.

'A2' Data chaining specified in READ PIU or SENSE SCB.

'A3' Data chaining specified in WRITE PIU or CONTROL SCB or AUTOPOLL.

Unit Check Condition for SDLC-Line Description (continued)

Lost Data (Bit 6)

This bit is set during the execution of commands when the line attachment has exhausted its buffer space with receive data before a READ type command was active. Logging will be performed only on Dial commands. The conditions are as follows:

'C0' At least one full character has been received and lost because no inbound command was active.

'C1' The length count is decremented to zero without having received a flag for a READ command.

'C2' PRESENT NEXT DIGIT (PND) has been found on during DIAL command initiation.

'C4' Distant Station Connected (DSC) has been found on during DIAL command initiation.

'C5' DSR or ACU's DSC signal rises prematurely during execution of a DIAL command. The command is terminated immediately.

'C7' During READ cmd active a Halt I/O has been issued, the command will be terminated immediately.

Timeout Complete (Bit 7)

This bit is set, when an unexpected timeout has occured. No logging will be performed. The conditions under which it is set are as follows:

'E6' The Abandon Call and Retry (ACR) lead of the ACU has risen during initiation of a DIAL command.

'E7' The Abandon Call and Retry (ACR) signal has become active during execution of a DIAL command.

'EC' Data Set Ready (DSR) has not been de-activated by the data set within 1s (modems with DTR procedure) or 25 s (modems with CDSTL procedure) after that the signal 'Data Terminal Ready' (DTR) has been dropped during the execution of a DISABLE command (valid only for switched network).

'F0' Non-productive receive timeout during READ type cmd active.
As Primary Station: No leading flag has been received after line has been turned to inbound. Line is not idling.
As Secondary Station: No leading flag has been received after line has been turned to inbound. Line is either receiving garbage or is idling.

'F1' Idle timeout on primary station when no current SCB exists or a READ command is active. No frame has been received after line has been turned to inbound and line is idling.

'F2' Fill character timeout. A WRITE type command is outstanding after transmitting a frame with P/F bit equal to zero.

'F3' Too many SCB's with skip specified in control flag during 'AUTOPOLL'.

Adapter Interface Cards

EIA/CCITT V24

General Description

The EIA Interface Card is a 2W-3H Logic Card, which converts the VTL-levels of the CCA card to EIA/CCITT levels of the modem and vice versa. Eight VTL to EIA/CCITT level drivers and eight EIA/CCITT to VTL level drivers are provided.

Transmission Rate

Transmission rates from 0 to 9600 bps are determined by the CCA card or the modem.

Clocking

Either CCA card or the modem provides the clock. If the CCA card provides the clock, the speed is determined by board wiring. See page 0090.

External Cable

Cable capacitance from the card socket to the using modem must not exceed 1500 pf for 9600 bps operation, and 2500 pf for 7200 bps operation and below. Max. cable length: 10,3 m

Wrap Test

The card is personalized to respond to the Test Control Lead (Tab pin B05) in one of two ways:

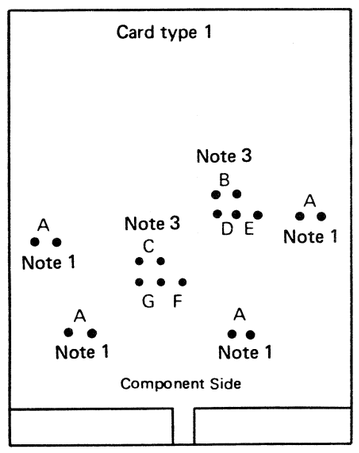
- Passes the signal through to an IBM modem which will go into wrap mode (modem wrap).
- Wraps selected interface leads at the VTL level on the EIA card wrap (card wrap).

If the modem used has the wrap facility, the modem wrap should be used. See jumper options.

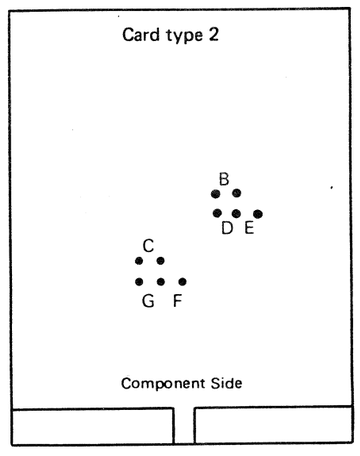
Jumper Options

Wrap Options	JUMPERS					Note 2	
	A	B	C	D	E	F	G
Modem Wrap	Note 1	Remove	Remove	Remove	Install	Install	Remove
Card Wrap	Note 1	Remove	Remove	Install	Remove	Install	Remove

Note: The clocking (modem or CCA clock) does not affect the jumpering.



Voltage: see Note 1



Voltage: Automatic voltage adaption.

Note 1: If 3 or less lines are installed and the A1 board is not installed, then jumpers A have to be removed. If 4 or more lines are installed or the A1 board is installed, then Jumpers A have to be installed.

Note 2: This cards are also used for ACA interface. In this case, Jumper F has to be removed and jumper G is to be installed. All other jumpering is the same.

Note 3: B and C are manufacturing test jumpers. Remove for normal operation.

For part numbers refer to plug list in binder MI30.

Adapter Interface Cards

INTEGRATED MODEM

General Description

The integrated modem is a 2W-3H logic card. It can operate up to 1200 bps, and is a Frequency Shift Keying (FSK) modem designed specifically for under covers implementation. It can operate on WT and US leased and switched facilities. The modem conforms to CCITT recommendation V23, operating up to 1200 bps. Operating at WE 202 frequencies is also selectable.

The modem converts a two level signal into a frequency modulated carrier for transmission over a voice grade telephone channel. Information is handled serially by bit and by character. Synchronism is not maintained between information on the send data interface lead and the line signal.

The modem data channel is tested by the host machine giving a Test Command and then transmitting test patterns. Self testing is provided for the Auto Answer function when in the switched network mode. This is done by simulating the interface signals from a CBS coupler or the World Trade Line Plate to sequence through an auto-answer. The test circuitry attenuates the transmit signal,
and sends it back through the receive channel for comparison with the transmitted data.

Common Characteristics

Transmission Rates

Synchronous (BSC, SDLC) US and CANADA	: up to 1200 bps
Asynchronous (S/S) US and CANADA	: up to 600 and 1200 bps
Synchronous (BSC, SDLC) WT	: up to 1200 bps
Asynchronous (S/S) WT	: up to 1200 bps

Clocking

The CCA card provides the clock and maintains synchronism.

Mark (1) frequency - 1300 HZ
Space (0) frequency - 2100 HZ

Answer Tone

- Frequency (for auto answer on switched network):
  V23 mode - 2100 HZ
  202 mode - 2025 HZ (necessary for distant WE202C or WE202D)

- Duration (auto answer on switched network):
  3.5 seconds

Line Termination

600 ohm

Propagation Delay: (Wrap)

US and Canada versions - 1.2 ms
WT versions - 3.0 ms

Test

Wraps analog data path; processor provides and checks test data sequence test of auto answer (if present) before wrap.

Transmit Level

Automatically set to 0 dBm (leased line) or adjustable down to -18 dBm (switched network) by means of rocker switches on the card.

INTEGRATED MODEM Card Types

Five different integrated modem cards can be used:

1. Card Code CE 60: Boeblingen Card Code SD5
   Provides selection of V23 or WE202 answer tone frequencies.
   Used for:
   - US and Canada switched network w/auto answer US SNAA

2. Card Code CE 61: Boeblingen Card Code SD6
   Provides selection of V23 or WE202 answer tone frequencies.
   Used for:
   - US and Canada leased line with switched network backup w/auto answer (US LLSB)

3. Card Code CE64: Boeblingen Card Code SD7
   Used for:
   - US and Canada leased line with switched network backup w/manual answer (US LLSM)
     Note: A LDT Data access arrangement must be used for connection to the switched network if the backup feature is used.
   - US and Canada leased line (US LL)

4. Card Code CE62: Boeblingen Card Code SD8
   Used for:
   - WT switched network w/auto answer (WT SNAA)
     Note: The 'line plate' is used for connection to the public switched network. The 'line plate' performs functions similar to a type CBS coupler.

5. Card Code CE65: Boeblingen Card Code SE1
   Used for:
   - World Trade leased line (WT LL).
     Note: Surge or lightning protection may be required.

   For part number refer to plug list in binder M130.

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Adapter Interface Cards

US and Canada Modems Adjustments (X means don't care)

Card Code	Modem Type	Line Type	Rocker Switch J	K	L	M	N	P	R
CE60	US SNAA	Switched Auto Answer Set ->	ON	ON	OFF	OFF	OFF	OFF	OFF
CE61	US LLSB	Leased 4-WIRE CTS = 30 MS SET -> Echo = 0 MS See Note 2 Page 0072	OFF	ON	X	OFF	OFF	ON	OFF
		Leased 2-Wire, local CTS = 80 MS SET - > Echo = 50 MS See Note 2 Page 0072	ON	OFF	ON	OFF	ON	OFF	OFF
		Leased 2-Wire, long SET - > Echo = 150 MS See Note 2 Page 0072	ON	OFF	OFF	OFF	OFF	OFF	OFF
		Auto Switched (Backup Function) Answer Set -> See Note 1 Page 0072	X	X	X	OFF	X	X	OFF
CE64	US LLSM US LL	Leased 4-Wire CTS = 30 MS Set -> See Note 2 Page 0072	OFF	ON	X	OFF	OFF	ON	OFF
		Leased 2-Wire, local CTS = 80 MS Set - > Echo = Sw.L off ≙ 150ms Sw.L on ≙ 50ms See Note 2 Page 0072	ON	OFF	ON See Echo	OFF	ON	OFF	OFF
		Leased CTS = 230 MS Set -> Echo = Sw.L off ≙ 150ms Sw.L on ≙ 50ms See Note 2 Page 0072	ON	OFF	OFF See Echo	OFF	OFF	OFF	OFF
		Switched (US LLSM only) Manual Answer (Backup function) Set -> See Note 1 Page 0072	X	X	X	OFF	X	X	OFF

Note: Switches not shown in this table are meaning – less for this application (ignore).

Adapter Interface Cards (continued)

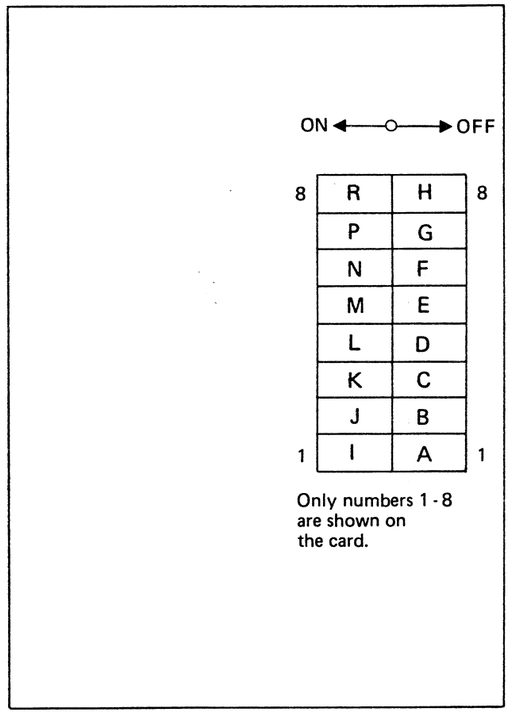
US and Canada Modems Adjustment (continued)

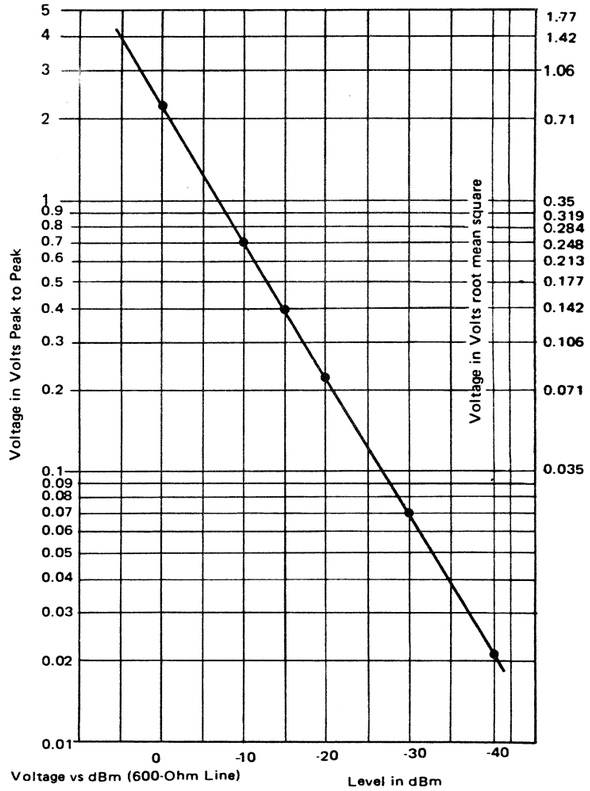
TRANSMIT LEVEL SWITCHES

DBM	A	B	C	D	E	F	G	H
0	I							
−1		I						
−2			I					
−3				I				
−4					I			
−5						I		
−6	I						I	
−7		I					I	
−8			I				I	
−9				I			I	
−10					I		I	
−11						I	I	
−12	I							I
−13		I						I
−14			I					I
−15				I				I
−16					I			I
−17						I		I
−18	I							I

1= On
blank= Off

ROCKER SWITCH IDENTIFICATION





Voltage vs dBm (600-Ohm Line)

If a 600 ohm communication line is used and dB meter is not available, the graph can be used to convert peak-to-peak voltage into dBm levels. Voltage from the top to the bottom of a waveshape is a peak-to-peak value. If a VOM is used, the voltage is read as a root mean square (rms) value. To convert rms to peak-to-peak, multiply by 2.83.

* Peak-to-peak = 

Adapter Interface Cards (continued)

US and Canada Modems Adjustments (continued)

Note 1
For Switched lines:
Set the transmit level as specified by the telephone company. See page 0070 for adjustment. Contact your TP specialist for specific information for your installation.

The following are obtained automatically:

- 2-wire line connection
- Clear to send delay 230 MS
- Echo Clamp 150 MS
- Signal threshold for data carrier detect :
  ON at -43 dBm (10-20 ms delay)
  OFF at -48 dBm (5-15 ms delay)

Note 2
For leased lines the following settings are obtained automatically:

- Transmit level 0 dBm.
  The data wrap function may not function properly with -9dBm and higher.
- Signal threshold for data carrier detect :
  ON at -33 dBm (10-20 ms delay)
  OFF at -38 dBm (5-15 ms delay)

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4331

CA

Adapter Interface Cards

WT Modems ADJUSTMENTS

Card Code	Modem Type	Line Type	Rocker Switches I	J	K	L	M	N	P	AA	BB	CC	DD
CE62	WT SNAA	Switched Normal settings: ->	ON	ON	ON	OFF	OFF	ON	ON	-	-	-	-
		Note: Equalizer switches N - Normal delay J - Disable high freq. delay P - Disable mid freq. delay I - Disable low freq. delay M - Disable HF Amp boost Switch on = Function enabled Switch off = Function disabled If unsatisfactory operation is encountered on 'worst case' lines, the delay switches J,I,N and P should be set off before setting any other equalizer switch. See Note 1 page 0076											
CE65	WTLL	Leased 4-wire CTS = 30 MS Normal settings Equalizer = Normal Note: Equalizer switches CC - Normal delay AA - Disable high frequency delay DD - Disable mid frequency delay BB - Disable low frequency delay N - Disable HF Amp boost Switch on = Function enabled Switch off = Function disabled If unsatisfactory operation is encountered on 'worst case' lines, the equalizer switch AA,BB, CC,DD and N, should be set off before setting any other equalizer switch. See Note 2 page 0076	ON	OFF	ON	X	OFF	ON	OFF	ON	ON	ON	ON
		Leased 2-wire, local CTS = 80 ms Set ->	OFF	ON	OFF	ON See Echo	ON	ON	OFF	ON	ON	ON	ON
		Echo = Sw.L off ≙ 150ms Sw.L on ≙ 50ms Equalizer = normal For equalizer see 4-wire connection. See Note 2 page 0076											
		Leased 2-wire,long CTS = 230 ms Set ->	OFF	OFF	OFF	OFF See Echo	ON	ON	OFF	ON	ON	ON	ON
		Echo: Sw.L off ≙ 150ms Sw.L on ≙ 50ms Equalizer = normal For equalizer see 4-wire connection. See Note 2 page 0076											

Note: Switches not shown in this table are meaningless for this application (don't care).

Adapter Interface Cards (continued)

WT MODEM ADJUSTMENTS (continued)

Note 1:
Set the transmit level as specified by the PTT. See Figure 1 for adjustment. Contact your TP specialist for specific information for your installation.

The following are obtained automatically:

- 2-wire line connection
- Clear to send delay 230 ms
- Echo Clamp 150 ms
- Signal threshold for data carrier detect :
  on at -43 dBm (10-20 ms delay)
  off at -48 dBm (5-15 ms delay)

Note 2:
Set the transmit level as specified by the PTT. See Figure 1 for adjustment. Contact your TP specialist for specific information for your installation.

The following are obtained automatically:

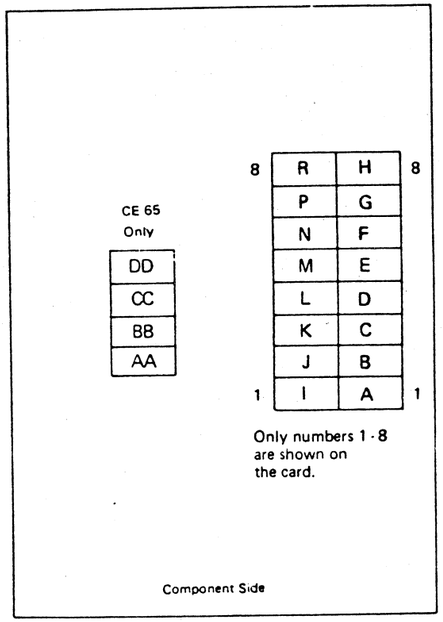
- Signal threshold for data carrier detect :
  on at -43 dBm (10-20 ms delay)
  off at -48 dBm (5-15 ms delay)

TRANSMIT LEVEL SWITCHES

DBM	A	B	C	D	E	F	G	H	R
0	1								
-1		1							
-2			1						
-3				1					
-4					1				
-5						1			
-6	1						1		
-7		1					1		
-8			1				1		
-9				1			1		
-10					1		1		
-11						1	1		
-12	1							1	
-13		1						1	
-14			1					1	
-15				1				1	
-16					1			1	
-17						1		1	
-18	1								1

1= On
blank= Off

ROCKER SWITCH INDENTIFICATION



For voltage - dBm table.
See page 0070.

Figure 1

CA

Adapter Interface Cards

V35 Interface Card

General Description

The V35 interface card is a 2w-3H logic card. It interfaces to a high speed modem and operates at transmission rates up to 64 kbps. The speed is determined by the modem clock.

The V35 card must be installed in line address 30 only. Due to the high transmission rate, the data and clock signals between the V35 card and the modem uses the 'Balanced Current Mode'. This requires two leads for each signal.

The V35 card converts the signal levels as shown on Figure 1.

Except for the tabs used for the 'Balanced Current Mode' interface leads, the V35 card is pin-compatible with the EIA/CCITT interface card.

Transmission rate: Maximum 64 kbps

Clocking: Modem Clocking

Modem Cable: 16 signals twisted pair; maximum length 10 m; capacitance 15pF/m.

Card Wrap Test

When the test control signal is active, the V35 card wraps selected interface signals from the CCA card back to the CCA card.

The signal 'NEW SYNC' is used as clock when in "card and cable wrap test" and is entirely controlled by the microcode (see Figure 2).

Note: Use of permanent RTS is recommended in Japan.

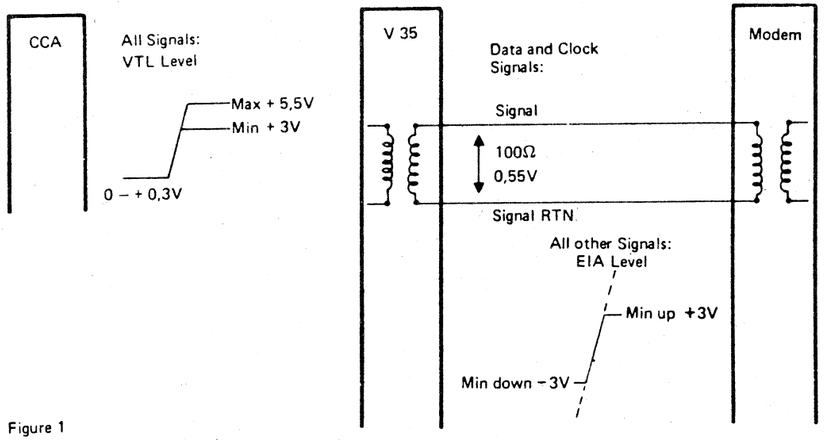


Figure 1

Jumpering

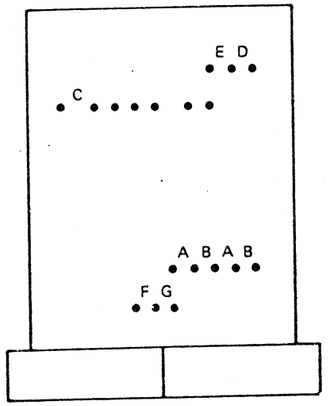


Figure 2

If 3 or less lines are installed and the A1 board is not installed then jumper A has to be removed and B has to be installed. If 4 or more lines are installed or the A1 board is installed then jumper A has to be installed and B has to be removed. Jumper C must always be installed.

Card wrap:
Install jumper D, remove jumper E

Modem wrap:
Remove jumper D, install jumper E

DCE clocking: (Japan only)
Install jumper G, remove jumper F

New SYNC clocking:
Remove jumper G, install jumper F

Note: Jumber cards as shown and remove any other Jumber.

For part number refer to plug list in binder MI30.

Adapter Interface Cards

DDSA Interface Card

DDSA = Data phone digital service adapter

General Description

The DDSA interface card is a 2H-3W logic card which connects the communications adapter to AT&T's private line Dataphone® Digital Service via an AT&T Channel Service Unit (CSU).
(® Registered Trademark of AT&T Corporation).

It can operate at transmission rates up to 56 kbps. The speed is determined by the connected CSU and jumper plugging on the DDSA card.

The DDSA card provides a clock for clocking data in and out of the DDSA.
For the highest speed (56 kbps) line address 30 must be used.

Due to the high transmission rate the data signals between the DDSA card and the CSU are transmitted as "bi-polar differential pulses". This requires two leads for each signal.

The DDSA card converts the signal levels as shown in figure 1.

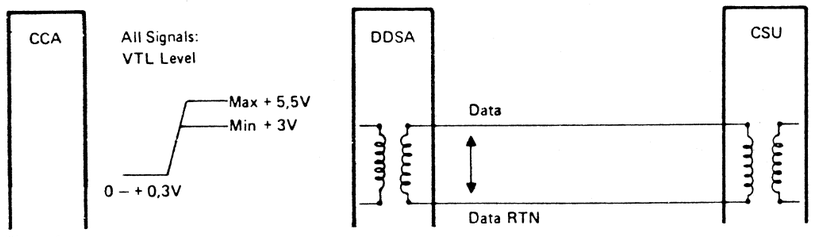


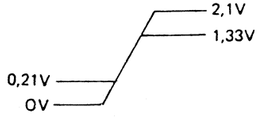
Figure 1

Transmission rates: 2400, 4800, 9600 and 56000

Clocking: The DDSA card provides the clock.

Card Wrap Test

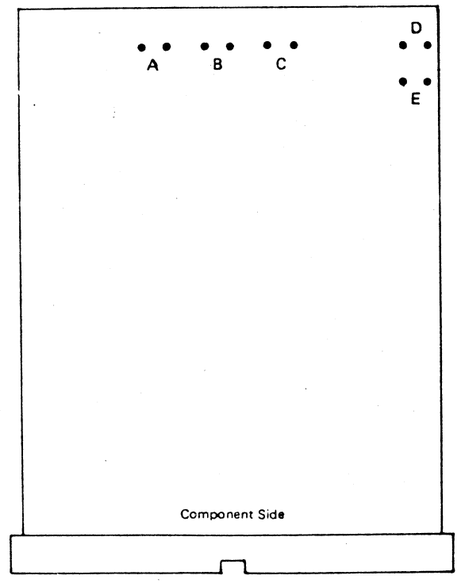
When the test control signal is active, the DDSA Card wraps selected interface signals from the CCA card back to the CCA card.



Jumpers

Install the jumpers as follows:

TRANSMISSION RATE	JUMPERS A	B	C	D	E
2400 bps	install	remove	remove	remove	install
4800 bps	remove	install	remove	remove	install
9600 bps	remove	remove	install	remove	install
56 kbps	remove	remove	remove	install	install



Note: Jumper cards as shown and remove any other Jumper.

For part number refer to plug list in binder MI30.

Adapter Interface Cards

Local Attachment Interface Card

General Description

The local attachment card is a 2W-3H logic card that interfaces directly (without a modem) to a local terminal which has an EIA/CCITT interface.

The conversion circuits on the card galvanically isolate the CCA card and the connected local terminal.

The card provides the clock, and the speed (transmission rate) is determined by the connected terminal and jumper plugging on the card.

The signal level conversion is shown in Figure 1.

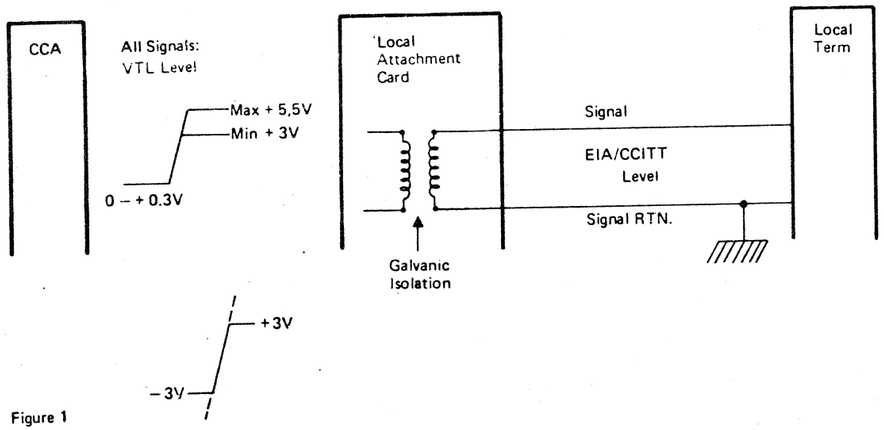


Figure 1

Note: The signal RTN line must be grounded at the terminal side to obtain correct levels.

The Local Attachment Card is pin compatible with the EIA/CITT Interface Card.

Transmission Rates: 1200, 2400, 4800 or 9600 bps.

Clocking: The Local Attachment Card provides the clock.

External Cable:

Speed (bps)	Maximum cable length (meters)
1200	800
2400	400
4800	200
9600	100

Twisted pair AWG 22 or equivalent.
Resistance nominal 112 ohms/km or 180 ohms/mile
Capacitance max. 51 nF/km or 82 nF/mile
Attenuation nominal 26 db/km or 41 db/mile at 1 Megaherz

Note: Shielding of customer provided cable may be required when noise suspected devices or cables are located close.

Adapter Interface Cards (continued)

Local Attachment Interface Card (CONTINUED)

Card Wrap Test

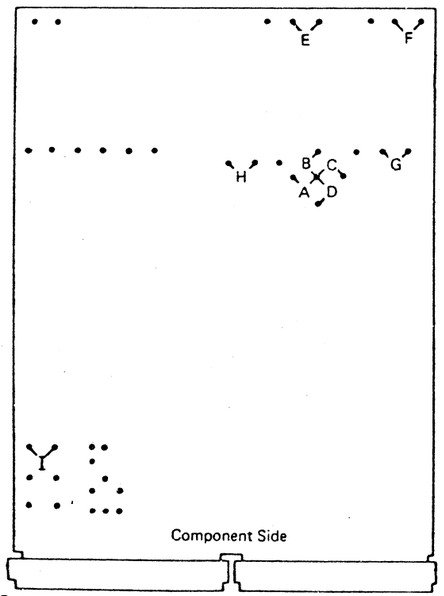
When the test control signal is active, the local attachment card wraps selected interface signals from the CCA card back to the CCA card.

Jumpers

Install the jumpers A, B, C, D to the center pin as follows:

Transmission Rate	Jumpers A	B	C	D	E F G H I
1200 bps	install	remove	remove	remove	install
2400 bps	remove	install	remove	remove	install
4800 bps	remove	remove	install	remove	install
9600 bps	remove	remove	remove	install	install

Note: All other jumpers are for factory use only and must not be installed.



For part number see plug list in binder MI30.

CA

X.21 Interface Card (XLCA)

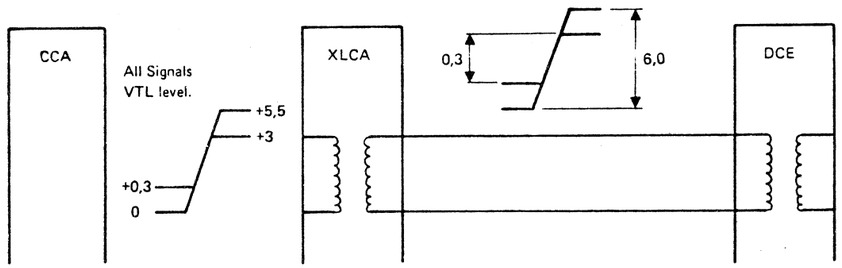
General Description

The X.21 Interface Card is a 2H-3W Logic Card. It works as a level converter and attaches the CCA to the Data Communication Equipment (DCE).

The datarate is fixed by the DCE which provides the clock. The speed is 2400 bps, 4800 bps, 9600 bps or 48 Kbps.
Operation at 48 Kbps is only possible on line 30.

Due to the noise sensitivity in high speed the data and control leads function as balanced pairs.

The XLCA converts the control and data levels as follows:



Card Wrap Test

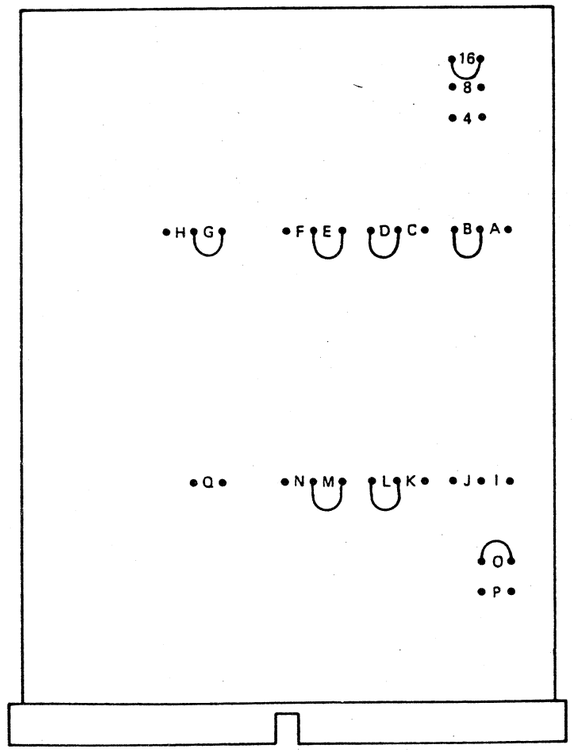
When the test control signal is active, the XLCA card wraps selected interface signals from the CCA card back to the CCA Card, that means, for inline test operation this card works as if I/F card wrap option is installed.

Jumpering

The following jumpers must always be installed:

D, E, G	For leased line
L	For continuous DSR
B,M	For normal wrap
O	For application use

Jumper 16 must be installed for CTS delay only if the line is to communicate with X21'Bis' terminal and does not specify permanent RTS on.



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CA

Board 01A-C2 Wiring

1. **Transmission Mode (BSC or Start/Stop or SDLC)**

Line Address	30	31	32	33	34	35	36	37
CCA Card Pos.	W2	U2	T2	R2	Q2	N2	M2	K2

a) For BSC and SDLC, remove wire M13 to ground at the CCA card position.

b. For Start/Stop, install wire M 13 to ground at the CCA card position.

2. **Transmission Rate (Line Speed)**

Whenever the CCA card provides the clocking, the transmission rate is determined by board wiring at the CCA card position.
Install only one of the wires if the CCA clock provides the clocking.

Line Speed	Wire	
1200 bps	M05 - ground	S/S, BSC, SDLC (Note:)
600 bps	M04 - ground	
300 bps	G13 - ground	S/S only
134.5 bps	M02 - ground	
110 bps	P05 - ground	
75 bps	P04 - ground	

3. **Integrated Modem, Leased Line**

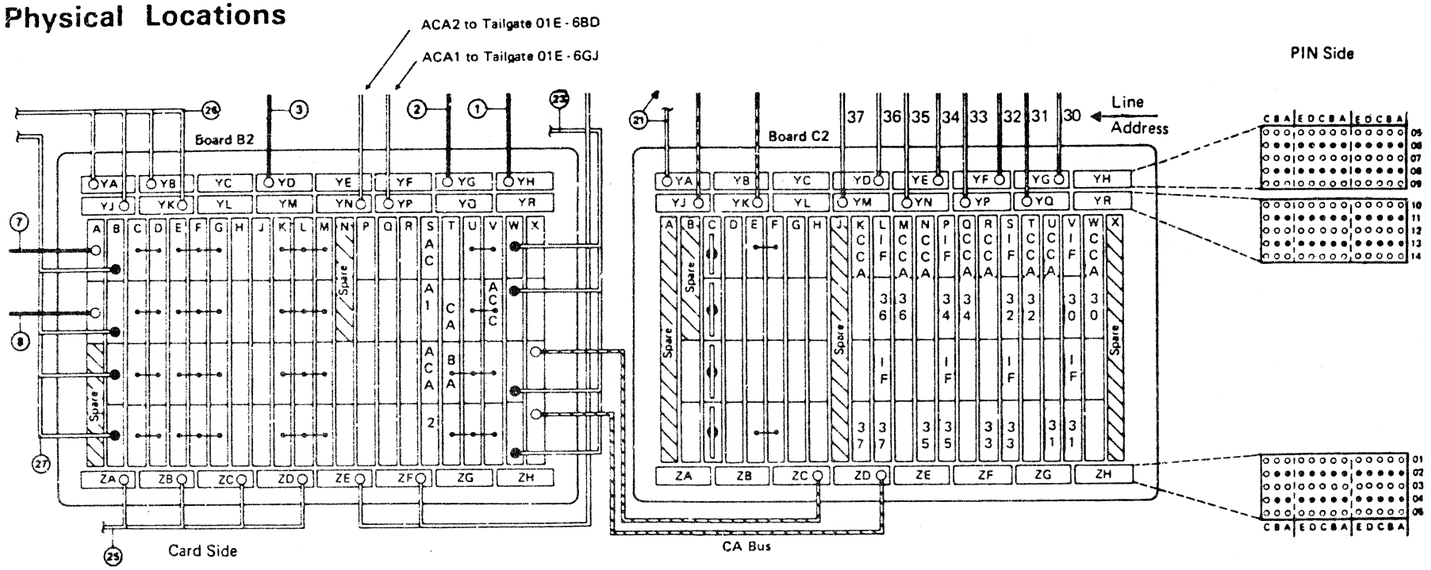
Line Address	30	31	32	33	34	35	36	37
Interface Card Pos:	V2	V4	S2	S4	P2	P4	L2	L4

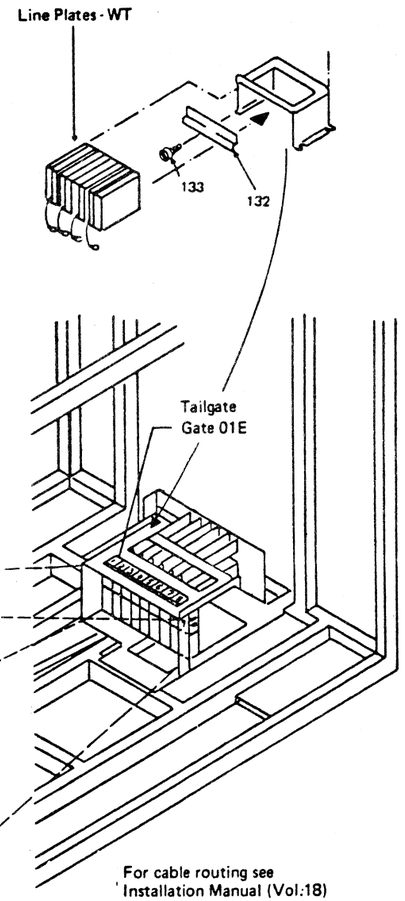
a) 2-wire operation
Install wires: G02-G09, J05 - J13
at the interface card position

b) 4-wire operation
Remove wires: G02-G09, J05-J13
at the interface card position.

Note: For BSC and SDLC, 600 bps (half speed) can be obtained by using the 'data signal rate select' option in both the configuration table update and the customer manops. See pages 4210, 5005.

Physical Locations





For cable routing see Installation Manual (Vol:18)

Line addr.	CCA Card	I/F Card	Internal Cable: Board 01A-C2 Socket	Internal Cable: Tailgate Socket
30	W2	C2 V2	C2 YG	1–GJ
31	U2	C2 V4	C2 YQ	2–BD
32	T2	C2 S2	C2 YF	2–GJ
33	R2	C2 S4	C2 YP	3–BD
34	Q2	C2 P2	C2 YE	3–GJ
35	N2	C2 P4	C2 YN	4–BD
36	M2	C2 L2	C2 YD	4–GJ
37	K2	C2 L4	C2 YM	5–BD
ACA 1		B2 S2	B2 YP	6–GJ
ACA 2		B2 S4	B2 YN	6–BD

A1	A2	A3	A4	A5	A6	A7	A8	A9
BD	BD	BD	BD	BD	BD	BD	BD	BD
REM Sup.	31 LN2	33 LN4	35 LN6	37 LN8	ACA 2	Spare or DAL 2	Spare or DAL 2	Spare
GJ	GJ	GJ	GJ	GJ	GJ	GJ	GJ	GJ
30 LN1	32 LN3	34 LN5	36 LN7	Spare	ACA 1	Spare or DAL 1	Spare or DAL 1	Spare

Gate seen from plugging side of the external cables.
CA Line Connector Arrangement and Location
Gate 01E

□ = The number in the square box is the line address
REM.SUP. = Remote Support
LN = Communication adapter line
ACA = Auto call adapter

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Signal Flow and Wrap Test

General

These charts show the signal flow and wrap test facilities for each adapter type. They should be used in conjunction with the MAP's when you are told to check a failing interface signal.

Probing Procedure

When a failing signal is to be checked, the MAP's give the following information:

1. The reference page in this manual 'Supplement to MAPs' (Features) that shows where to find the signal flow, for the wrap test facility being used.
2. The name of the failing signal.
3. Testpoint to probe.

The pin (testpoint) to probe is found on the refer - enced page by means of the signal name and the testpoint (see example).

The probe level is found in table 'A' on the referenced page. (See example).

Example

Line address 30 is being tested.
Failing signal: 'receive line signal detect' (obtained from the map).

The signal flow shows that the signal is wrapped. Therefore, four testpoints are available:

Testpoint in MAP	Physical Pin in Signal Flow	
A - IN	S04 - CCA Card	
B - OUT	B12 - I/F Card	
B - IN	D02 - I/F Card	At the other side
A - OUT	S10 - CCA Card	of the wrap

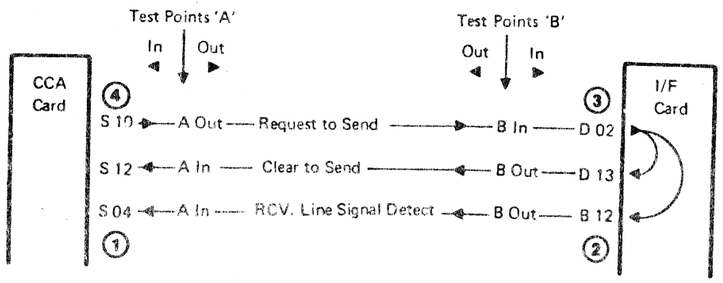
MAP Statement:

Probe the failing signal at testpoint 'A-IN'

CE Action:

In the chart find the signal 'receive line signal detect' and put the probe at the pin corresponding to the testpoint 'A-IN'.

Pin probed: S04 at the CCA card.



Before probing wait 2 minutes. The pin must be probed up to 20 seconds to observe a level change (from up-level to down-level or from down-level to up-level). Due to the test timings a signal may have the same level for 18 seconds.

(1) Probe the failing signal at testpoint 'A-IN' (S04 at CCA card)

Signal OK

Yes No

Compare the probed level with the 'Signal OK' level in table 'A'.

(2) Probe the failing signal at testpoint 'B-OUT' (B12 at I/F card)

Signal OK

Yes No

(3) Probe the failing signal at testpoint 'B-IN' (D02 at I/F card)

Signal OK

Yes No

(4) Probe the failing signal at testpoint 'A-OUT' (S10 at CCA card)

Signal OK

Yes No

Failing FRU: CCA card

TABLE 'A'

Signal Name	CE Probe Indication if Signal is OK 'Signal OK Level'
Request to Send	A level change must be observed
RCV Line Signal Detect	A level change must be observed
Clear to Send	A level change must be observed

CA

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intentionally left blank

Signal Flow and Wrap Test

EIA Adapter Interface

EIA card wrap test, CCA clock

Configuration byte 2 = 18

Signal Checking

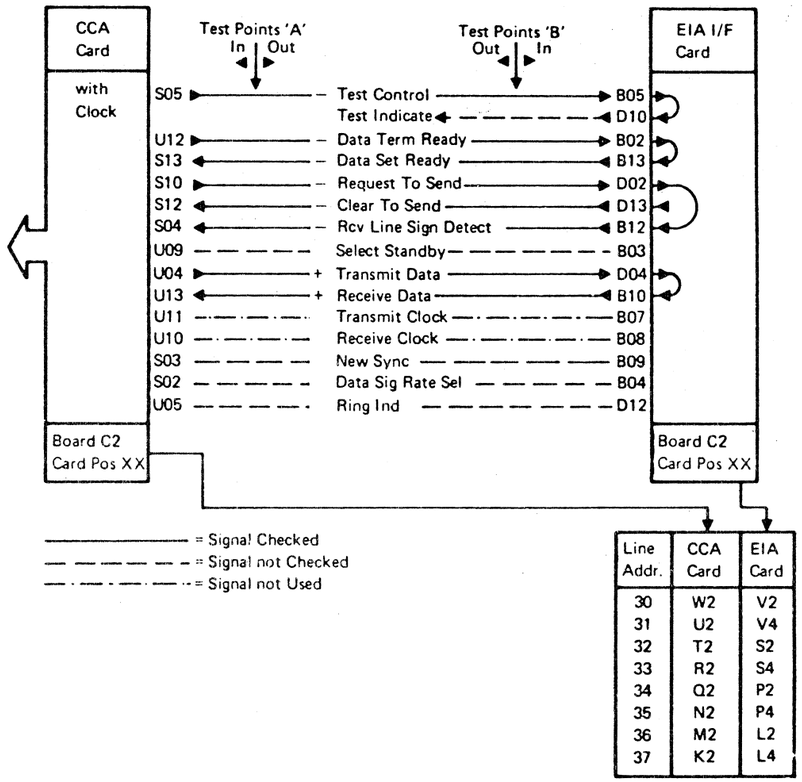
- Find the failing signal (given in the MAP) in the chart.
- Put the probe at the pin corresponding to the test point given in the MAP.
- Compare the probed level with the "signal OK" level in table "A".

Before probing wait two minutes. The pin must be probed for up to 20 seconds to observe a level change (from up - level to down - level or from down - level to up - level).
Due to the test timings, a signal may have the same level for 18 seconds.

TABLE "A"

Signal Name	CE Probe Indication if Signal is OK "Signal OK Level"
For All Signals	A level change must be observed
Test Control	Always down level

Jumpering
- Wrap options see page 0060.
- Transmission mode/rate see page 0090.



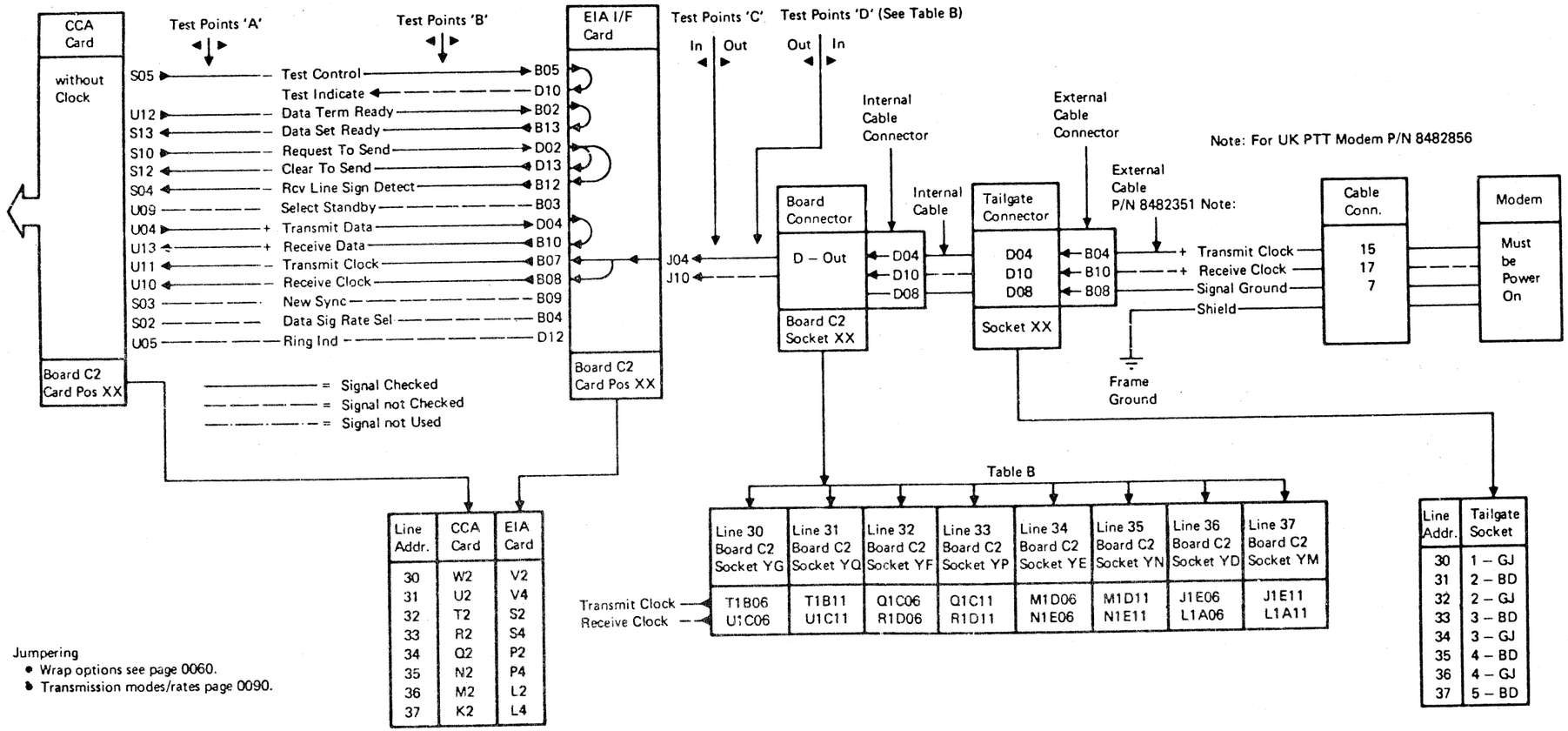
Line Addr.	CCA Card	EIA Card
30	W2	V2
31	U2	V4
32	T2	S2
33	R2	S4
34	Q2	P2
35	N2	P4
36	M2	L2
37	K2	L4

CA

Signal Flow and Wrap Test

EIA Adapter Interface

EIA Card Wrap Test, Modem Clock
Configuration byte 2 = 10



Line Addr.	CCA Card	EIA Card
30	W2	V2
31	U2	V4
32	T2	S2
33	R2	S4
34	Q2	P2
35	N2	P4
36	M2	L2
37	K2	L4

Table B

	Line 30 Board C2 Socket YG	Line 31 Board C2 Socket YQ	Line 32 Board C2 Socket YF	Line 33 Board C2 Socket YP	Line 34 Board C2 Socket YE	Line 35 Board C2 Socket YN	Line 36 Board C2 Socket YD	Line 37 Board C2 Socket YM
Transmit Clock	T1B06	T1B11	Q1C06	Q1C11	M1D06	M1D11	J1E06	J1E11
Receive Clock	U1C06	U1C11	R1D06	R1D11	N1E06	N1E11	L1A06	L1A11

Line Addr.	Tailgate Socket
30	1 – GJ
31	2 – BD
32	2 – GJ
33	3 – BD
34	3 – GJ
35	4 – BD
36	4 – GJ
37	5 – BD

Jumpering
- Wrap options see page 0060.
- Transmission modes/rates page 0090.

Signal Flow and Wrap Test
EIA Adapter Interface (continued)

Signal Checking

- Find the failing signal (given in the MAP) in the chart.
- Put the probe at the pin corresponding to the test point given in the MAP.
- Compare the probed level with the "signal OK" level in table "A".

Before probing wait 2 minutes.
The pin must be probed for up to 20 seconds to observe a level change (from up-level to down-level or from down-level to up-level).
Due to the test timings, a signal may have the same level for 18 seconds.

TABLE "A"

Signal Name	CE Probe Indication if Signal is OK "Signal OK Level"
For All Signals	A level change must be observed
Test Control	Always down level

Jumpering

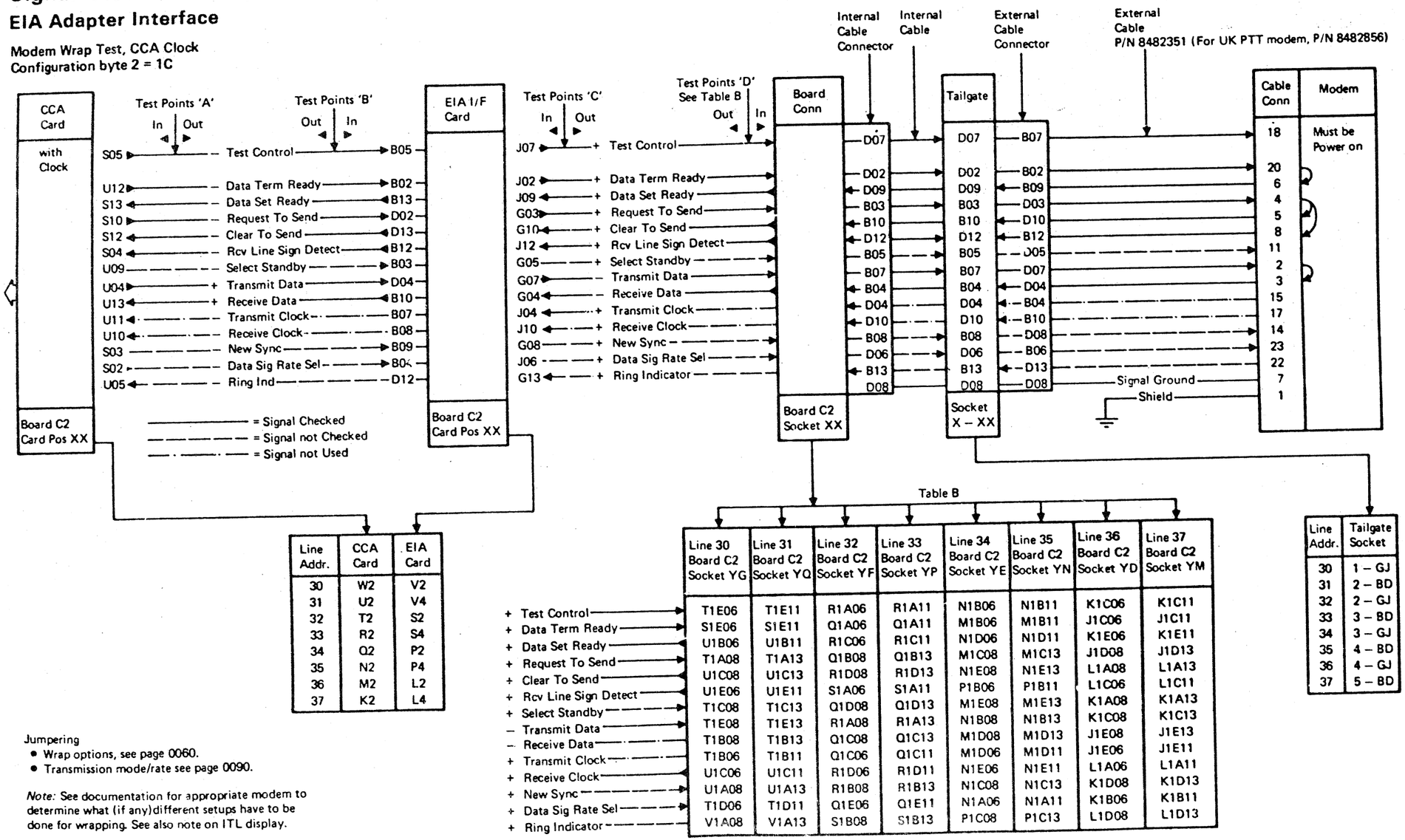
- Wrap options see page 0060.
- Transmission mode/rate see page 0090.

CA

Signal Flow and Wrap Test

EIA Adapter Interface

Modem Wrap Test, CCA Clock
Configuration byte 2 = 1C



Line Addr.	CCA Card	EIA Card
30	W2	V2
31	U2	V4
32	T2	S2
33	R2	S4
34	Q2	P2
35	N2	P4
36	M2	L2
37	K2	L4

Table B

	Line 30 Board C2 Socket YG	Line 31 Board C2 Socket YQ	Line 32 Board C2 Socket YF	Line 33 Board C2 Socket YP	Line 34 Board C2 Socket YE	Line 35 Board C2 Socket YN	Line 36 Board C2 Socket YD	Line 37 Board C2 Socket YM
+ Test Control	T1E06	T1E11	R1A06	R1A11	N1B06	N1B11	K1C06	K1C11
+ Data Term Ready	S1E06	S1E11	Q1A06	Q1A11	M1B06	M1B11	J1C06	J1C11
+ Data Set Ready	U1B06	U1B11	R1C06	R1C11	N1D06	N1D11	K1E06	K1E11
+ Request To Send	T1A08	T1A13	Q1B08	Q1B13	M1C08	M1C13	J1D08	J1D13
+ Clear To Send	U1C08	U1C13	R1D08	R1D13	N1E08	N1E13	L1A08	L1A13
+ Rcv Line Sign Detect	U1E06	U1E11	S1A06	S1A11	P1B06	P1B11	L1C06	L1C11
+ Select Standby	T1C08	T1C13	Q1D08	Q1D13	M1E08	M1E13	K1A08	K1A13
– Transmit Data	T1E08	T1E13	R1A08	R1A13	N1B08	N1B13	K1C08	K1C13
– Receive Data	T1B08	T1B13	Q1C08	Q1C13	M1D08	M1D13	J1E08	J1E13
+ Transmit Clock	T1B06	T1B11	Q1C06	Q1C11	M1D06	M1D11	J1E06	J1E11
+ Receive Clock	U1C06	U1C11	R1D06	R1D11	N1E06	N1E11	L1A06	L1A11
+ New Sync	U1A08	U1A13	R1B08	R1B13	N1C08	N1C13	K1D08	K1D13
+ Data Sig Rate Sel	T1D06	T1D11	Q1E06	Q1E11	N1A06	N1A11	K1B06	K1B11
+ Ring Indicator	V1A08	V1A13	S1B08	S1B13	P1C08	P1C13	L1D08	L1D13

Line Addr.	Tailgate Socket
30	1 – GJ
31	2 – BD
32	2 – GJ
33	3 – BD
34	3 – GJ
35	4 – BD
36	4 – GJ
37	5 – BD

Jumpering
- Wrap options, see page 0060.
- Transmission mode/rate see page 0090.

Note: See documentation for appropriate modem to determine what (if any) different setups have to be done for wrapping. See also note on ITL display.

Signal Flow and Wrap Test
EIA Adapter Interface (continued)

Signal Checking

- Find the failing signal (given in the MAP) in the chart.
- Put the probe at the pin corresponding to the test point given in the MAP.
- Compare the probed level with the "signal OK" level in table "A".

Before probing wait 2 minutes. The pin must be probed for up to 20 seconds to observe a level change (from up-level to down-level or from down-level to up-level).
Due to the test timings, a signal may have the same level for 18 seconds.

TABLE "A"

Signal Name	CE Probe Indication if Signal is OK "Signal OK Level"
For All Signals	A level change must be observed
Test Control	Always down level

Jumpering

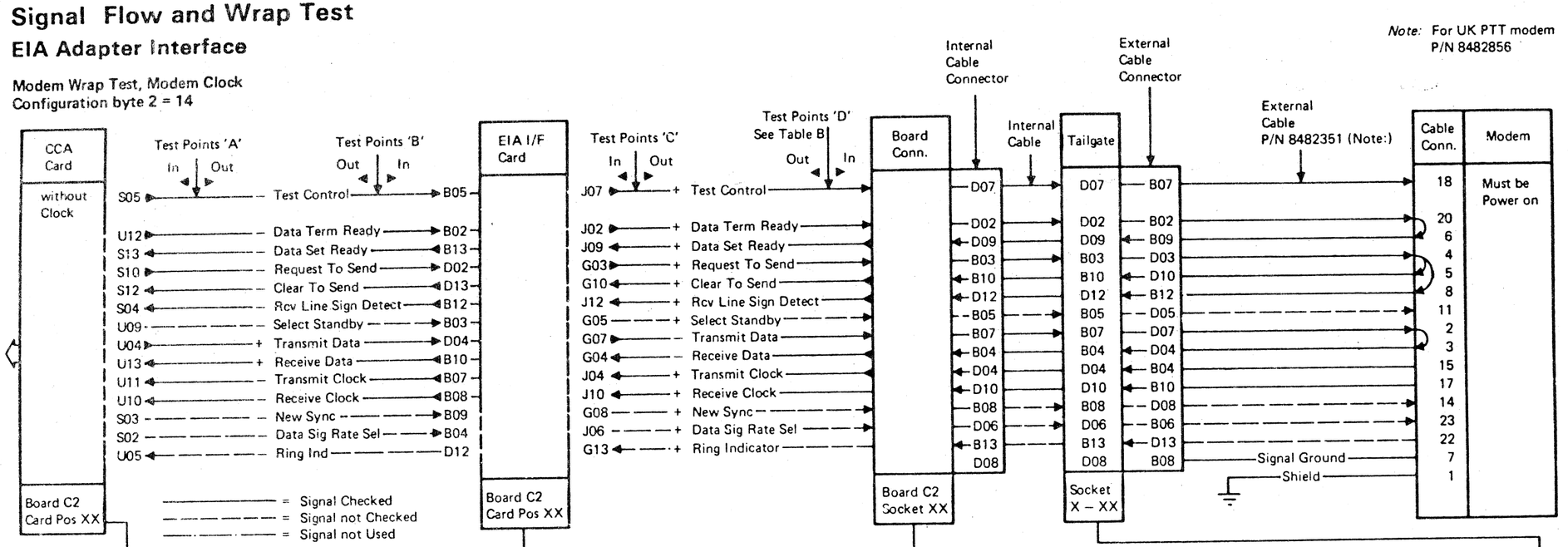
- Wrap options see page 0060.
- Transmission mode/rate see page 0090.

CA

Signal Flow and Wrap Test

EIA Adapter Interface

Modem Wrap Test, Modem Clock
Configuration byte 2 = 14



Note: For UK PTT modem P/N 8482856

Line Addr	CCA Card	EIA Card
30	W2	V2
31	U2	V4
32	T2	S2
33	R2	S4
34	Q2	P2
35	N2	P4
36	M2	L2
37	K2	L4

Jumpering
- Wrap options see page 0060.
- Transmission modes/rates see page 0090.

Note: See documentation for appropriate modem to determine what (if any) different setups have to be done for wrapping. See also note on ILT display.

Table B

	Line 30 Board C2 Socket YG	Line 31 Board C2 Socket YQ	Line 32 Board C2 Socket YF	Line 33 Board C2 Socket YP	Line 34 Board C2 Socket YE	Line 35 Board C2 Socket YN	Line 36 Board C2 Socket YD	Line 37 Board C2 Socket YM
+ Test Control	T1E06	T1E11	R1A06	R1A11	N1B06	N1B11	K1C06	K1C11
+ Data Term Ready	S1E06	S1E11	Q1A06	Q1A11	M1B06	M1B11	J1C06	J1C11
+ Data Set Ready	U1B06	U1B11	R1C06	R1C11	N1D06	N1D11	K1E06	K1E11
+ Request To Send	T1A08	T1A13	Q1B08	Q1B13	M1C08	M1C13	J1D08	J1D13
+ Clear To Send	U1C08	U1C13	R1D08	R1D13	N1E08	N1E13	L1A08	L1A13
+ Rcv Line Sign Detect	U1E06	U1E11	S1A06	S1A11	P1B06	P1B11	L1C06	L1C11
+ Select Standby	T1C08	T1C13	Q1D08	Q1D13	M1E08	M1E13	K1A08	K1A13
– Transmit Data	T1E08	T1E13	R1A08	R1A13	N1B08	N1B13	K1C08	K1C13
– Receive Data	T1B08	T1B13	Q1C08	Q1C13	M1D08	M1D13	J1E08	J1E13
+ Transmit Clock	T1B06	T1B11	Q1C06	Q1C11	M1D06	M1D11	J1E06	J1E11
+ Receive Clock	U1C06	U1C11	R1D06	R1D11	N1E06	N1E11	L1A06	L1A11
+ New Sync	U1A08	U1A13	R1B08	R1B13	N1C08	N1C13	K1D08	K1D13
+ Data Sig Rate Sel	T1D06	T1D11	Q1E06	Q1E11	N1A06	N1A11	K1B06	K1B11
+ Ring Indicator	V1A08	V1A13	S1B08	S1B13	P1C08	P1C13	L1D08	L1D13

Line Addr	Tailgate Socket
30	1 – GJ
31	2 – BD
32	2 – GJ
33	3 – BD
34	3 – GJ
35	4 – BD
36	4 – GJ
37	5 – BD

Signal Flow and Wrap Test
EIA Adapter Interface (continued)

Signal Checking

- Find the failing signal (given in the MAP) in the chart.
- Put the probe at the pin corresponding to the test point given in the MAP.
- Compare the probed level with the "signal OK" level in table "A".

Before probing wait 2 minutes. The pin must be probed for up to 20 seconds to observe a level change (from up-level to down-level or from down-level to up-level).
Due to the test timings, a signal may have the same level for 18 seconds.

TABLE "A"

Signal Name	CE Probe Indication if Signal is OK "Signal OK Level"
For All Signals	A level change must be observed
Test Control	Always down level

Jumpering

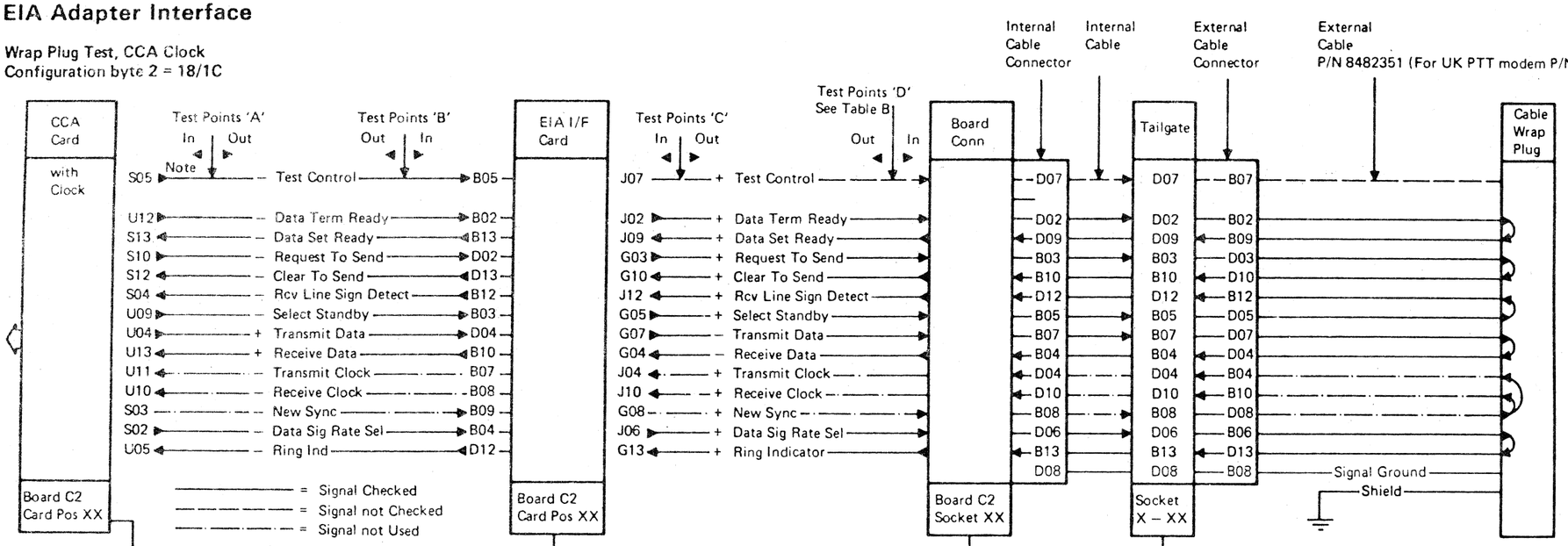
- Wrap options see page 0060.
- Transmission mode/rate 0090.

CA

Signal Flow and Wrap Test

EIA Adapter Interface

Wrap Plug Test, CCA Clock
Configuration byte 2 = 18/1C



Line Addr	CCA Card	EIA Card
30	W2	V2
31	U2	V4
32	T2	S2
33	R2	S4
34	Q2	P2
35	N2	P4
36	M2	L2
37	K2	L4

Table B

	Line 30 Board C2 Socket YG	Line 31 Board C2 Socket YQ	Line 32 Board C2 Socket YF	Line 33 Board C2 Socket YP	Line 34 Board C2 Socket YE	Line 35 Board C2 Socket YN	Line 36 Board C2 Socket YD	Line 37 Board C2 Socket YM
+ Test Control	T1E06	T1E11	R1A06	R1A11	N1B06	N1B11	K1C06	K1C11
+ Data Term Ready	S1E06	S1E11	Q1A06	Q1A11	M1B06	M1B11	J1C06	J1C11
+ Data Set Ready	U1B06	U1B11	R1C06	R1C11	N1D06	N1D11	K1E06	K1E11
+ Request To Send	T1A08	T1A13	Q1B08	Q1B13	M1C08	M1C13	J1D08	J1D13
+ Clear To Send	U1C08	U1C13	R1D08	R1D13	N1E08	N1E13	L1A08	L1A13
+ Rcv Line Sign Detect	U1E06	U1E11	S1A06	S1A11	P1B06	P1B11	L1C06	L1C11
+ Select Standby	T1C08	T1C13	Q1D08	Q1D13	M1E08	M1E13	K1A08	K1A13
– Transmit Data	T1E08	T1E13	R1A08	R1A13	N1B08	N1B13	K1C08	K1C13
– Receive Data	T1B08	T1B13	Q1C08	Q1C13	M1D08	M1D13	J1E08	J1E13
+ Transmit Clock	T1B06	T1B11	Q1C06	Q1C11	M1D06	M1D11	J1E06	J1E11
+ Receive Clock	U1C06	U1C11	R1D06	R1D11	N1E06	N1E11	L1A06	L1A11
+ New Sync	U1A08	U1A13	R1B08	R1B13	N1C08	N1C13	K1D08	K1D13
+ Data Sig Rate Sel	T1D06	T1D11	Q1E06	Q1E11	N1A06	N1A11	K1B06	K1B11
+ Ring Indicator	V1A08	V1A13	S1B08	S1B13	P1C08	P1C13	L1D08	L1D13

Line Addr	Tailgate Socket
30	1 – GJ
31	2 – BD
32	2 – GJ
33	3 – BD
34	3 – GJ
35	4 – BD
36	4 – GJ
37	5 – BD

Jumpering

- Wrap options see page 0060.
- Transmission modes/rates see page 0090.

Signal Flow and Wrap Test
EIA Adapter Interface (continued)

Signal Checking

- Find the failing signal (given in the MAP) in the chart. See Note.
- Put the probe at the pin corresponding to the test point given in the MAP.
- Compare the probed level with the "signal OK" level in table "A".

Before probing wait 2 minutes. The pin must be probed for up to 20 seconds to observe a level change (from up-level to down-level or from down-level to up-level).
Due to the test timings, a signal may have the same level for 18 seconds.

TABLE "A"

Signal Name	CE Probe Indication if Signal is OK "Signal OK Level"
Test Control	Always up level
For all other signals	A level change must be observed

Jumpering

- Wrap options see page 0060.
- Transmission mode/rate see page 0090.

Note : The failing signal may change its name if it is probed over the wrap point.
Example :
Failing signal is CLEAR TO SEND.
After the wrap point it is called Request TO SEND.

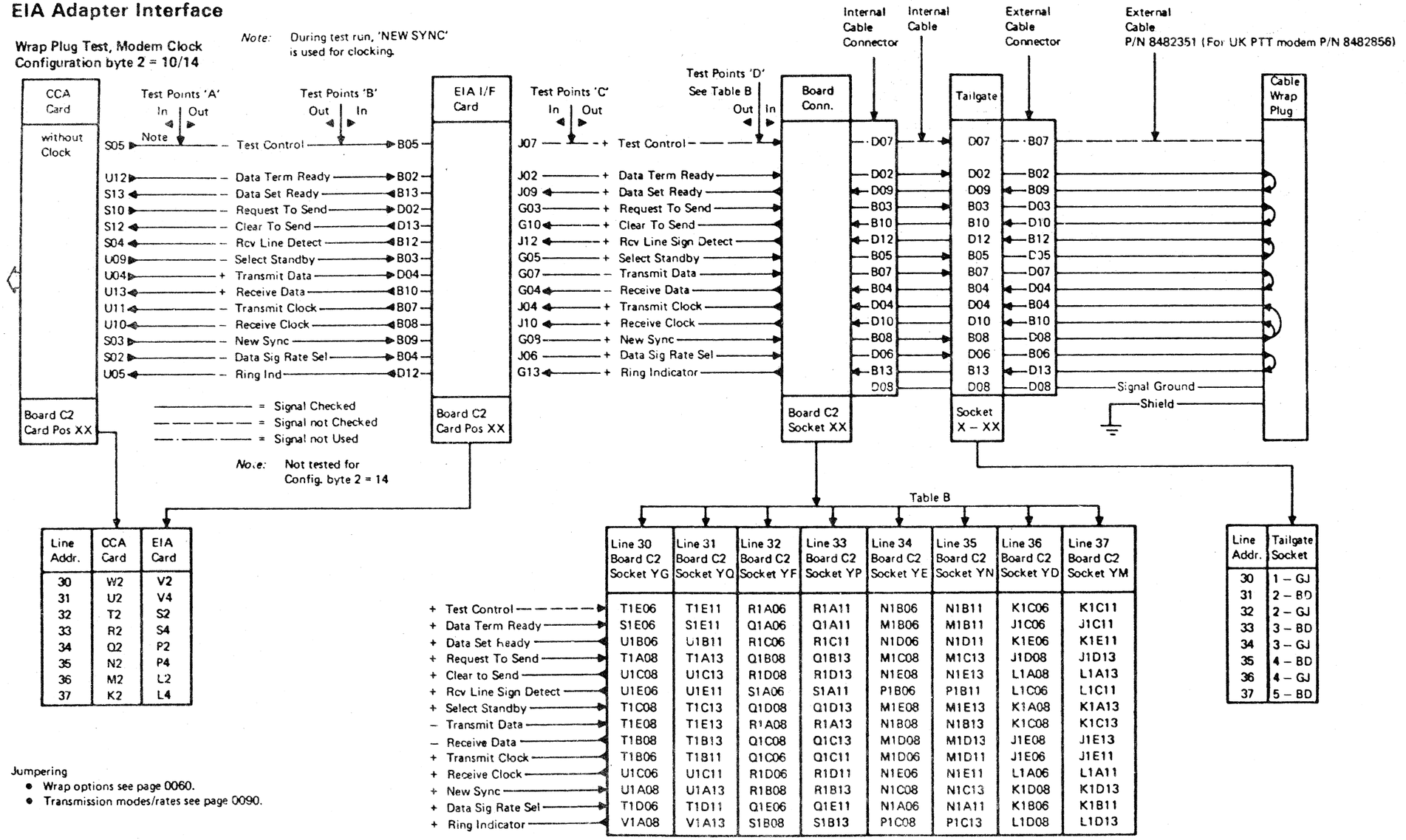
CA

Signal Flow and Wrap Test

EIA Adapter Interface

Wrap Plug Test, Modem Clock
Configuration byte 2 = 10/14

Note: During test run, 'NEW SYNC' is used for clocking.



Line Addr.	CCA Card	EIA Card
30	W2	V2
31	U2	V4
32	T2	S2
33	R2	S4
34	Q2	P2
35	N2	P4
36	M2	L2
37	K2	L4

Table B

	Line 30 Board C2 Socket YG	Line 31 Board C2 Socket YQ	Line 32 Board C2 Socket YF	Line 33 Board C2 Socket YP	Line 34 Board C2 Socket YE	Line 35 Board C2 Socket YN	Line 36 Board C2 Socket YD	Line 37 Board C2 Socket YM
+ Test Control	T1E06	T1E11	R1A06	R1A11	N1B06	N1B11	K1C06	K1C11
+ Data Term Ready	S1E06	S1E11	Q1A06	Q1A11	M1B06	M1B11	J1C06	J1C11
+ Data Set Ready	U1B06	U1B11	R1C06	R1C11	N1D06	N1D11	K1E06	K1E11
+ Request To Send	T1A08	T1A13	Q1B08	Q1B13	M1C08	M1C13	J1D08	J1D13
+ Clear to Send	U1C08	U1C13	R1D08	R1D13	N1E08	N1E13	L1A08	L1A13
+ Rcv Line Sign Detect	U1E06	U1E11	S1A06	S1A11	P1B06	P1B11	L1C06	L1C11
+ Select Standby	T1C08	T1C13	Q1D08	Q1D13	M1E08	M1E13	K1A08	K1A13
– Transmit Data	T1E08	T1E13	R1A08	R1A13	N1B08	N1B13	K1C08	K1C13
– Receive Data	T1B08	T1B13	Q1C08	Q1C13	M1D08	M1D13	J1E08	J1E13
+ Transmit Clock	T1B06	T1B11	Q1C06	Q1C11	M1D06	M1D11	J1E06	J1E11
+ Receive Clock	U1C06	U1C11	R1D06	R1D11	N1E06	N1E11	L1A06	L1A11
+ New Sync	U1A08	U1A13	R1B08	R1B13	N1C08	N1C13	K1D08	K1D13
+ Data Sig Rate Sel	T1D06	T1D11	Q1E06	Q1E11	N1A06	N1A11	K1B06	K1B11
+ Ring Indicator	V1A08	V1A13	S1B08	S1B13	P1C08	P1C13	L1D08	L1D13

Line Addr.	Tailgate Socket
30	1 – GJ
31	2 – BD
32	2 – GJ
33	3 – BD
34	3 – GJ
35	4 – BD
36	4 – GJ
37	5 – BD

Jumpering

- Wrap options see page 0060.
- Transmission modes/rates see page 0090.

Signal Flow and Wrap Test
EIA Adapter Interface(continued)

Signal Checking

- Find the failing signal (given in the MAP) in the chart.
- Put the probe at the pin corresponding to the test point given in the MAP.
- Compare the probed level with the "signal OK" level in table "A".

Before probing wait 2 minutes. The pin must be probed for up to 20 seconds to observe a level change (from up-level to down-level or from down-level to up-level).
Due to the test timings, a signal may have the same level for 18 seconds.

TABLE "A"

Signal Name	CE Probe Indication if Signal is OK "Signal OK Level"
Test Control	Always up level
For all other signals	A level change must be observed

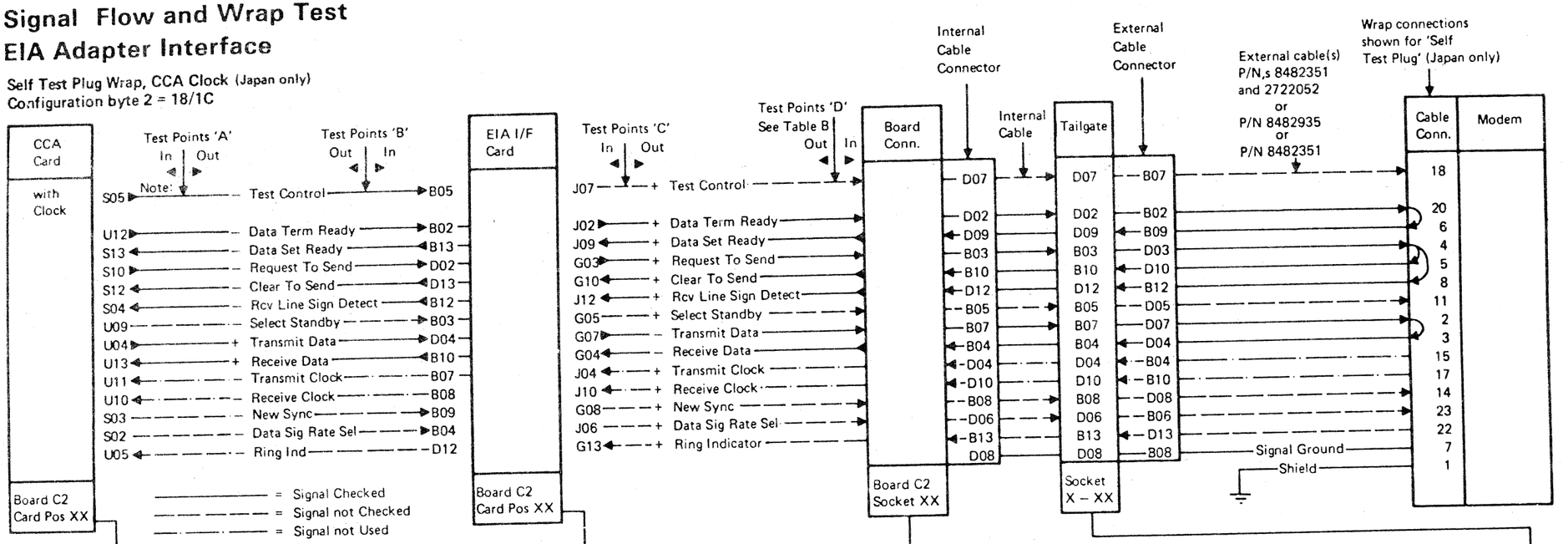
Jumpering

- Wrap options see page 0060.
- Transmission mode/rate see page 0090.

CA

Signal Flow and Wrap Test
EIA Adapter Interface

Self Test Plug Wrap, CCA Clock (Japan only)
Configuration byte 2 = 18/1C



Note: Not tested for config. byte 2 = 1C

Line Addr.	CCA Card	EIA Card
30	W2	V2
31	U2	V4
32	T2	S2
33	R2	S4
34	Q2	P2
35	N2	P4
36	M2	L2
37	K2	L4

Jumpering

- Wrap options see page 0060.
- Transmission modes/rates see page 0090.

Table B

	Line 30 Board C2 Socket YG	Line 31 Board C2 Socket YQ	Line 32 Board C2 Socket YF	Line 33 Board C2 Socket YP	Line 34 Board C2 Socket YE	Line 35 Board C2 Socket YN	Line 36 Board C2 Socket YD	Line 37 Board C2 Socket YM
+ Test Control	T1E06	T1E11	R1A06	R1A11	N1B06	N1B11	K1C06	K1C11
+ Data Term Ready	S1E06	S1E11	Q1A06	Q1A11	M1B06	M1B11	J1C06	J1C11
+ Data Set Ready	U1B06	U1B11	R1C06	R1C11	N1D06	N1D11	K1E06	K1E11
+ Request To Send	T1A08	T1A13	Q1B08	Q1B13	M1C08	M1C13	J1D08	J1D13
+ Clear To Send	U1C08	U1C13	R1D08	R1D13	N1E08	N1E13	L1A08	L1A13
+ Rcv Line Sign Detect	U1E06	U1E11	S1A06	S1A11	P1B06	P1B11	L1C06	L1C11
+ Select Standby	T1C08	T1C13	Q1D08	Q1D13	M1E08	M1E13	K1A08	K1A13
– Transmit Data	T1E08	T1E13	R1A08	R1A13	N1B08	N1B13	K1C08	K1C13
– Receive Data	T1B08	T1B13	Q1C08	Q1C13	M1D08	M1D13	J1E08	J1E13
+ Transmit Clock	T1B06	T1B11	Q1C06	Q1C11	M1D06	M1D11	J1E06	J1E11
+ Receive Clock	U1C06	U1C11	R1D06	R1D11	N1E06	N1E11	L1A06	L1A11
+ New Sync	U1A08	U1A13	R1B08	R1B13	N1C08	N1C13	K1D08	K1D13
+ Data Sig Rate Sel	T1D06	T1D11	Q1E06	Q1E11	N1A06	N1A11	K1B06	K1B11
+ Ring Indicator	V1A08	V1A13	S1B08	S1B13	P1C08	P1C13	L1D08	L1D13

Line Addr	Tailgate Socket
30	1 – GJ
31	2 – BD
32	2 – GJ
33	3 – BD
34	3 – GJ
35	4 – BD
36	4 – GJ
37	5 – BD

Signal Flow and Wrap Test
EIA Adapter Interface (continued)

Signal Checking

- Find the failling signal (given in the MAP) in the chart.
- Put the probe at the pin corresponding to the test point given in the MAP.
- Compare the probed level with the "signal OK" level in table "A".

Before probing wait two minutes. The pin must be probed for up to 20 seconds to observe a level change (from up - level to down - level or from down - level to up - level).
Due to the test timings, a signal may have the same level for 18 seconds.

TABLE "A"

Signal Name	CE Probe Indication if Signal is OK "Signal OK Level"
Test Control	Always up level
For all other Signals	A level change must be observed

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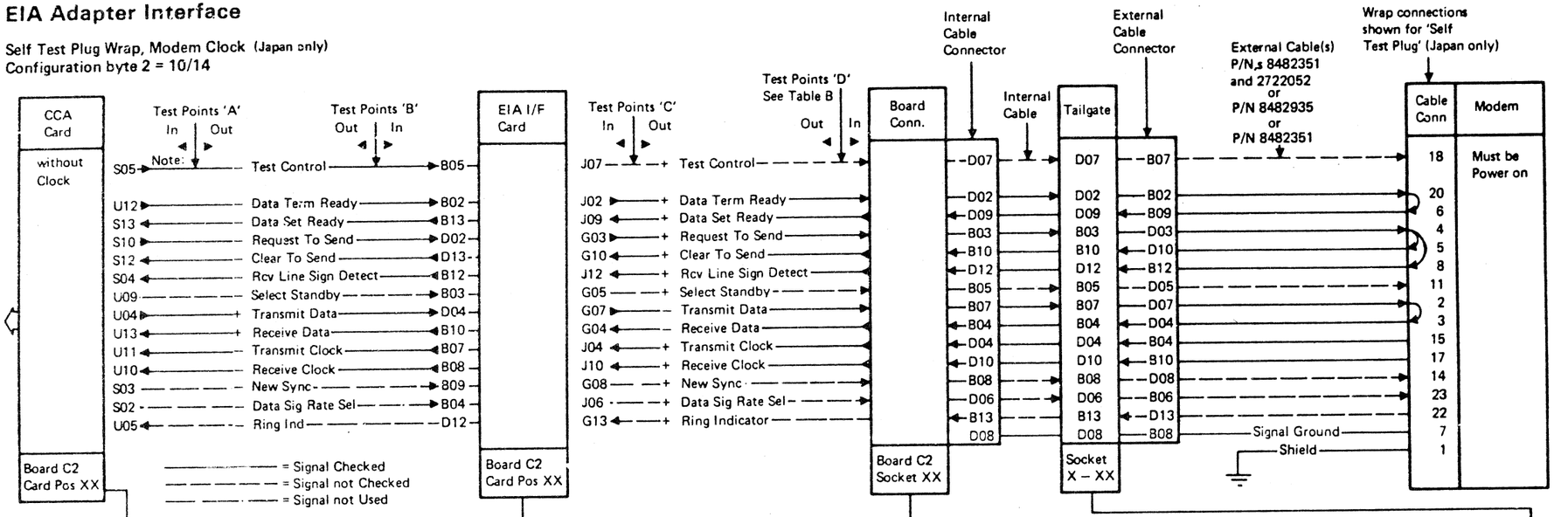
Signal Flow and Wrap Test

EIA Adapter Interface

Self Test Plug Wrap, Modem Clock (Japan only)
Configuration byte 2 = 10/14



Note: Not tested for config. byte 2 = 14

Line Addr.	CCA Card	EIA Card
30	W2	V2
31	U2	V4
32	T2	S2
33	R2	S4
34	Q2	P2
35	N2	P4
36	M2	L2
37	K2	L4

Table B

	Line 30 Board C2 Socket YG	Line 31 Board C2 Socket YQ	Line 32 Board C2 Socket YF	Line 33 Board C2 Socket YP	Line 34 Board C2 Socket YE	Line 35 Board C2 Socket YN	Line 36 Board C2 Socket YD	Line 37 Board C2 Socket YM
+ Test Control	T1E06	T1E11	R1A06	R1A11	N1B06	N1B11	K1C06	K1C11
+ Data Term Ready	S1E06	S1E11	Q1A06	Q1A11	M1B06	M1B11	J1C06	J1C11
+ Data Set Ready	U1B06	U1B11	R1C06	R1C11	N1D06	N1D11	K1E06	K1E11
+ Request To Send	T1A08	T1A13	Q1B08	Q1B13	M1C08	M1C13	J1D08	J1D13
+ Clear To Send	U1C08	U1C13	R1D08	R1D13	N1E08	N1E13	L1A08	L1A13
+ Rcv Line Sign Detect	U1E06	U1E11	S1A06	S1A11	P1B06	P1B11	L1C06	L1C11
+ Select Standby	T1C08	T1C13	Q1D08	Q1D13	M1E08	M1E13	K1A08	K1A13
– Transmit Data	T1E08	T1E13	R1A08	R1A13	N1B08	N1B13	K1C08	K1C13
– Receive Data	T1B08	T1B13	Q1C08	Q1C13	M1D08	M1D13	J1E08	J1E13
+ Transmit Clock	T1B06	T1B11	Q1C06	Q1C11	M1D06	M1D11	J1E06	J1E11
+ Receive Clock	U1C06	U1C11	R1D06	R1D11	N1E06	N1E11	L1A06	L1A11
+ New Sync	U1A08	U1A13	R1B08	R1B13	N1C08	N1C13	K1D08	K1D13
+ Data Sig Rate Sel	T1D06	T1D11	Q1E06	Q1E11	N1A06	N1A11	K1B06	K1B11
+ Ring Indicator	V1A08	V1A13	S1B08	S1B13	P1C08	P1C13	L1D08	L1D13

Line Addr.	Tailgate Socket
30	1 – GJ
31	2 – BD
32	2 – GJ
33	3 – BD
34	3 – GJ
35	4 – BD
36	4 – GJ
37	5 – BD

Jumpering

- Wrap options see page 0060.
- Transmission modes/rates see page 0090.

Signal Flow and Wrap Test
EIA Adapter Interface (continued)

Signal Checking

- Find the failing signal (given in the MAP) in the chart.
- Put the probe at the pin corresponding to the test point given in the MAP.
- Compare the probed level with the "signal OK" level in table "A".

Before probing wait 2 minutes. The pin must be probed for up to 20 seconds to observe a level change (from up-level to down-level or from down-level to up-level).
Due to the test timings, a signal may have the same level for 18 seconds.

TABLE "A"

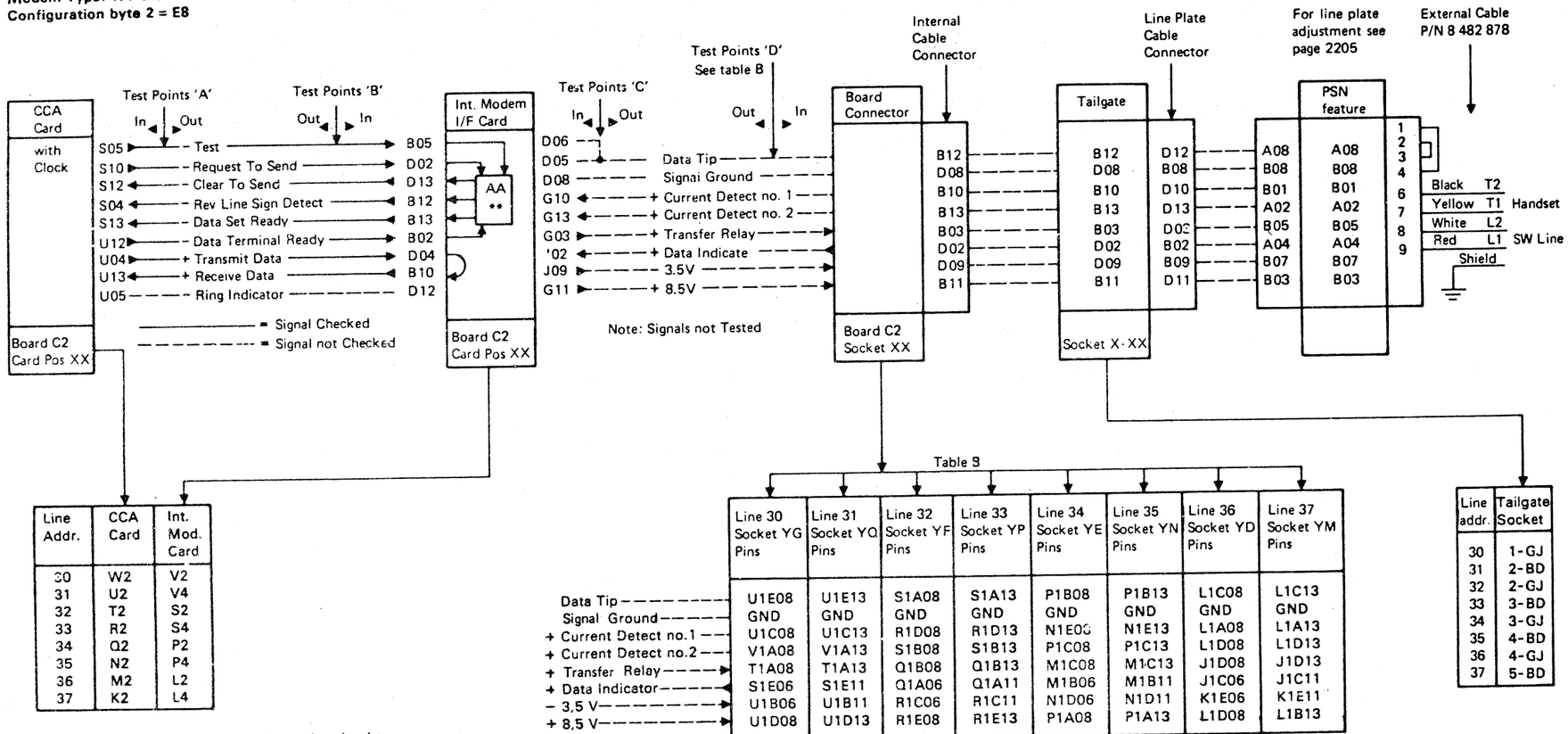
Signal Name	CE Probe Indication if Signal is OK "Signal OK Level"
Test Control	Always up Level
For all other Signals	A level change must be observed

CA

Signal Flow and Wrap Test

Integrated Modem Adapter Interface

Integrated Modem Card Wrap Test, CCA Clock
Modem Type: WT Switched Network, Auto Answer (WT SNAA), card code CE62.
Configuration byte 2 = E8



Line Addr.	CCA Card	Int. Mod. Card
30	W2	V2
31	U2	V4
32	T2	S2
33	R2	S4
34	Q2	P2
35	N2	P4
36	M2	L2
37	K2	L4

** *Note:* AA - Auto Answer Logic: Outcoming signals are a result of all incoming signals.

For transmission mode/rate see page 0090.
For description see page 0062.
For transmission level switches and rocker switches see page 0074 and 0076.

Note: Do not lift the handset when running the In - line Test. This may result in unpredictable reference codes.

Signal Flow and Wrap Test
Integrated Modem Adapter Interface (continued)

Signal Checking

- Find the failing signal (given in the MAP) in the chart.
- Put the probe at the pin corresponding to the test point given in the MAP.
- Compare the probed level with the "signal OK" level in table "A".

Before probing wait 2 minutes. The pin must be probed for up to 20 seconds to observe a level change (from up-level to down-level or from down-level to up-level).
Due to the test timings, a signal may have the same level for 18 seconds.

TABLE "A"

Signal Name	CE Probe Indication if Signal is OK "Signal OK Level"
For All Signals	A level change must be observed
Test Contol	Always down level

For transmission mode/rate see page 0090.
For description see page 0062.
For transmission level switches and rocker switches see page 0074 and 0076.

Jumper Setting on PSN Feature (Line Plate)

On the PSN (Public Switched Network) the jumpers A, G, K, M, and N must be plugged.

Note on Jumper A: The normal telephone DC voltage level supplied ranges from 26-50 V.

Line Plate

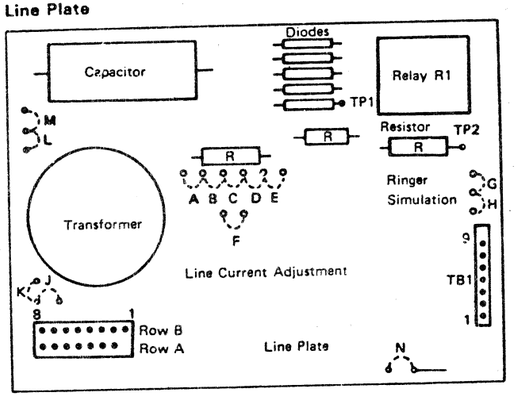


Figure 1

Note on Jumper G: If no telephone set is installed, plug jumper H instead of G.

Connect the DC voltmeter to TP1 and TP2 on the line plate, see Figure 1, to check the DC voltage.

If the supplied DC voltage deviates from the 'normal' range replug jumper A according to the table, Figure 2.

Voltage Level (V)	Jumper Setting	
0.5 - 2	F	
2 - 3.5	E	
3.5 - 4	E	
4 - 6	E	
6 - 8	C	
8 - 9	C	
9 - 14	D	
14 - 26	B	
26 - 37	A	) Normal
37 - 50	A	)

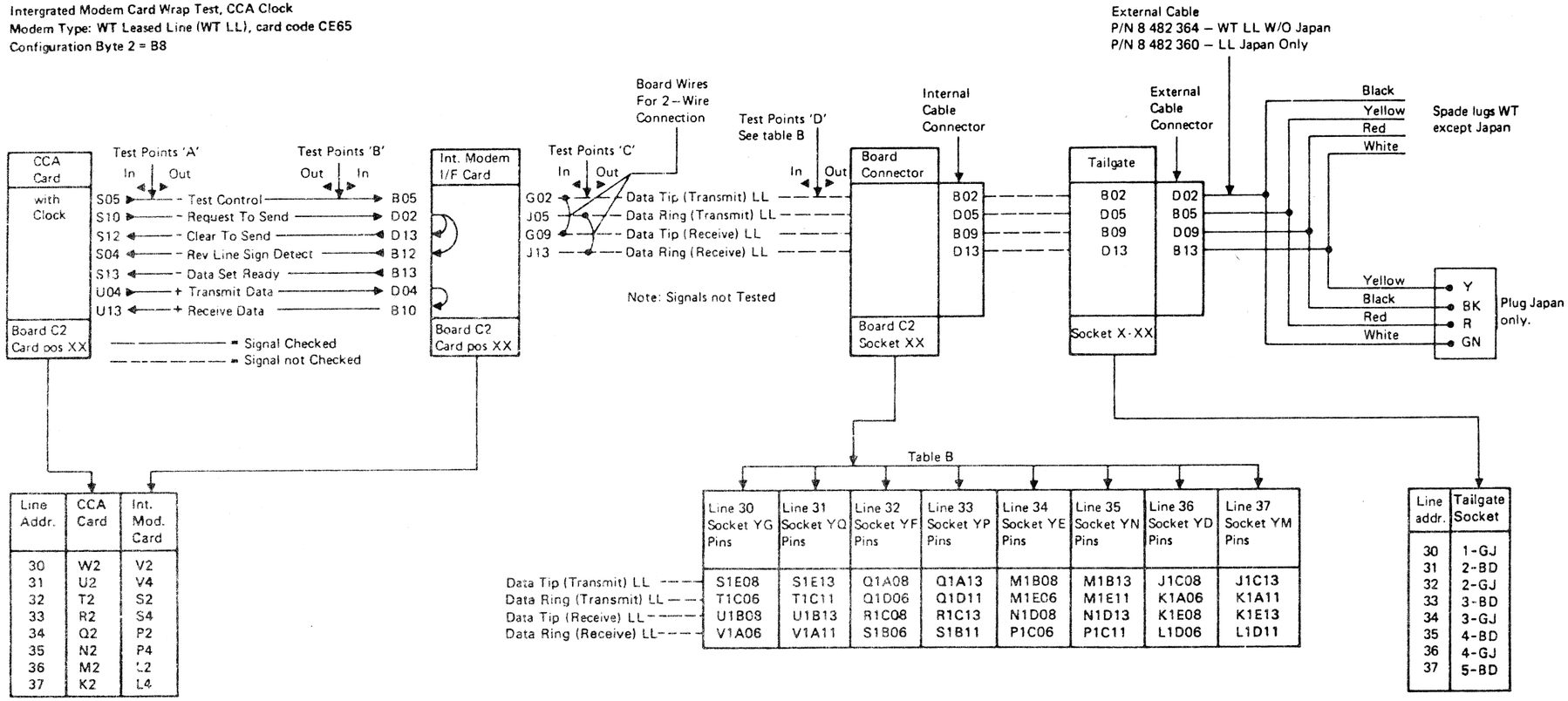
Figure 2

CA

Signal Flow and Wrap Test

Integrated Modem Adapter Interface

Intergrated Modem Card Wrap Test, CCA Clock
Modem Type: WT Leased Line (WT LL), card code CE65
Configuration Byte 2 = B8



Line Addr.	CCA Card	Int. Mod. Card
30	W2	V2
31	U2	V4
32	T2	S2
33	R2	S4
34	Q2	P2
35	N2	P4
36	M2	L2
37	K2	L4

Line addr.	Tailgate Socket
30	1-GJ
31	2-BD
32	2-GJ
33	3-BD
34	3-GJ
35	4-BD
36	4-GJ
37	5-BD

For transmission mode/rate see page 0090.
For description see page 0062.
For transmission level switches and rocker switches see page 0074 and 0076.

Signal Flow and Wrap Test
Integrated Modem Adapter Interface (continued)

Signal Checking

- Find the failing signal (given in the MAP) in the chart.
- Put the probe at the pin corresponding to the test point given in the MAP.
- Compare the probed level with the "signal OK" level in table "A".

Before probing wait 2 minutes.
The pin must be probed for up to 20 seconds to observe a level change (from up-level to down-level or from down-level to up-level).
Due to the test timings, a signal may have the same level for 18 seconds.

TABLE "A"

Signal Name	CE Probe Indication if Signal is OK "Signal OK Level"
Data Set ready	Always down level.
Test Control	Always down level
For All Other Signals	A level change must be observed

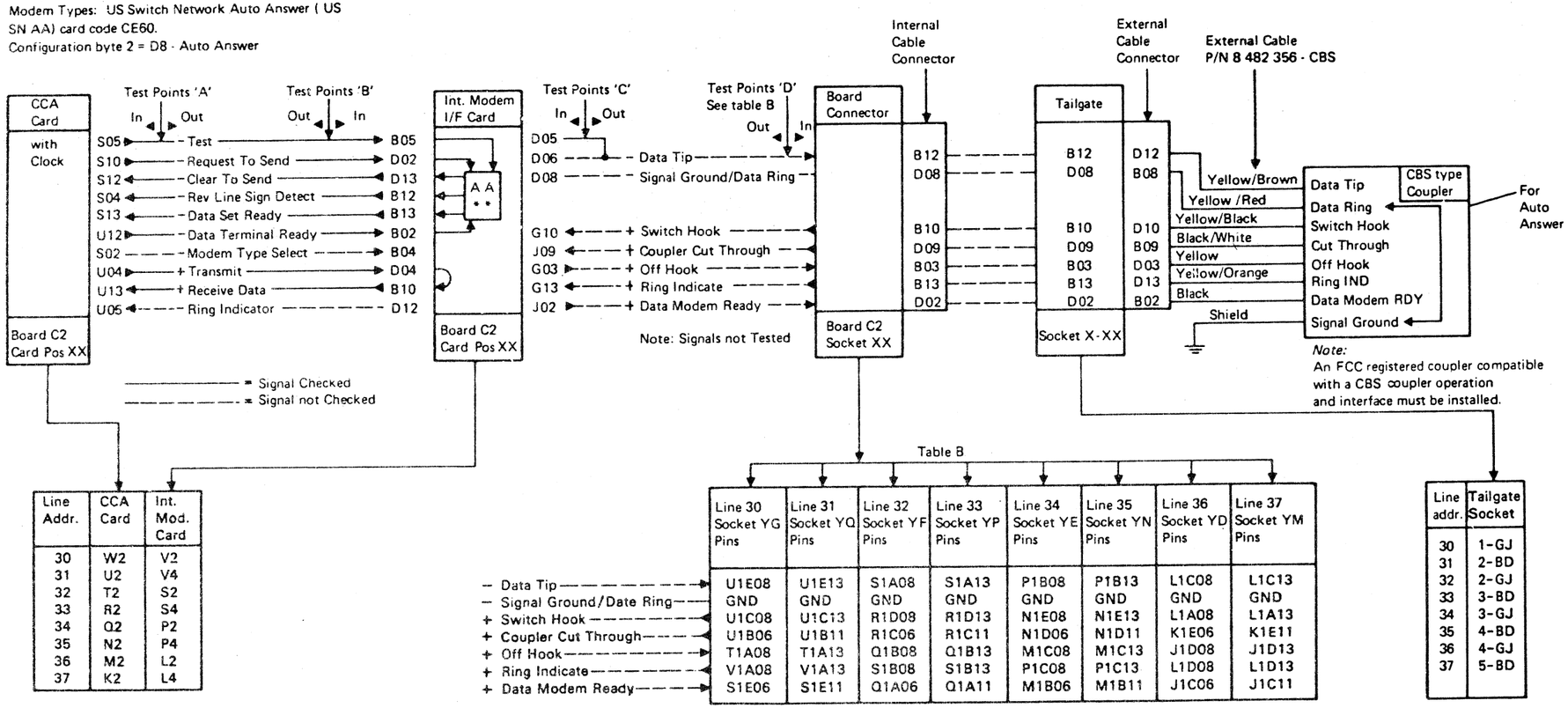
For Transmission mode/rate see page 0090.
For description see page 0062.
For transmission level switches and rocker switches see page 0074 and 0076.

CA

Signal Flow and Wrap Test

Integrated Modem Adapter Interface

Intergrated Modem Card Wrap Test, CCA Clock
Modem Types: US Switch Network Auto Answer (US SN AA) card code CE60.
Configuration byte 2 = D8 - Auto Answer



Line Addr.	CCA Card	Int. Mod. Card
30	W2	V2
31	U2	V4
32	T2	S2
33	R2	S4
34	Q2	P2
35	N2	P4
36	M2	L2
37	K2	L4

	Line 30 Socket YG Pins	Line 31 Socket YQ Pins	Line 32 Socket YF Pins	Line 33 Socket YP Pins	Line 34 Socket YE Pins	Line 35 Socket YN Pins	Line 36 Socket YD Pins	Line 37 Socket YM Pins
– Data Tip	U1E08	U1E13	S1A08	S1A13	P1B08	P1B13	L1C08	L1C13
– Signal Ground/Date Ring	GND	GND	GND	GND	GND	GND	GND	GND
+ Switch Hook	U1C08	U1C13	R1D08	R1D13	N1E08	N1E13	L1A08	L1A13
+ Coupler Cut Through	U1B06	U1B11	R1C06	R1C11	N1D06	N1D11	K1E06	K1E11
+ Off Hook	T1A08	T1A13	Q1B08	Q1B13	M1C08	M1C13	J1D08	J1D13
+ Ring Indicate	V1A08	V1A13	S1B08	S1B13	P1C08	P1C13	L1D08	L1D13
+ Data Modem Ready	S1E06	S1E11	Q1A06	Q1A11	M1B06	M1B11	J1C06	J1C11

Line addr.	Tailgate Socket
30	1-GJ
31	2-BD
32	2-GJ
33	3-BD
34	3-GJ
35	4-BD
36	4-GJ
37	5-BD

Note:
An FCC registered coupler compatible with a CBS coupler operation and interface must be installed.

***Note:* AA - Auto Answer Logic: Outcoming signals are a result of all incoming signals.

For transmission mode/rate see page 0090.
For transmission level see page 0062.
For setting of rocker switches see page 0068 and 0070.

Signal Flow and Wrap Test
Integrated Modem Adapter Interface (continued)

Signal Checking

- Find the failing signal (given in the MAP) in the chart.
- Put the probe at the pin corresponding to the test point given in the MAP.
- Compare the probed level with the "signal OK" level in table "A".

Before probing wait 2 minutes. The pin must be probed for up to 20 seconds to observe a level change (from up-level to down-level or from down-level to up-level).
Due to the test timings, a signal may have the same level for 18 seconds.

TABLE "A"

Signal Name	CE Probe Indication if Signal is OK "Signal OK Level"
Data set ready	A level change must be observed.
Test Control	Always down level
For all other signals	A level change must be observed

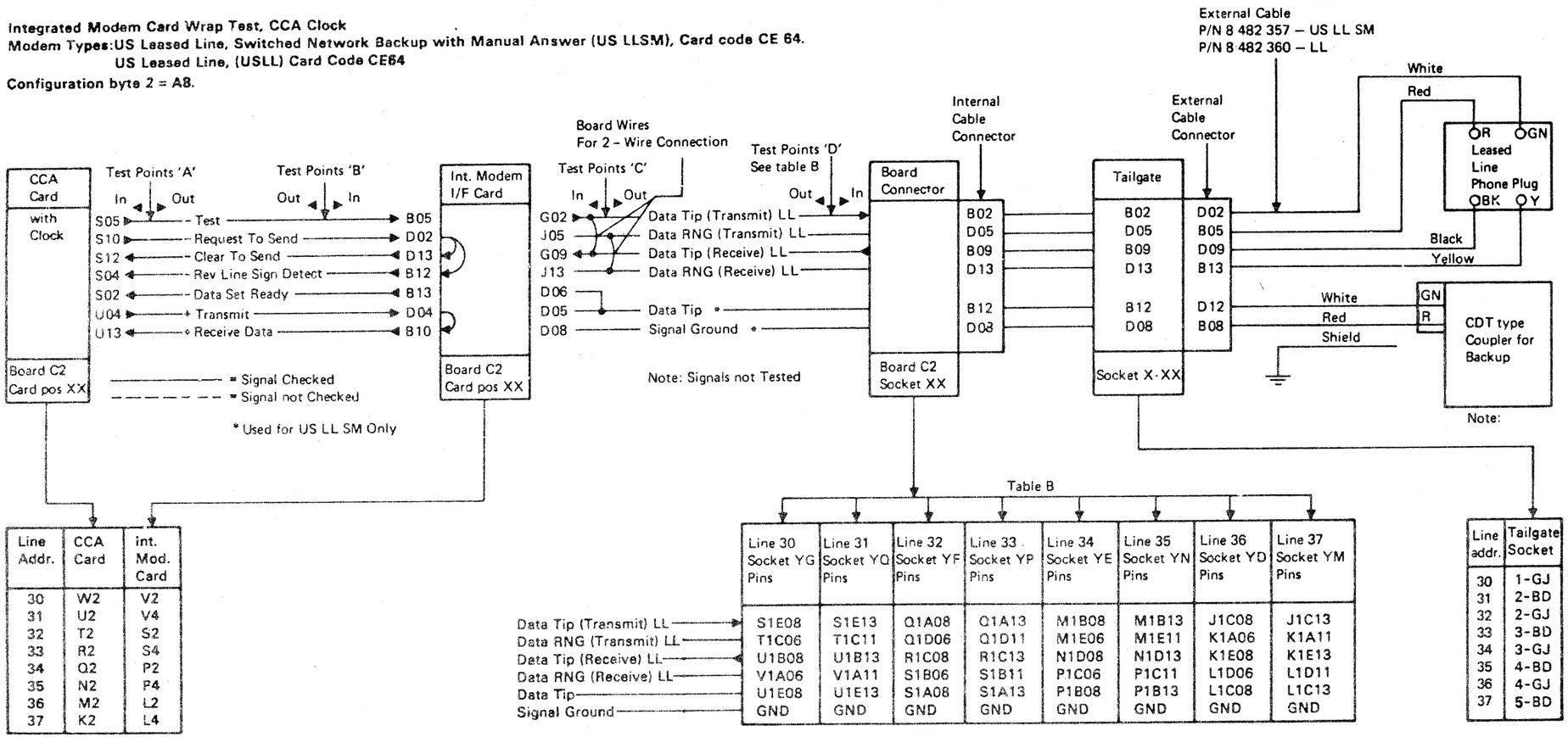
For transmission mode/rate see page 0090.
For transmission level see page 0062.
For setting of rocker switches see pages 0068, 0070, 0074, 0076.

CA

Signal Flow and Wrap Test

Integrated Modem Adapter Interface

Integrated Modem Card Wrap Test, CCA Clock
Modem Types: US Leased Line, Switched Network Backup with Manual Answer (US LLSM), Card code CE 64.
US Leased Line, (USLL) Card Code CE64
Configuration byte 2 = A8.



Line Addr.	CCA Card	int. Mod. Card
30	W2	V2
31	U2	V4
32	T2	S2
33	R2	S4
34	Q2	P2
35	N2	P4
36	M2	L2
37	K2	L4

Line addr.	Tailgate Socket
30	1-GJ
31	2-BD
32	2-GJ
33	3-BD
34	3-GJ
35	4-BD
36	4-GJ
37	5-BD

For transmission mode/rate see page 0090.
For description see page 0064.
For rocker switch setting see page 0068 and 0070.

Note: An FCC registered coupler compatible with a CBS and/or CDT coupler operation and interface must be installed.

Signal Flow and Wrap Test
Integrated Modem Adapter Interface (continued)

Signal Checking

- Find the failing signal (given in the MAP) in the chart.
- Put the probe at the pin corresponding to the test point given in the MAP.
- Compare the probed level with the "signal OK" level in table "A".

Before probing wait 2 minutes. The pin must be probed for up to 20 seconds to observe a level change (from up-level to down-level or from down-level to up-level).
Due to the test timings, a signal may have the same level for 18 seconds.

TABLE "A"

Signal Name	CE Probe Indication if Signal is OK "Signal OK Level"
Data Set Ready	Always down Level
Test Control	Always down level
For All Other Signals	A level change must be observed

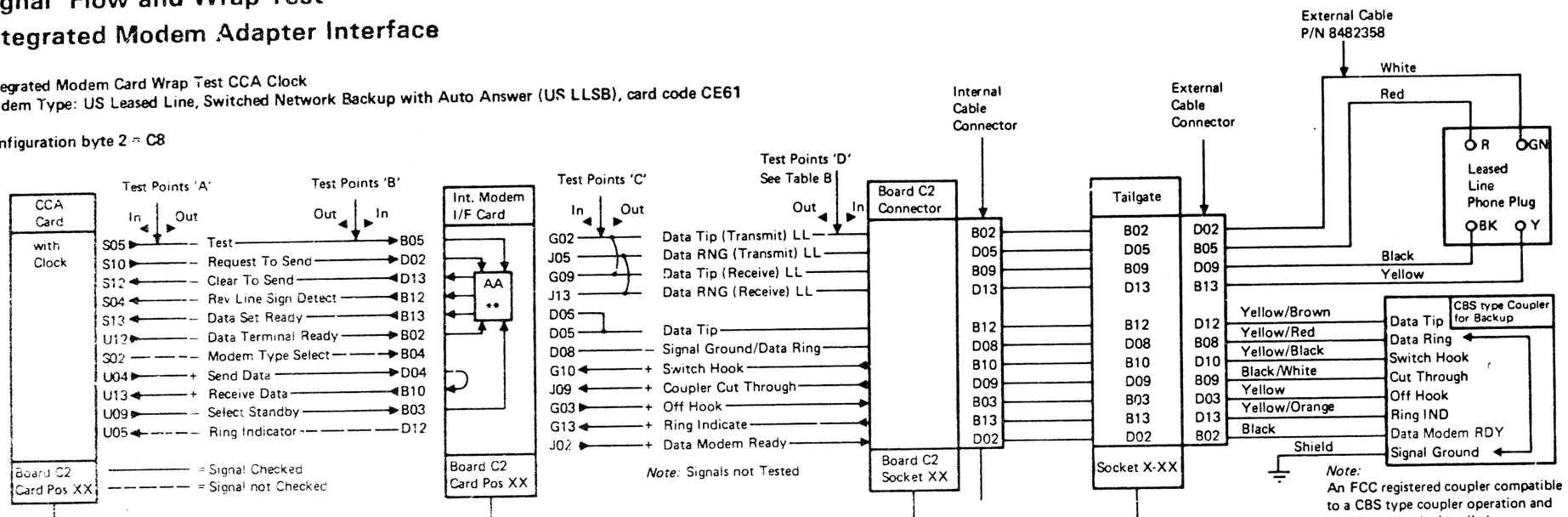
For transmission mode/rate see page 0090.
For description see page 0064.
For rocker switches setting see page 0068 and 0070.

CA

Signal Flow and Wrap Test
Integrated Modem Adapter Interface

Integrated Modem Card Wrap Test CCA Clock
Modem Type: US Leased Line, Switched Network Backup with Auto Answer (US LLSB), card code CE61

Configuration byte 2 = C8



Line Addr.	CCA Card	Int. Mod. Card
30	W2	V2
31	U2	V4
32	T2	S2
33	R2	S4
34	Q2	P2
35	N2	P4
36	M2	L2
37	K2	L4

**Note: AA - Auto Answer logic outcoming signals are a result of incoming signals

Table B

	Line 30 Socket YG Pins	Line 31 Socket YQ Pins	Line 32 Socket YF Pins	Line 33 Socket YP Pins	Line 34 Socket YE Pins	Line 35 Socket YN Pins	Line 36 Socket YD Pins	Line 37 Socket YM Pins
Data Tip (Transmit) LL	S1E08	S1E13	Q1A08	Q1A13	M1B08	M1B13	J1C08	J1C13
Data RNG (Transmit) LL	T1C06	T1C11	Q1D06	Q1D11	M1E06	M1E11	K1A06	K1A11
Data Tip (Receive) LL	U1B08	U1B13	R1C08	R1C13	N1D08	N1D13	K1E08	K1E13
Data RNG (Receive) LL	V1A06	V1A11	S1B06	S1B11	P1C06	P1C11	L1D06	L1D11
Data Tip	U1E08	U1E13	S1A08	S1A13	P1B08	P1B13	L1C08	L1C13
– Signal Ground/Data Ring	GND	GND	GND	GND	GND	GND	GND	GND
+ Switch Hook	U1C08	U1C13	R1D08	R1D13	N1E08	N1E13	L1A08	L1A13
+ Coupler Cut Through	U1B06	U1B11	R1C06	R1C11	N1D06	N1D11	K1E06	K1E11
+ Off Hook	T1A08	T1A13	Q1B08	Q1B13	M1C08	M1C13	J1D08	J1D13
+ Ring Indicate	V1A08	V1A13	S1B08	S1B13	P1C08	P1C13	L1D08	L1D13
+ Data Modem Ready	S1E06	S1E11	Q1A06	Q1A11	M1B06	M1B11	J1C06	J1C11

Line Addr.	Tailgate Socket
30	1 – GJ
31	2 – BD
32	2 – GJ
33	3 – BD
34	3 – GJ
35	4 – BD
36	4 – GJ
37	5 – BD

For transmission mode/rate see page 0090.
For description see page 0064.
For rocker switch setting see page 0068 and 0070.

Signal Flow and Wrap Test
Integrated Modem Adapter Interface (continued)

Signal Checking

- Find the failing signal (given in the MAP) in the chart.
- Put the probe at the pin corresponding to the test point given in the MAP.
- Compare the probed level with the "signal OK" level in table "A".

Before probing wait 2 minutes. The pin must be probed for up to 20 seconds to observe a level change (from up-level to down-level or from down-level to up-level).
Due to the test timings, a signal may have the same level for 18 seconds.

TABLE "A"

Signal Name	CE Probe Indication if Signal is OK "Signal OK Level"
For All Signals	A level change must be observed
Test Control	Always down level

For transmission mode/rate see page 0090.
For description see page 0064.
For rocker switches setting see page 0068 and 0070.

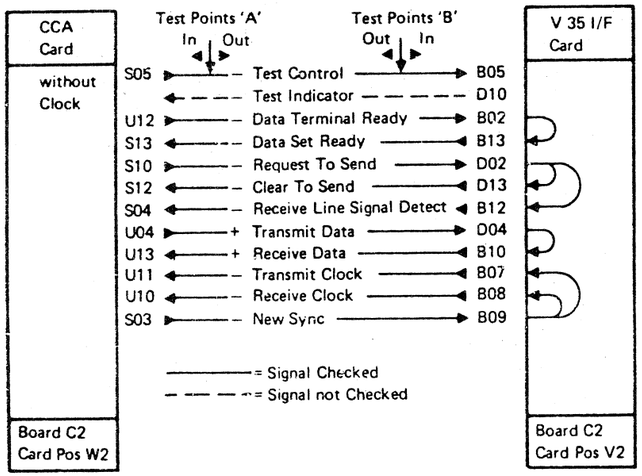
CA

Signal Flow and Wrap Test

V35 Adapter Interface

V35 Card Wrap Test, Modem Clock
Configuration byte 2 = 20

Note: During test run 'NEW SYNC' is used for clocking.



For jumpering see page 0078.

Signal Flow and Wrap Test

V35 Adapter Interface (continued)

Signal Checking

- Find the failing signal (given in the MAP) in the chart.
- Put the probe at the pin corresponding to the test point given in the MAP.
- Compare the probed level with the "signal OK" level in table "A".

Before probing wait 2 minutes. The pin must be probed for up to 20 seconds to observe a level change (from up-level to down-level or from down-level to up-level).
Due to the test timings, a signal may have the same level for 18 seconds.

TABLE "A"

Signal Name	CE Probe Indication if Signal is OK "Signal OK Level"
For All Signals	A level change must be observed
Test Control	Always down level

Information about the interface card is found on page 0078.

Information about board wiring is found on page 0078.

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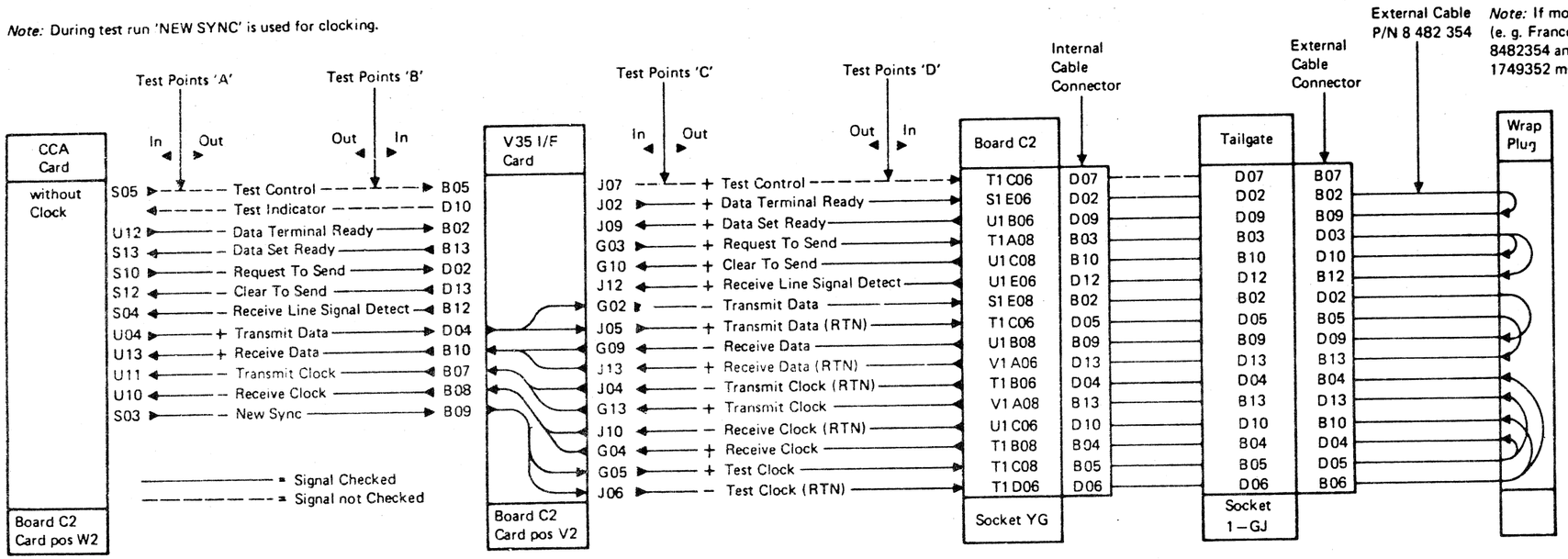
Signal Flow and Wrap Test

V35 Adapter Interface

Wrap Plug Test, Modem Clock
Configuration byte 2 = 20/24.

Note: During test run 'NEW SYNC' is used for clocking.



Note: If modem with pin size 20 (e. g. France), modem cable P/N 8482354 and adapter cable P/N 1749352 must be used.

Note : Ground line from tailgate position D08 is connected with wrap plug position 'B' through modem cable connector position B08.

For jumpering see page 0078.

Signal Flow and Wrap Test
V35 Adapter Interface (continued)

Signal Checking

- Find the failing signal (given in the MAP) in the chart
- Put the probe at the pin corresponding to the test point given in the MAP.
- Compare the probed level with the "signal OK" level in table "A".

Before probing wait 2 minutes. The pin must be probed for up to 20 seconds to observe a level change (from up-level to down-level or from down-level to up-level).

Due to the test timings, a signal may have the same level for 18 seconds.

TABLE "A"

Signal Name	CE probe indication if signal is OK "Signal OK Level"
Test control	Always up level
For all other signals	A level change must be observed

Information about the interface card is found on page 0078.

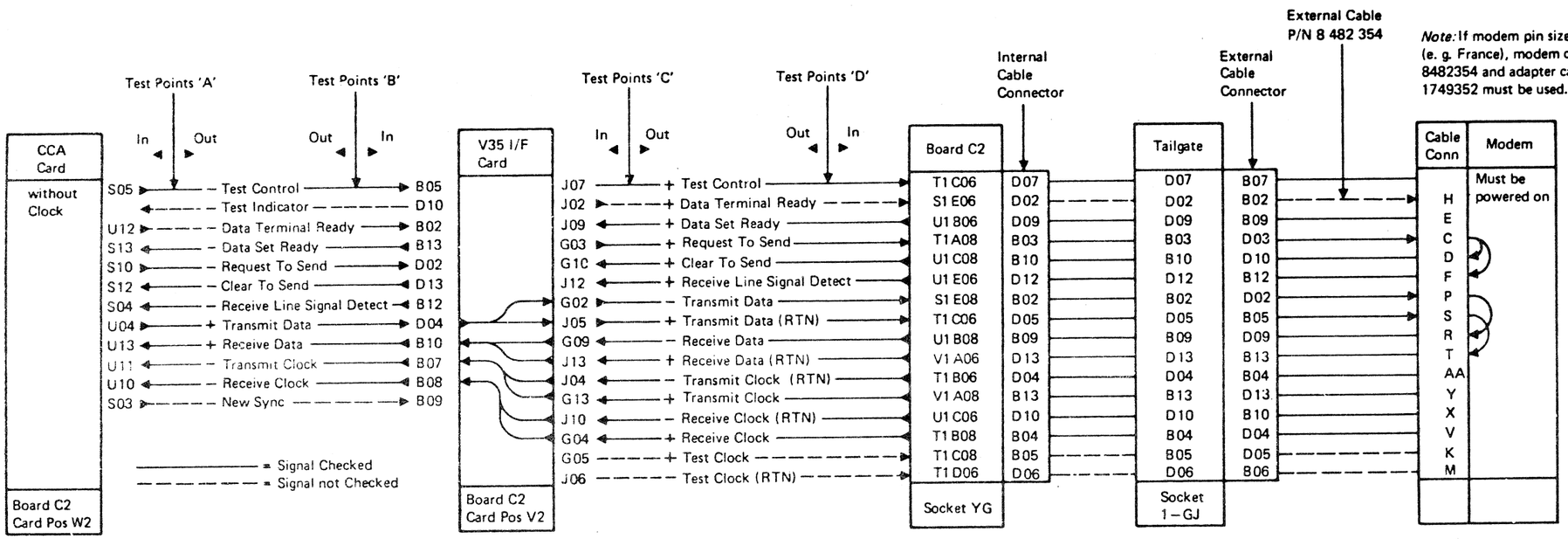
Information about board wiring is found on page 0078.

CA

Signal Flow and Wrap Test

V35 ADAPTER INTERFACE

Modem Wrap Test, Modem Clock
Configuration byte 2 = 24



Note: If modem pin size 20 (e. g. France), modem cable P/N 8482354 and adapter cable P/N 1749352 must be used.

Note : Ground line from tailgate position D08 is connected with modem side cable connector position 'B' through modem cable connector position B08.

For jumpering see page 0078.

Note: See documentation for appropriate modem to determine what (if any) different setups have to be done for wrapping. See also note on ILT display.

Signal Flow and Wrap Test
V35 Adapter Interface (continued)

Signal Checking

- Find the failing signal (given in the MAP) in the chart.
- Put the probe at the pin corresponding to the test point given in the MAP.
- Compare the probed level with the "signal OK" level in table "A".

Before probing wait 2 minutes. The pin must be probed for up to 20 seconds to observe a level change (from up-level to down-level or from down-level to up-level).

Due to the test timings, a signal may have the same level for 18 seconds.

TABLE "A"

Signal Name	CE Probe Indication if signal is OK "Signal OK Level"
Test Control	Always down level
For all other signals	A level change must be observed

Information about the interface card is found on page 0078.

Information about board wiring is found on page 0078.

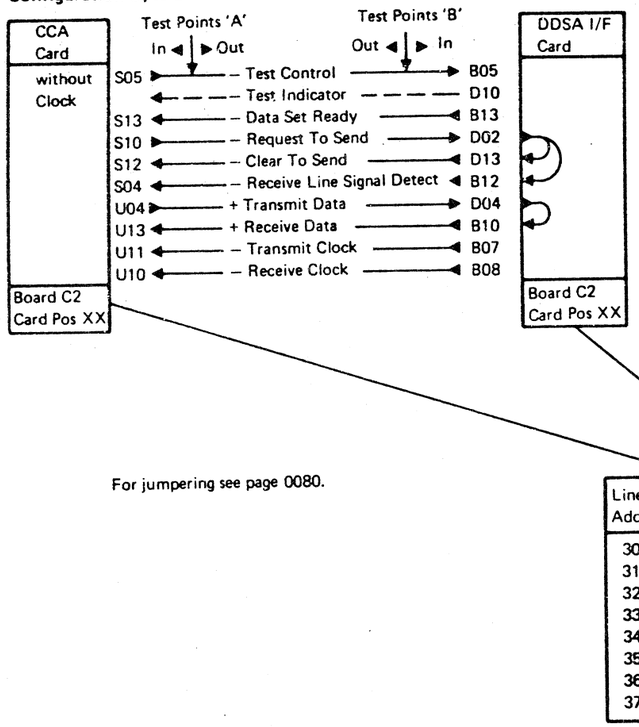
CA

Signal Flow and Wrap Test

Dataphone* Digital Service Adapter Interface (DDSA)

*Registered trademark of AT & T.

DDSA Card Wrap Test, DDSA Card Clock
Configuration byte 2 = 80



For jumpering see page 0080.

Line Addr.	CCA Card	DDSA Card
30	W2	V2
31	U2	V4
32	T2	S2
33	R2	S4
34	Q2	P2
35	N2	P4
36	M2	L2
37	K2	L4

Signal Flow and Wrap Test
Dataphone* Digital Service Adapter Interface (DDSA) (continued)

* Registered trade mark of AT&T.

Signal Checking

- Find the falling signal (given in the MAP) in the chart.
- Put the probe at the pin corresponding to the test point given in the MAP.
- Compare the probed level with the "signal OK" level in table "A".

Before probing wait 2 minutes. The pin must be probed for up to 20 seconds to observe a level change (from up-level to down-level or from down-level to up-level).

Due to the test timings, a signal may have the same level for 18 seconds.

TABLE "A"

Signal Name	CE Probe indication if signal is OK "Signal OK Level"
Data Set Ready	Always down level
Test Control	Always down level
For all other Signals	A level change must be observed

Information about the interface card is found on page 0080.

Information about board wiring is found on page 0090.

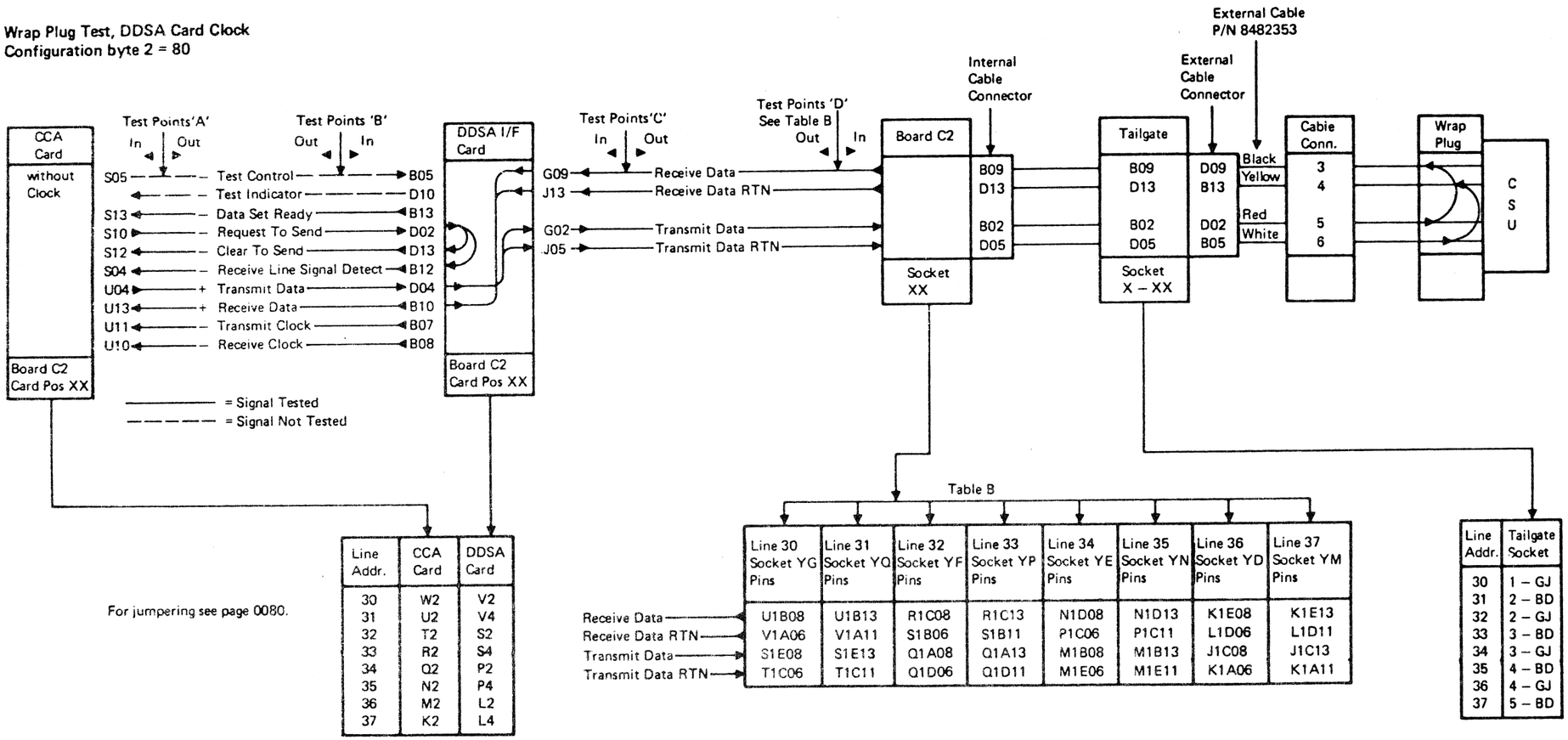
CA

Signal Flow and Wrap Test

Dataphone* Digital Service Adapter Interface (DDSA)

* Registered trademark of AT & T.

Wrap Plug Test, DDSA Card Clock
Configuration byte 2 = 80



Line Addr.	CCA Card	DDSA Card
30	W2	V2
31	U2	V4
32	T2	S2
33	R2	S4
34	Q2	P2
35	N2	P4
36	M2	L2
37	K2	L4

	Line 30 Socket YG Pins	Line 31 Socket YQ Pins	Line 32 Socket YF Pins	Line 33 Socket YP Pins	Line 34 Socket YE Pins	Line 35 Socket YN Pins	Line 36 Socket YD Pins	Line 37 Socket YM Pins
Receive Data	U1B08	U1B13	R1C08	R1C13	N1D08	N1D13	K1E08	K1E13
Receive Data RTN	V1A06	V1A11	S1B06	S1B11	P1C06	P1C11	L1D06	L1D11
Transmit Data	S1E08	S1E13	Q1A08	Q1A13	M1B08	M1B13	J1C08	J1C13
Transmit Data RTN	T1C06	T1C11	Q1D06	Q1D11	M1E06	M1E11	K1A06	K1A11

Line Addr.	Tailgate Socket
30	1 – GJ
31	2 – BD
32	2 – GJ
33	3 – BD
34	3 – GJ
35	4 – BD
36	4 – GJ
37	5 – BD

Signal Flow and Wrap Test
Dataphone* Digital Service Adapter Interface (DDSA) (continued)

* Registered trademark of AT&T

Signal Checking

- Find the failing signal (given in the MAP) in the chart.
- Put the probe at the pin corresponding to the test point given in the MAP.
- Compare the probed level with the "signal OK" level in table "A".

Before probing wait 2 minutes. The pin must be probed for up to 20 seconds to observe a level change (from up-level to down-level or from down-level to up-level).

Due to the test timings, a signal may have the same level for 18 seconds.

TABLE "A"

Signal Name	CE Probe Indication if signal is OK "Signal OK Level"
Test Control	Always up level
Data set ready	Always down level
For all other signals	A level change must be observed

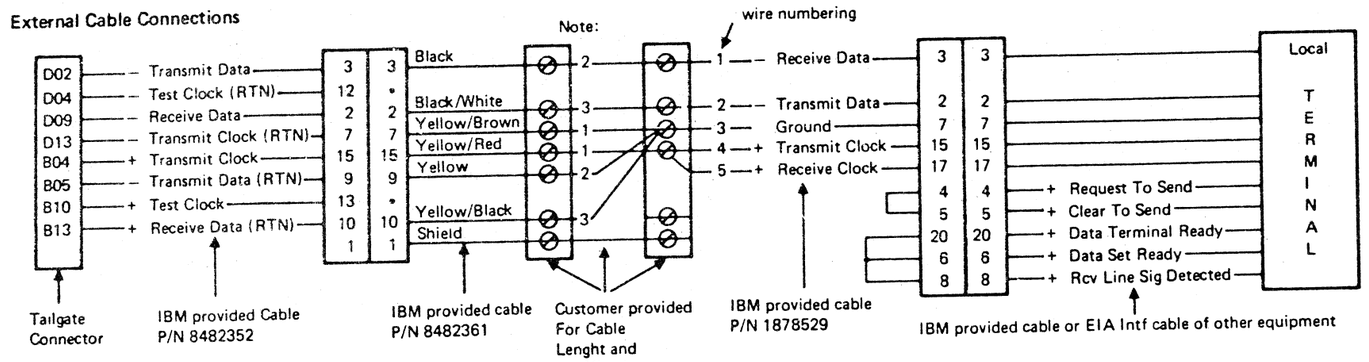
Information about the interface card is found on page 0080.

Information about board wiring is found on page 0090.

CA

Signal Flow and Wrap Test
Local Attachment Adapter Interface

External Cable Connections



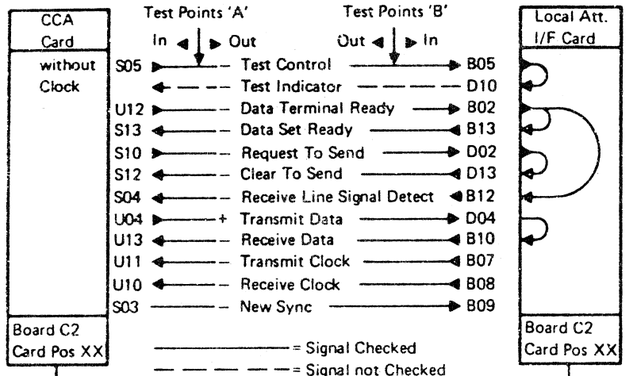
Note: Twisted pair is identified by equal numbers.

Wire	Colour
1	Black
2	Yellow
3	Orange
4	White
5	Blue

Signal Flow and Wrap Test

Local Attachment Adapter Interace

Local Attachment Card Wrap Test, Local Attachment Card Clock
Configuration byte 2 = '90'



Note:
The local attachment card clock is directly gated to the transmit/receive clock. For this reason, the signal 'NEW SYNC' is always at up level.

Line Addr.	CCA Card	Local Att. Card
30	W2	V2
31	U2	V4
32	T2	S2
33	R2	S4
34	Q2	P2
35	N2	P4
36	M2	L2
37	K2	L4

Signal Checking

- Find the failing signal (given in the MAP) in the chart.
- Put the probe at the pin corresponding to the test point given in the MAP.
- Compare the probed level with the "signal OK" level in table "A".

Before probing wait 2 minutes. The pin must be probed for up to 20 seconds to observe a level change (from up - level to to down - level or from down-level to up - level).

Due to the test timings, a signal may have the same level for 18 seconds.

TABLE "A"

Signal Name	CE Probe Indication if Signal is OK "Signal OK Level"
New Sync	Always up level
Test Control	Always down level
For all other Signals	A level change must be observed

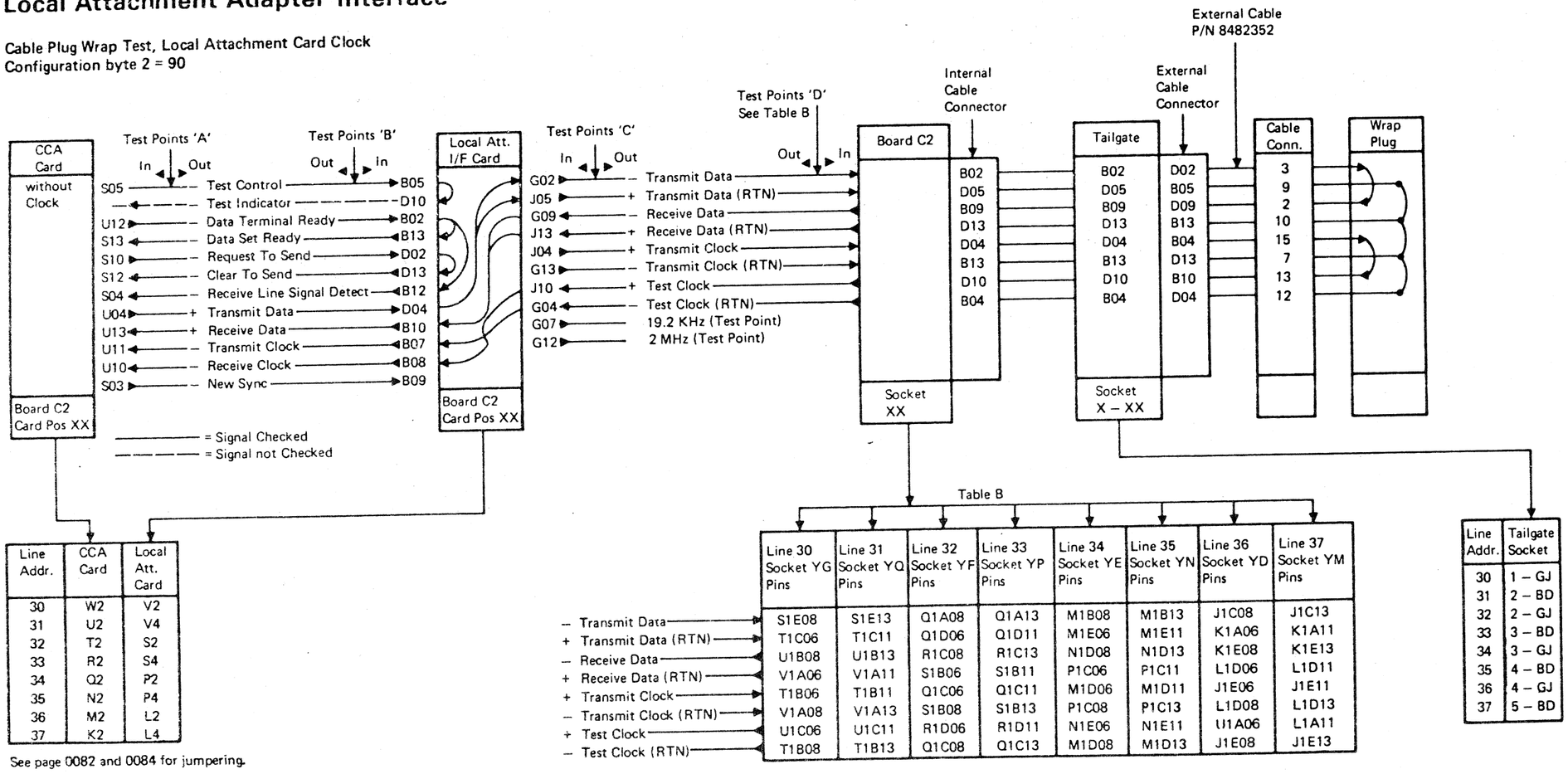
Information about the interface card is found on page 0082.

Information about board wiring is found on page 0084 and 0090.

Signal Flow and Wrap Test

Local Attachment Adapter Interface

Cable Plug Wrap Test, Local Attachment Card Clock
Configuration byte 2 = 90



Line Addr.	CCA Card	Local Att. Card
30	W2	V2
31	U2	V4
32	T2	S2
33	R2	S4
34	Q2	P2
35	N2	P4
36	M2	L2
37	K2	L4

Table B

	Line 30 Socket YG Pins	Line 31 Socket YQ Pins	Line 32 Socket YF Pins	Line 33 Socket YP Pins	Line 34 Socket YE Pins	Line 35 Socket YN Pins	Line 36 Socket YD Pins	Line 37 Socket YM Pins
– Transmit Data →	S1E08	S1E13	Q1A08	Q1A13	M1B08	M1B13	J1C08	J1C13
+ Transmit Data (RTN) →	T1C06	T1C11	Q1D06	Q1D11	M1E06	M1E11	K1A06	K1A11
– Receive Data ←	U1B08	U1B13	R1C08	R1C13	N1D08	N1D13	K1E08	K1E13
+ Receive Data (RTN) ←	V1A06	V1A11	S1B06	S1B11	P1C06	P1C11	L1D06	L1D11
+ Transmit Clock →	T1B06	T1B11	Q1C06	Q1C11	M1D06	M1D11	J1E06	J1E11
– Transmit Clock (RTN) →	V1A08	V1A13	S1B08	S1B13	P1C08	P1C13	L1D08	L1D13
+ Test Clock ←	U1C06	U1C11	R1D06	R1D11	N1E06	N1E11	U1A06	L1A11
– Test Clock (RTN) ←	T1B08	T1B13	Q1C08	Q1C13	M1D08	M1D13	J1E08	J1E13

Line Addr.	Tailgate Socket
30	1 – GJ
31	2 – BD
32	2 – GJ
33	3 – BD
34	3 – GJ
35	4 – BD
36	4 – GJ
37	5 – BD

See page 0082 and 0084 for jumpering.

Note: Normally, the local attachment card clock is directly gated to the Transmit/Receive clock signals to the CCA. For this reason 'NEW SYNC' is at up level. For the last test step (plug wrap test) the 'NEW SYNC' switches to down level and the local attachment card clock is gated via transmit clock to the wrap plug, test clock back to the CCA. The Transmit Data is routed back from the wrap plug as Receive Data.

Signal Flow and Wrap Test
Local Attachment Adapter Interface (continued)

Cable Plug Wrap Test, Local Attachment Card Clock

Signal Checking

- Find the failing signal (given in the MAP) in the chart.
- Put the probe at the pin corresponding to the test point given in the MAP.
- Compare the probed level with the "signal OK" level in table "A".

Before probing wait two minutes. The pin must be probed for up to 20 seconds to observe a level change (from up-level to down-level or from down-level to up-level).

Due to the test timings, a signal may have the same level for 18 seconds.

TABLE "A"

Signal Name	CE Probe Indication if Signal is OK. "Signal OK Level"
Test Control	Always up level
New Sync	Always down
For all other Signals	A level change must be observed.

Information about the interface card is found on page 0082.

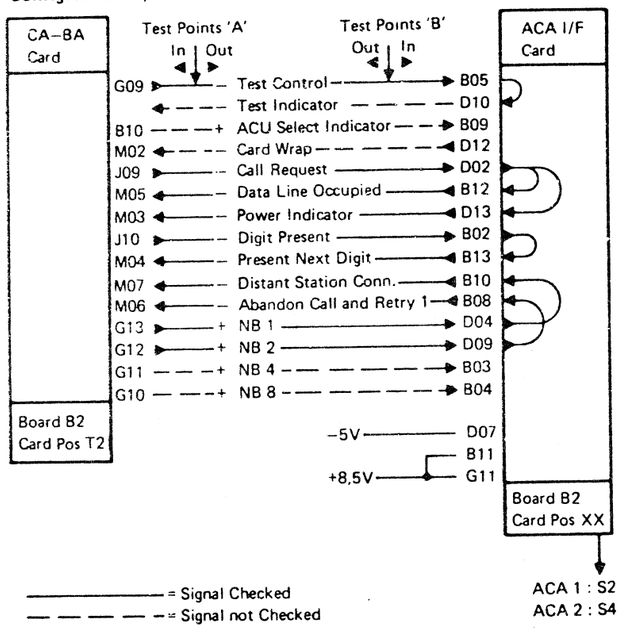
Information about board wiring is found on page 0084 and 0090.

CA

Signal Flow and Wrap Test

Automatic Call Adapter 1 and 2 (ACA1 and 2) Interface

ACA Card Wrap Test
Configuration byte 2 = 10, 14, 18, 1C



Signal Checking

- Find the failing signal (given in the MAP) in the chart.
- Put the probe at the pin corresponding to the test point given in the MAP.
- Compare the probed level with the "signal OK" level in table "A".

Before probing wait 2 minutes. The pin must be probed for up to 20 seconds to observe a level change (from up - level to down - level or from down - level to up - level).

Due to the test timings, a signal may have the same level for 18 seconds.

TABLE "A"

Signal Name	CE Probe Indication if Signal is OK "Signal OK Level"
Test Control	Always down level
For all other Signals	A level change must be observed

Information about the interface card and board wiring is found on page 0060.
(EIA card).

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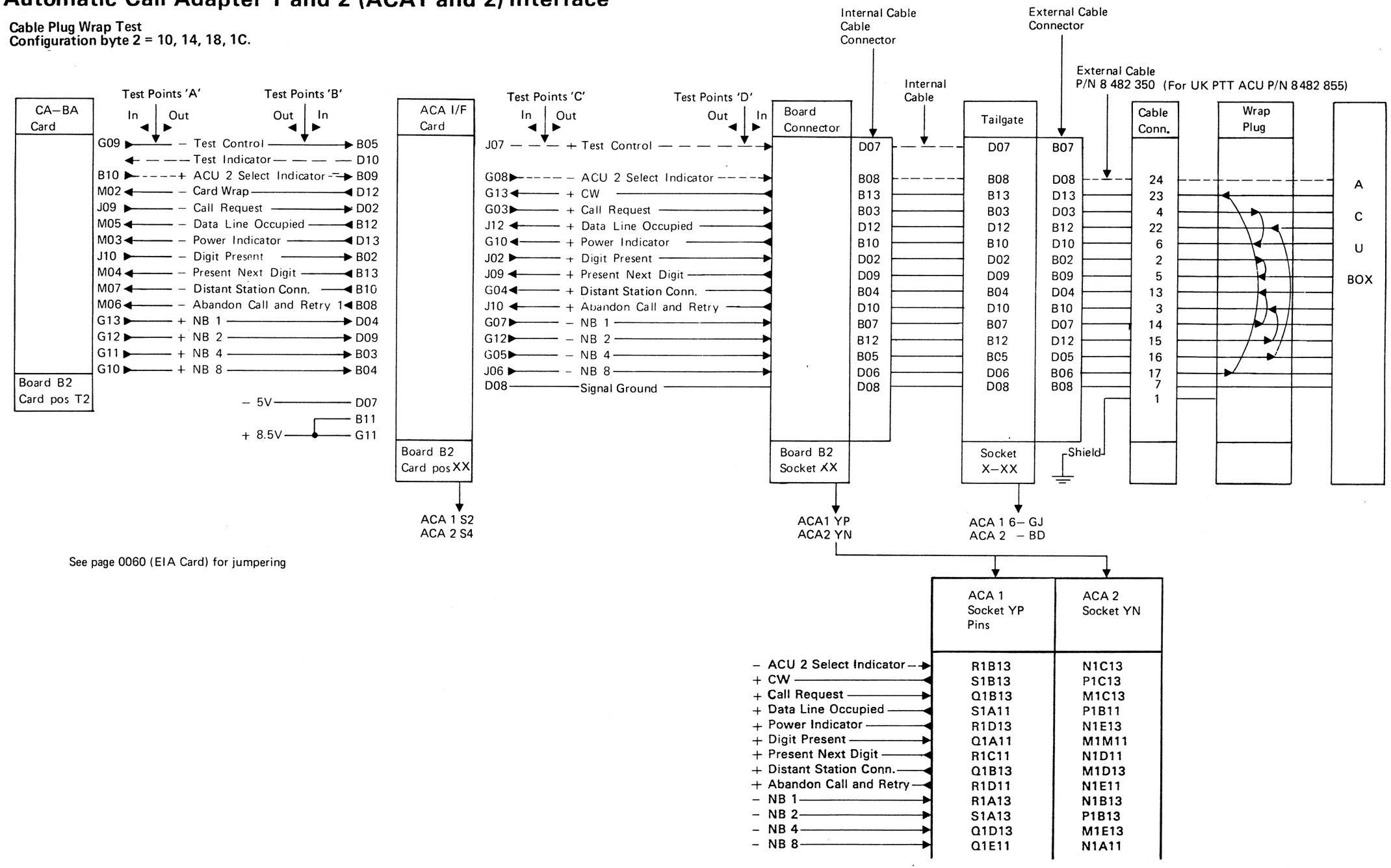
intentionally left blank

Signal Flow and Wrap Test

Automatic Call Adapter 1 and 2 (ACA1 and 2) Interface

Cable Plug Wrap Test
Configuration byte 2 = 10, 14, 18, 1C.



	ACA 1 Socket YP Pins	ACA 2 Socket YN
– ACU 2 Select Indicator	R1B13	N1C13
+ CW	S1B13	P1C13
+ Call Request	Q1B13	M1C13
+ Data Line Occupied	S1A11	P1B11
+ Power Indicator	R1D13	N1E13
+ Digit Present	Q1A11	M1M11
+ Present Next Digit	R1C11	N1D11
+ Distant Station Conn.	Q1B13	M1D13
+ Abandon Call and Retry	R1D11	N1E11
– NB 1	R1A13	N1B13
– NB 2	S1A13	P1B13
– NB 4	Q1D13	M1E13
– NB 8	Q1E11	N1A11

See page 0060 (EIA Card) for jumpering

Signal Flow And Wrap Test
Automatic Call Adapter 1 and 2 (ACA1 and 2) Interface (continued)

Signal Checking

- Find the failing signal (given in the MAP) in the chart.
- Put the probe at the pin corresponding to the test point given in the MAP.
- Compare the probed level with the "signal OK" level in table "A".

TABLE "A"

Note:
Before probing wait 2 minutes. The pin must be probed for up to 20 seconds to observe a level change (from up-level to down-level or from down-level to up-level). Due to the test timings, a signal may have the same level for 18 seconds.

Signal Name	CE Probe Indication if Signal is OK "Signal OK Level"
Test Control	Always Up Level
For All Signals	A level change must be observed

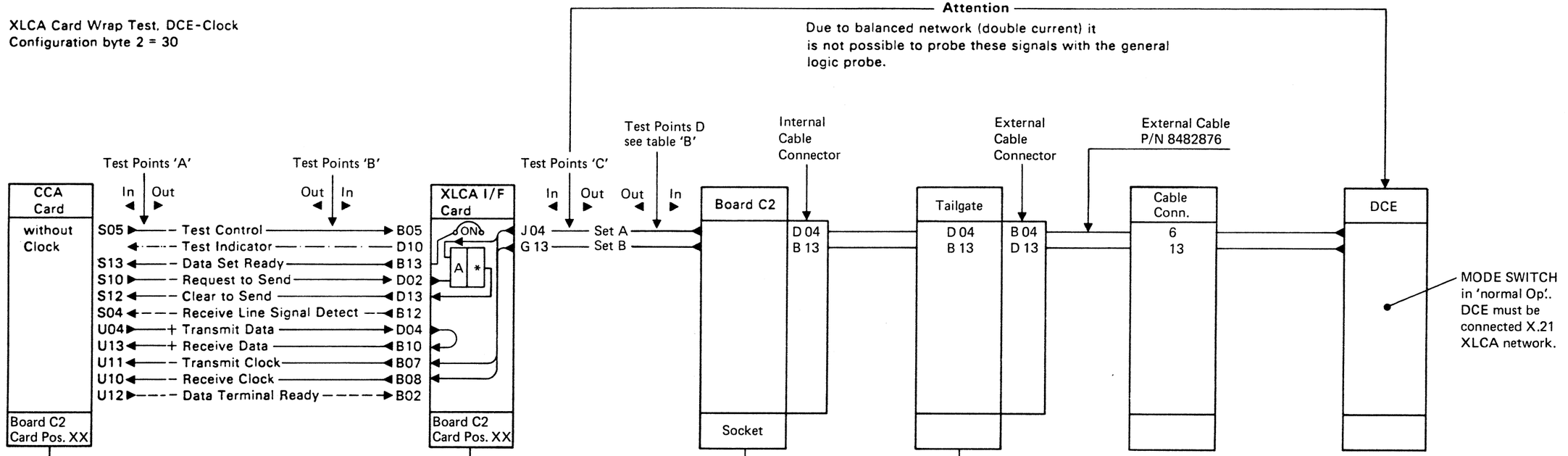
Information about the interface card is found on page 0060.

Signal Flow and Wraptest (continued)

X. 21 Adapter Interface (XLCA)

XLCA Card Wrap Test, DCE-Clock
Configuration byte 2 = 30

Attention
Due to balanced network (double current) it is not possible to probe these signals with the general logic probe.



Line Addr.	CCA Card	XLCA Card
30	W2	V2
31	U2	V4
32	T2	S2
33	R2	S4
34	Q2	P2
35	N2	P4
36	M2	L2
37	K2	L4

Table B

	Line 30 Socket YG Pins	Line 31 Socket YQ Pins	Line 32 Socket YF Pins	Line 33 Socket YP Pins	Line 34 Socket YE Pins	Line 35 Socket YN Pins	Line 36 Socket YD Pins	Line 37 Socket YM Pins
Set A	T1B06	T1B11	Q1C06	Q1C11	M1D06	M1D11	J1E06	J1E11
Set B	V1A08	V1A13	S1B08	S1B13	P1C08	P1C13	L1D08	L1D13

Line Addr.	Tailgate Socket
30	1 - GJ
31	2 - BD
32	2 - GJ
33	3 - BD
34	3 - GJ
35	4 - BD
36	4 - GJ
37	5 - BD

Signal Flow and Wraptest (continued)

X21 Adapter Interface (XLCA)

Signal Checking

- Find the failing signal (given in the MAP) in the chart.
- Put the probe at the pin corresponding to the test point given in the MAP.
- Compare the probed level with the "signal OK" level in table "A".

Before probing wait 2 minutes. The pin must be probed for up to 20 seconds to observe a level change (from up-level to down-level or from down-level to up-level).

Due to the test timings, a signal may have the same level for 18 seconds.

TABLE "A"

Signal Name	CE Probe indication if signal is OK "Signal OK Level"
Data Set Ready	Always down level
For all other Signals	A level change must be observed

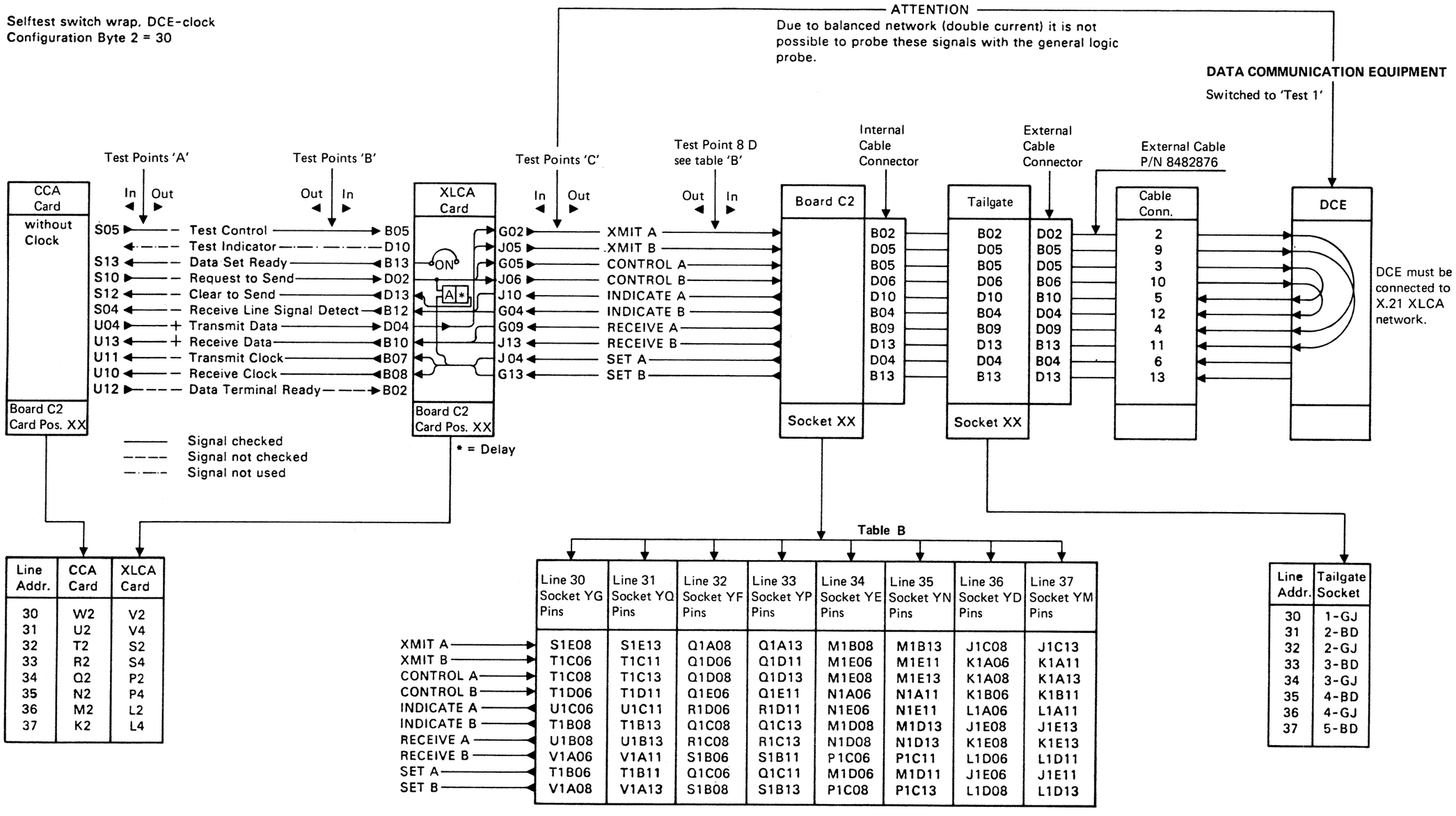
Information about the interface card is found on page 0086.

Information about board wiring is found on page 0090.

Signal Flow and Wraptest (continued)

X.21 Adapter Interface (XLCA)

Selftest switch wrap, DCE-clock
Configuration Byte 2 = 30



Line Addr.	CCA Card	XLCA Card
30	W2	V2
31	U2	V4
32	T2	S2
33	R2	S4
34	Q2	P2
35	N2	P4
36	M2	L2
37	K2	L4

Table B

	Line 30 Socket YG Pins	Line 31 Socket YQ Pins	Line 32 Socket YF Pins	Line 33 Socket YP Pins	Line 34 Socket YE Pins	Line 35 Socket YN Pins	Line 36 Socket YD Pins	Line 37 Socket YM Pins
XMIT A	S1E08	S1E13	Q1A08	Q1A13	M1B08	M1B13	J1C08	J1C13
XMIT B	T1C06	T1C11	Q1D06	Q1D11	M1E06	M1E11	K1A06	K1A11
CONTROL A	T1C08	T1C13	Q1D08	Q1D13	M1E08	M1E13	K1A08	K1A13
CONTROL B	T1D06	T1D11	Q1E06	Q1E11	N1A06	N1A11	K1B06	K1B11
INDICATE A	U1C06	U1C11	R1D06	R1D11	N1E06	N1E11	L1A06	L1A11
INDICATE B	T1B08	T1B13	Q1C08	Q1C13	M1D08	M1D13	J1E08	J1E13
RECEIVE A	U1B08	U1B13	R1C08	R1C13	N1D08	N1D13	K1E08	K1E13
RECEIVE B	V1A06	V1A11	S1B06	S1B11	P1C06	P1C11	L1D06	L1D11
SET A	T1B06	T1B11	Q1C06	Q1C11	M1D06	M1D11	J1E06	J1E11
SET B	V1A08	V1A13	S1B08	S1B13	P1C08	P1C13	L1D08	L1D13

Line Addr.	Tailgate Socket
30	1-GJ
31	2-BD
32	2-GJ
33	3-BD
34	3-GJ
35	4-BD
36	4-GJ
37	5-BD

Signal Flow and Wraptest (continued)

X21 Adapter Interface (XLCA)

Signal Checking

- Find the failing signal (given in the MAP) in the chart.
- Put the probe at the pin corresponding to the test point given in the MAP.
- Compare the probed level with the "signal OK" level in table "A".

Before probing wait 2 minutes. The pin must be probed for up to 20 seconds to observe a level change (from up-level to down-level or from down-level to up-level).

Due to the test timings, a signal may have the same level for 18 seconds.

TABLE "A"

Signal Name	CE Probe indication if signal is OK "Signal OK Level"
Data Set Ready	Always down level
For all other Signals	A level change must be observed

Information about the interface card is found on page 0086.

Information about board wiring is found on page 0090.

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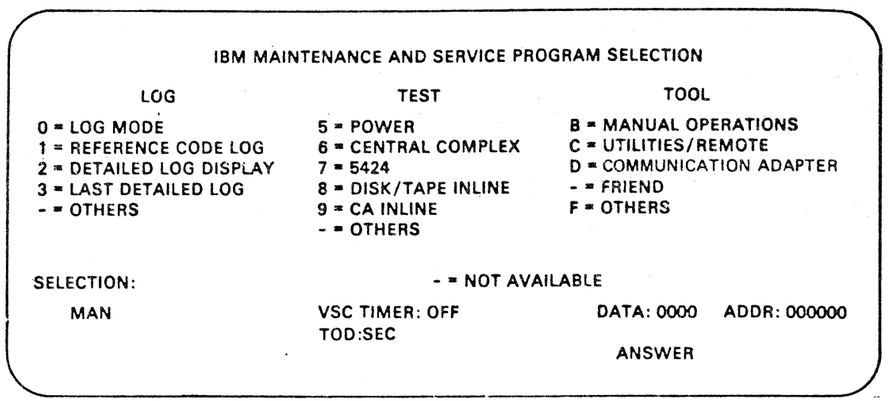
CA INLINE TEST

General

The CA Inline Test aids the CE to isolate failures of the CA hardware. They also assist in isolating failures of the communication lines.

The Inline Test can be run against only one line at a time. When running an CA Inline Test, the customer program must not access the line tested. If the user program tries to access the communication line being used by the Inline Test, the command will be terminated and a busy condition shown.

The CA Inline Test is activated via the System Maintenance Selection Picture. After selection of '9' in that picture, the CA Inline Test Selection Picture is displayed and further selection can take place. Before a test is started the actual circuits to be checked are displayed. Information for the display is fetched from the CA Configuration Table.



CA Inline Test

How to start an CA Inline Test

1. Press the Alternate key and hold it down and press the Mode Select key.

   The maintenance selection picture is displayed. The heading 'test' provides the option:

   9 CA Inline.

   Make sure that modem is powered up for line to be tested (External clock).

2. Enter 9 and press Enter.

   The CA Inline selection picture will be displayed, the function codes for the CA inlines are shown. The CA Inline Tests (CA ILT's) have FCN = 20.

   Note: If another ILT is already active, a self explanatory message is displayed. The CE must now leave the selection procedure by either pressing PF3 or by stopping the running test by entering mode P.

3. Enter 20 and press Enter

   This will display the CA ILT functions available:

   FCN: 21 line interface test without wrap plug
   22 line interface test with wrap plug
   23 modem data stress test
   24 special wrap test

4. Enter either Function (FCN), Line address, Mode.

   Press Enter

   Self-explanatory messages will now be displayed. Read these messages and carry out what is being said.

5. Press Enter to start the test

   The test is now running and the screen is returned to the customer program.

```
 CA INLINES
-------------------------------------------------------------------------------
FCN: 20  INLINE TESTS                          MODE: S:  SINGLE RUN (DEFAULT)
     60  TRACE / DYNAMIC DISPLAY                    P:  STOP ACTIVE INLINE
     A0  LINE EXERCISER                         E/EC/EI/EA:  LOOP UNTIL FIRST ERROR
                                                L   /LI/LA:  SCOPE LOOP
-------------------------------------------------------------------------------

FCN:  21  LINE INTERFACE TEST WITHOUT WRAP PLUG
      22  LINE INTERFACE TEST WITH WRAP PLUG
      23  MODEM DATA STRESS TEST
      24  SPECIAL WRAP TEST




INPUT:FCN 20 LINE    MODE
-------------------------------------------------------------------------------
```

CA Inline Test

How to Stop (Terminate) an CA Inline Test

If the test is looping (Mode : E, EC, EI, EA, L, LI, LA) then:

1. Press the Alternate key and hold it down and press the Mode Select key.
2. Enter 9 and press ENTER.
3. Enter P and press ENTER.

The test is now stopped.

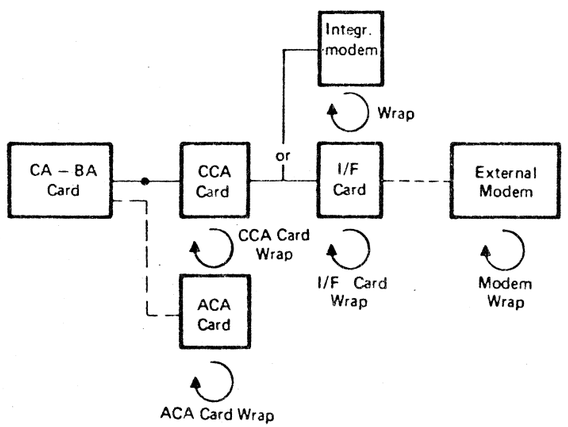
CA ILT Functions and Modes

Any error detected by the ILT on the CA-bus, or pre-CA-BA circuitry causes the test to stop before entering the different test steps of functions 21 to 24. In this case the reference code recommends normally to run the BA off-line diagnostics.

FCN = 20 - CA ILT menu

Function 20 displays the four 'test-functions':

- FCN 21 line interface test without wrap plug
- FCN 22 line interface test with wrap plug
- FCN 23 modem data stress test
- FCN 24 special wrap test



The desired function can now be selected together with the line address and mode.

FCN = 21 - line interface test without wrap plug.

Function 21 tests the line interface using either the interface (I/F) card wrap facility or the modem wrap facility, whichever is installed.

If the autocall adapter (ACA) is installed. it will be tested when the proper mode is selected.

Function 21 consists of the following steps:

- CCA card static test
- CCA card wrap test
- I/F card wrap test (if I/F card wrap is installed)
- Modem wrap test (if modem wrap is installed)
- ACA card wrap test (if ACA is installed)

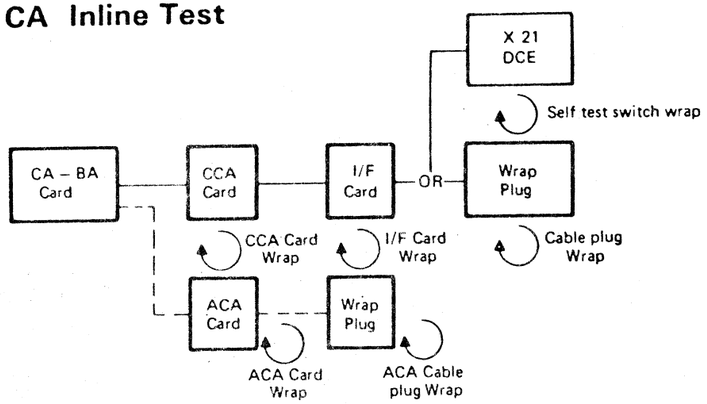
```
  CA INLINE
------------------------------------------------------------------------
FCN: 20 INLINE TESTS                    MODE: S = SINGLE RUN (DEFAULT)
     60 TRACE / DYNAMIC DISPLAY               P = STOP ACTIVE INLINE
     A0 LINE EXERCISER                        E/EC/EI/EA = LOOP UNTIL FIRST ERROR
                                              L/LI/LA = SCOPE LOOP
------------------------------------------------------------------------
THE FOLLOWING TEST ROUTINE (S) WILL BE EXECUTED
   - CCA FUNCTIONAL TEST
   - CCA WRAP TEST
   - EIA CARD WRAP TEST
   - EIA/ACA CARD WRAP TEST




PRESS ENTER TO START TEST OR PF3 TO EXIT

INPUT:FCN 21 LINE 30 MODE S
------------------------------------------------------------------------
                S Y S T E M     A R E A
```

CA Inline Test

Mode	Explanation
S	This mode is the default. (Mode S is assumed if no mode is specified.) All applicable steps (see 3104) execute once, and then the test stops, if error-free. In case of error, the test stops when the error occurs, and a reference code is displayed.
E	The following steps are executed and repeated until an error occurs: CCA card static test CCA card wrap test I/F card or modem wrap test ACA card wrap test (if ACA is installed) In case of error, the test stops when the error occurs, and a reference code is displayed. If the test is error-free, it continues looping and must be stopped by pressing mode P (see: how to stop and CA ILT).
EC	The following steps are executed and repeated until an error occurs: CCA card static test CCA card wrap test In case of error, the test stops when the error occurs, and a reference code is displayed. If the test is error-free, it continues looping and must be stopped by pressing mode P (see: how to stop and CA ILT).
EI	The following steps are executed and repeated until an error occurs: CCA card static test CCA card wrap test I/F card or modem wrap test In case of error, the test stops when the error occurs, and a reference code is displayed. If the test is error-free, it continues looping and must be stopped by pressing mode P (see: how to stop an CA ILT page 3104).
EA	This mode is valid only if an ACA is installed. The steps executed are the same as for mode E.
L	The following steps are executed and then the last step loops (regardless of error) until the test is stopped by pressing mode P. See Note. CCA card static test CCA card wrap test I/F card or modem wrap test ACA card wrap test (if ACA is installed)
LI	The following steps are executed and then the last step loops (regardless of error) until the test is stopped by pressing mode P. (See: How to stop an CA ILT page 3104.) See Note. CCA card static test CCA card wrap test I/F card or modem wrap test
LA	This mode is valid only if an ACA is installed. The following steps are executed and then the last step loops (regardless of error) until the test is stopped by pressing mode P. (See: How to stop an CA ILT.) See Note. CCA card static test CCA card wrap test I/F card or modem wrap test ACA card wrap test

Note: If any error is detected before the last test step is entered the ILT stops with an appropriate reference code indicator.

CA Inline Test



FCN = 22 Line Interface test with wrap plug (for X21 interface, see Note).

Function 22 tests the line interface using the I/F card wrap facility and the cable wrap plug. To run this test the cable wrap plug must be connected (for X21 interface, see Note).

If the autocall adapter (ACA) is installed, it will be tested when a proper mode is selected.
ACA cable wrap plug must be connected.

Function 22 consists of the following steps:

CCA card static test
CCA card wrap test
I/F card wrap test (if I/F card wrap is installed)
Cable wrap plug test (for X21 interface, see Note)
ACA card wrap test (if ACA is installed)
ACA cable wrap plug test (if ACA is installed)

Mode **Explanation**

S This mode is the default (mode S is assumed if no mode is specified). All applicable steps (see above) are executed once, and then the test stops, if error-free.

In case of error, the test stops when the error occurs, and a reference code is displayed.

E The following steps are executed and repeated until an error occurs:

CCA card static test
CCA card wrap test
I/F card wrap test (if I/F card wrap is installed)
Cable wrap plug test
ACA card wrap test (if ACA is installed)
ACA cable wrap plug test (if ACA is installed)

In case of error, the test stops when the error occurs, and a reference code is displayed.

If the test is error-free, it continues looping and must be stopped by pressing mode P (see: how to stop a CA ILT page 3104).

EC The following steps are executed and repeated until an error occurs:

CCA card static test
CCA card wrap test

In case of error, the test stops when the error occurs, and a reference code is displayed.

If the test is error-free, it continues looping and must be stopped by pressing mode P (see: how to stop a CA ILT page 3104).

EI The following steps are executed and repeated until an error occurs:

CCA card static test
CCA card wrap test
I/F card wrap test (if I/F card wrap is installed)
Cable wrap plug test

In case of error, the test stops when the error occurs, and a reference code is displayed.

If the test is error-free, it continues looping and must be stopped by pressing mode P (see: how to stop a CA ILT page 3104).

Note: For testing of X21 interface the selftest switch or the wrap test tool must be used instead of the wrap plug.

```
 CA INLINE
-------------------------------------------------------------------------------
FCN: 20 INLINE TESTS                        MODE: S = SINGLE RUN (DEFAULT)
     60 TRACE / DYNAMIC DISPLAY                   P = STOP ACTIVE INLINE
     A0 LINE EXERCISER                            E/EC/EI/EA = LOOP UNTIL FIRST ERROR
                                                  L/LI/LA = SCOPE LOOP
-------------------------------------------------------------------------------
THE FOLLOWING TEST ROUTINE(S) WILL BE EXECUTED
   - CCA FUNCTIONAL TEST
   - CCA WRAP TEST
   - EIA CARD WRAP TEST
   - EIA MODEM CABLE PLUG WRAP TEST
   - EIA/ACA CARD WRAP TEST
   - ACA I/F PLUG WRAP TEST

INSERT EIA MODEM CABLE WRAP PLUG AND ACA I/F WRAP PLUG

PRESS ENTER TO START TEST OR PF3 TO EXIT

INPUT:FCN 22 LINE 30 MODE S
-------------------------------------------------------------------------------
```

CA Inline Test

EA This mode is valid only if an ACA is installed on the line tested.

The steps being executed are the same as for mode E.

L The following steps are executed and then the last step loops (regardless of error) until the test is stopped by pressing mode P. (See: how to stop an CA ILT page 3104.) See Note.

CCA card static test
CCA card wrap test
I/F card wrap test (if I/F card wrap is installed)
Cable wrap plug test
ACA card wraptest (if ACA is installed)
ACA cable wrap plug test (if ACA is installed)

LI The following steps are executed and then the last step loops (regardless of error) until the test is stopped by pressing mode P. (See: how to stop and CA ILT page 3104.) See Note.

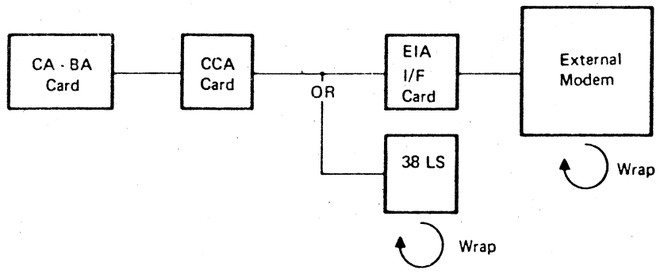
CCA card static test
CCA card wrap test
I/F card wrap test (if I/F card wrap is installed)
Cable wrap plug test

LA This mode is valid only if an ACA is installed.

The following steps are executed and then the last step loops (regardless of error) until the test is stopped by pressing mode P. (See: how to stop and CA ILT page 3104.) See Note.

CCA card static test
CCA card wrap test
I/F card wrap test (if I/F card wrap is installed)
Cable wrap plug test
ACA card wrap test
ACA wrap plug test

FCN = 23 - Modem data stress test



If EIA interface is installed function 23 is valid only if the modem wrap facility is available. The EIA interface must be strapped to external modem wrap and the external modem wrap option must be set into the configuration table by the CA tool 'Update Configuration Table'.

Mode Explanation

Regardless of mode selected, the test will loop.

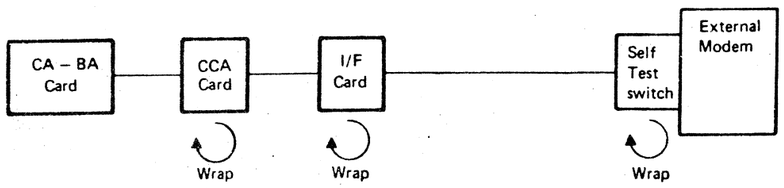
If an error occurs, the test stops and a reference code is displayed.

If the test is error-free, it must be stopped by pressing mode P. (See: How to stop and CA Inline test page 3104.)

Note: If any error is detected before the last step is entered the ILT stops with an appropriate reference code indication.

CA Inline Test

FCN = 24 – Special Wrap Test



If the external cable has P/N 8 482 351 (no Self Test Switch), use Function 22.

Function 24 tests the line interface using the I/F card wrap facility (if installed) and the self test switch facility.

Note: Self test switch is a special wrap facility for Japan only, implemented on the external cable required for NTT modem attachment to EIA interface.

The switch on the self test plug must be in test mode.

If the modem provides the clock, the modem must be connected and have power on.

Function 24 consists of the following steps:

CCA card static test
CCA card wrap test
I/F card wrap test (if I/F card wrap is installed)
Self test plug wrap

```
CA INLINE
FCN: 20 INLINE TESTS                    MODE: S = SINGLE RUN (DEFAULT)
     60 TRACE / DYNAMIC DISPLAY               P = STOP ACTIVE INLINE
     A0 LINE EXERCISER                        E/EC/EI/EA = LOOP UNTIL FIRST ERROR
                                              L/LI/LA = SCOPE LOOP
THE FOLLOWING TEST ROUTINE(S) WILL BE EXECUTED
   - CCA FUNCTIONAL TEST
   - CCA WRAP TEST
   - EIA CARD WRAP TEST
   - EIA MODEM CABLE SPECIAL WRAP TEST


ASSURE THAT SPECIAL WRAP CAPABILITY IS ACTIVATED

PRESS ENTER TO START TEST OR PF3 TO EXIT

INPUT:FCN 24 LINE 30 MODE S
```


Mode **Explanation**

S This mode is the default (mode S is assumed if no mode is specified). All applicable steps (see above) are executed once, and then the test stops, if error-free.

In case of error, the test stops when the error occurs, and a reference code is displayed.

E The follwoing steps are executed and repeated until an error occurs:

CCA card static test
CCA card wrap test
I/F card wrap test (if I/F card wrap is installed)
Self test plug wrap

In case of error, the test stops when the error occurs and a reference code is displayed.

If the test is error-free, it continues looping and must be stopped by pressing mode P (see: how to stop an CA ILT page 3104).

EC Same as mode E

EI Same as mode E

EA Same as mode E

L The following steps are executed and then the last step loops (regardless of error) until the test is stopped by pressing mode P. (See: how to stop an CA ILT page 3104.) See Note.

CCA card static test
CCA card wrap test
I/F card wrap test (if I/F card wrap is installed)
Self test plug wrap test

LI Same as mode L. See Note.

LA Same as mode L. See Note.

Note: If any error is detected before the last step is entered the ILT stops with an appropriate reference code indication.

CA Trace

General

The CA Trace collects hardware and microcode information from one or more CA lines while the lines are performing their normal function.
The information is fetched from the UCWs (Unit Control Word) in the CA microcode in the PU, and from the sense registers on the CCA card.
The traced information is stored in a 10K-byte area in Main Storage. This area is reserved for Disk ILTs and CA ILTs, and are not accessable by customer programs.

Information is traced and stored for each trap. The Standard Line Trace traces and stores 4 bytes of information; the Extended Line Trace stores 16 bytes. If the total information collected takes more than 10K-byte, the 10K bytes area is "wrapped". This means that only the last 10K bytes of information is saved.

The traced data remains intact as long as no other ILT is started. The collected data may now be displayed on the System Console Display, (see CA Tools for details).

The line trace can be run using up to eight lines at the same time.

Standard Line Trace, FCN 61

The standard line trace should be run using only one line at a time. If more than one line is specified at a time, no line address is presented and it is not possible to interpret Trace data.
The following 4 bytes of information are traced:

Status and command (S/S and BSC); Modifier, status and Command for SDLC (1 byte in total)
Mode byte
Second Sense byte (CA Check Code)
Data Character Buffer

For details see "CA Tools, Display Trace Data", Page 4304.

Extended Line Trace, FCN 62

The trace data collected in this mode is intended for detailed analysis of complex microcode/circuitry problems.
The use of this trace mode therefore is restricted to those cases where this type of information is requested by the product engineering group.

The following 16 bytes of information are traced by the extended trace:

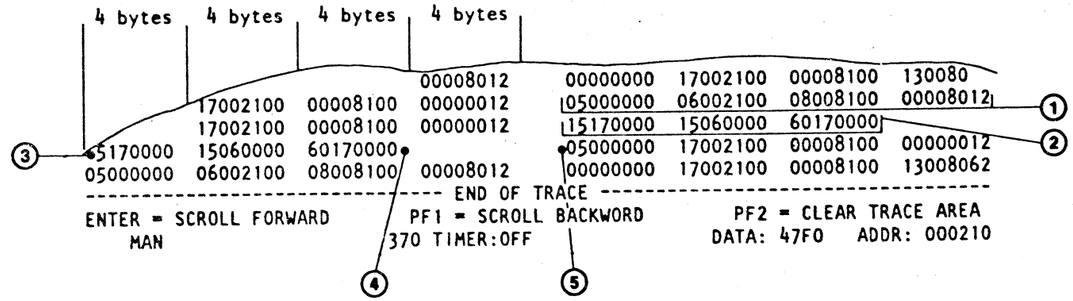
Command byte (S/S and BSC), Modifier and Command for SDLC.
CCW Byte Count
First Sense byte (Not for SDLC)
UCW 6
UCW 7
Status information

For details see CA Tools, Display Trace Data, Page 4304.

Dynamic Trace, FCN 64

Stores the same information as Standard Line Trace. Only one line can be monitored. For details see page 4304.

Note:
When CA Trace is stopped and started again, trace entries are always on 16 byte boundaries and it is possible that blank entries are displayed when standard trace is repeatedly stopped and started or when extended trace entries follow entries already stored by standard trace. See example below.



(1) This can be one extended trace entry or four standard trace entries without stop.

(2) Three entries of standard trace are stopped here.

(3) Standard trace (three entries) is started again (16 byte boundary).

(4) Standard trace stopped.

(5) Standard trace or extended trace started (16 byte boundary). Note that space between (2) and (3) as well as (4) and (5) is left blank. Dynamic trace starts always at the initial point of the trace area.

CA Trace

How to Start and Stop the CA Trace

How to Start the Trace

1. Press the Alternate key and hold it down and press the Mode Select Key.
   The maintenance selection picture is displayed. Under the heading "test", option 9 specifies CA Inline.

2. Enter 9 and press ENTER
   The CA Inline Selection picture is displayed.

   Note: If another ILT is active, a self-explanatory message is displayed. The CE must now leave the selection procedure by either pressing PF3 or by entering mode P.

   The CA inline selection picture displays:

   FCN: 60 trace/dynamic display

3. Enter 60 and press ENTER
   This displays the CA line trace and dynamic display function codes.

   61 start standard line trace
   62 start extended line trace
   63 start dynamic display
   64 invoke/start dynamic trace

4. Enter function (FCN) 61 or 62 and the address(es) for the line(s) to be traced and press ENTER

   The line trace is now active and the screen is given to the customer program.

   FCN 64 without line address is for DYNAMIC TRACE invoke. This is the prerequiste for use of a operating system controlled trace program (e.g. DYNADUMP under DOS/VSE). The line to be traced will be selected by the trace program which starts and stops the trace activities dynamically.

   FCN 64 with one line address is for DYNAMIC TRACE invoke and start. By using this option, the collection of trace data for the specified line starts immediately. The trace program should not use the start option before the stop option in this case.

The trace remains active until stopped by pressing mode P (see: how to stop the trace).

CA Trace

While the trace is active, a message is displayed in the ILT result area.

```
+-------------------------------------------------------------------------+
|  CA INLINE                                                              |
|-------------------------------------------------------------------------|
|FCN: 20 INLINE TESTS                MODE: S = SINGLE RUN (DEFAULT)       |
|     60 TRACE / DYNAMIC DISPLAY           P = STOP ACTIVE INLINE         |
|     A0 LINE EXERCISER                    E/EC/EI/EA = LOOP UNTIL FIRST ERROR|
|                                          L/LI/LA = SCOPE LOOP           |
|-------------------------------------------------------------------------|
|   61  START STANDARD LINE TRACE                                         |
|   62  START EXTENDED LINE TRACE                                         |
|   63  START DYNAMIC DISPLAY                                             |
|   64  INVOKE/START DYNAMIC TRACE                                        |
|                                                                         |
|                                                                         |
|                                                                         |
|                                                                         |
|                                                                         |
|INPUT:FCN 61 LINE(S): 303132          | XX YY YY YY YY YY YY YY YY        |
|-------------------------------------- ┌  ┌  ┌  ┌  ┌  ┌  ┌  ┌  ┌  ---------|
                              Function→|  |  |  |  |  |  |  |  |
                          Line address→|  |  |  |  |  |  |  |
```

No line address is displayed in case of INVOKE/START DYNAMIC TRACE

How to Stop the Trace

1. Press the Alternate key and hold it down and press the Mode Select key.

2. Enter 9 and press ENTER
   A self-explanatory message is displayed. If the trace is active the following is displayed:

   CA trace active Enter mode P to stop

3. Enter P and press ENTER

   The trace is now stopped.

   In case of Dynamic Trace, active Dynamic Trace dump command is stopped. When the Dynamic Trace should be continued, it must be invoked again via FCN 64.

CA Dynamic Display

General

The CA dynamic display displays information about one CA line at the system console display.
The information is continuously updated and the line operation is not impacted. There will, however, be some impact on the total system performance.

How to Start the Dynamic Display

1. Press the Alternate key and hold it down and press the Mode Select key.

   The maintenance selection picture is displayed. The heading 'test' specifies the option:

   9 CA inline

2. Enter 9 and press ENTER

   The CA Inline selection picture is displayed. The function codes for the CA inlines are shown. The trace/dynamic display has FCN = 60.

   Note: If another ILT is active, a self-explanatory message is displayed. The CE must now leave the selection procedure by either pressing PF3 or by entering mode P.

3. Enter 60 and press ENTER

   This displays the function codes for the traces and the dynamic display

   FCN : 61 start standard line trace
   FCN : 62 start extended line trace
   FCN : 63 start dynamic display

4. Enter function (FCN) 63 and desired line address.

   Press ENTER

   The dynamic display is now active.

How to stop the CA dynamic display

1. Press the Alternate key and hold it down and press the Mode Select key.

2. Enter 9 and press ENTER

3. Enter P and press ENTER

   The dynamic display is now stopped.

Display Format

```
                                    I63AA BCC DDEE FG H JK L MN
                                    |  |  |  |  |  |  |  |  |
                                    |  |  |  |  |  |  |  |  |
ID OF THE DYNAMIC DISPLAY -> I63    |  |  |  |  |  |  |  |  |
LINE ADDRESS ----------------->AA   |  |  |  |  |  |  |  |  |
COMMAND CODE ----------------->B    |  |  |  |  |  |  |  |  |
DATA CHARACTER ---------------->CC  |  |  |  |  |  |  |  |  |
FIRST SENSE BYTE ----------------> DD  |  |  |  |  |  |  |  |
SECOND SENSE BYTE ---------------->EE  |  |  |  |  |  |  |  |
RM - RECEIVE MODE ------------------->F  |  |  |  |  |  |  |
TM - TRANSMIT MODE ------------------->G  |  |  |  |  |  |  |
RI - RING INDCATOR ----------------> H  |  |  |  |  |  |  |
DTR - DATA TERMINAL READY ---------->  J  |  |  |  |  |  |
DSR - DATA SET READY ---------------->K  |  |  |  |  |  |
CD - CARRIER DETECT ----------------> L  |  |  |  |  |  |
RTS - REQUEST TO SEND ------------------->M  |  |  |  |
CTS - CLEAR TO SEND ---------------------> N  |  |  |  |
```

Note: For detailed information about command code, (first and second sense byte).
See CA tools (display trace data) page 4304.

CA Line Exerciser

General

The Line Exerciser S/S and BSC allows the CE to specify and execute his own CCW (Channel Command Word) chains inline. For SDLC, the XID, SNRM and Test functions are supported.

Note 1: To make this test meaningful for S/S and BSC the CE should know the control characters used in the application and be able to put them in right sequence. As an aid, use the examples shown on page 3414.

Note 2: The line exerciser should be used as a network debug tool, and not to debug the CA.

The Line Exerciser has four main functions:

- A0 = Line Exerciser Menu
  The Menu is a list of the main functions A1 - A3
- A1 = Line Exerciser Invoke
  The Invoke function is used when entering and starting the CCW chain, or XID and test function.
- A2 = Line Exerciser displays CCW's and data
  The Display function is used to display the CCW chain and data after execution. For SDLC no CCW chain will be shown.
- A3 = Line Exerciser Repeat last chain (S/S and BSC or XID, SNRM and Test function for SDLC). This function is used to modify and restart the CCW chain.

Once the CCW chain is set up, it can be executed once (single), repeatedly (loop), or until an error occurs by specifying the appropriate Mode.

Further features are:
- Stop looping CCW chain (Mode P)
- Trace/No Trace selection (FCN = A1)
- Edit CCW chain (replace, delete, insert CCW commands, FCN = A1)

How to Select the Line Exerciser

1. Press the Alternate Key and hold it down and press the Mode Select key.

   The maintenance selection picture is displayed. The heading 'test' specifies the option:

   9 CA Inline

2. Enter 9 and press ENTER

   The CA inline selection picture is displayed. The first function codes for the CA inlines are shown.
   The line exerciser has FCN = A0.

   Note: If another ILT is active, a self-explanatory message is displayed. The CE must now leave the selection procedure by either pressing PF3 or to stop the inline tested line by entering mode P.

3. Enter A0 and press ENTER

   This displays the function codes for the line exerciser (line exerciser menu).

   FCN : A1 Line Exerciser Invoke
   FCN : A2 Line Exerciser display CCW's and data
   FCN : A3 Line Exerciser Repeat last chain

4. Enter the desired function (line and mode) Press ENTER

Line: The address of the line to be tested.

Mode: Valid Modes are

S - Single run. The CCW chain is executed once (default)
E - Loop CCW chain, stop on error (unit check or unit exception)
L - Loop CCW chain regardless of error (scope loop)
P - Stop looping chain (valid only if a chain already is looping).

Note: For SDLC:

- The loop functions are performed on the data transfer part of the CCW chain and not on the initialization or ending sequence.
- The loop function is not entered if an error comes up during the initialization sequence.
- The loop function will be broken if a command reject, intervention required or equipment check unit status is found. Note, that an SDLC line will be disabled after specific unit checks which will be followed by a command reject situation when running in mode L.

How to Stop a Looping CCW Chain

Do step 1 and 2 in the line exerciser select procedure above.
Then enter P and press ENTER.

Note: The Line Exerciser stops immediately by resetting of the CCA for the selected line. This may leave the tested terminal in an undefined state.

CA Line Exerciser

FCN = A1 - Invoke

(See page 3404 - 3408 for details.)
This function must be selected when the CE wants to create a CCW chain.

The commands and necessary data are entered in the input field - one command at a time. When the command and data are complete, ENTER is pressed. The command and data are then placed at line 8-17 in the sequence entered with the sequence number in front of the command.
The CCW chain can contain a maximum of 10 commands including the execute command. For SDLC only XID, SNRM, TS or TE is to be entered.
The execute command is the last command entered.
The CE is prompted to select trace or not trace.
If trace is selected the extended trace facility will be used.

```
 CA INLINE
-------------------------------------------------------------------------------
FCN: 20 INLINE TESTS                          MODE: S = SINGLE RUN (DEFAULT)
     60 TRACE / DYNAMIC DISPLAY                     P = STOP ACTIVE INLINE
     A0 LINE EXERCISER                              E/EC/EI/EA = LOOP UNTIL FIRST ERROR
                                                    L/LI/LA = SCOPE LOOP
-------------------------------------------------------------------------------
INPUT: _
-------------------------------------------------------------------------------
```

FCN = A2 - Display CCW's/Data (Note:)

This function displays the CCW chain - for S/S and BSC or the XID, SNRM, TS or TE function (no CCW's) for SDLC - including any received data. All data, including the dial number, is presented in hex notation. If the information to be displayed requires more than one line, 'more' appears at the end of the line. If, in read type commands, the length count is higher than the received message, zeros are shown in the remaining positions on the screen. Zeros are also shown with control type commands where no data transfer is done.

```
 CA INLINE
-------------------------------------------------------------------------------
FCN: 20 INLINE TESTS                          MODE: S = SINGLE RUN (DEFAULT)
     60 TRACE / DYNAMIC DISPLAY                     P = STOP ACTIVE INLINE
     A0 LINE EXERCISER                              E/EC/EI/EA = LOOP UNTIL FIRST ERROR
                                                    L/LI/LA = SCOPE LOOP
-------------------------------------------------------------------------------
CCW01 = 27003128 60000001   DATA = 00
CCW02 = 01003129 60000001   DATA = 2D
CCW03 = 0200312A 60000002   DATA = 1070
CCW04 = 0100312C 60000016   DATA = 025C5C5C 4040F0F1 F2F3F4F5 F6F7F8F9 40405C5C
                                   5C03
CCW05 = 02003169 60000002   DATA = 1061
CCW06 = 0100316B 60000001   DATA = 37
CCW07 = 2F00316C 20000001   DATA = 00


                                                    CCW07 END U0C C00 RC00 SNS0000
INPUT:FCN A2 LINE    MODE
-------------------------------------------------------------------------------
```

FCN = A3 - Repeat last chain (Note:)

This function is entered if the CE wants to run the same CCW chain again or to modify it before restarting.

The present CCW chain - for S/S and BSC or the XID 'SNRM' TS or TE function for SDLC - will be displayed and the CE can now change it as described under function A1 (for S/S and BSC only).

To change the line, mode or trace specifications, enter X (execute command).
If XY or XN is entered, the old specifications for line, mode and trace are used.

```
 CA INLINE
-------------------------------------------------------------------------------
FCN: 20 INLINE TESTS                          MODE: S = SINGLE RUN (DEFAULT)
     60 TRACE / DYNAMIC DISPLAY                     P = STOP ACTIVE INLINE
     A0 LINE EXERCISER                              E/EC/EI/EA = LOOP UNTIL FIRST ERROR
                                                    L/LI/LA = SCOPE LOOP
-------------------------------------------------------------------------------
01 E
02 W2D
03 R02
04 W025C5C5C4040F0F1F2F3F4F5F6F7F8F940405C5C5C03
05 R02
06 W37
07 D



INPUT: _
-------------------------------------------------------------------------------
```

Note: The CCW chains are lost when trace data is displayed.

CA Line Exerciser

Function A1 - Invoke, details.

Commands S/S and BSC

Command	Data Required	Length count Required
E - Enable	-	-
D - Disable	-	-
A - Dial	Yes	-
W - Write	Yes	-
R - Read	-	Yes
P - Prepare	-	Yes
I - Inhibit	-	Yes
B - Break	Yes	-
T - Transfer In Channel	-	-
X - Execute	n/a	n/a

SDLC

Function	Data required
TS (Test send)	Yes
TE (Test echo)	No
XID (Transmit ID request)	No
SNRM (Set Normal Response Mode)	No
X (Execute)	n/a

S/S AND BSC

Enable

The Enable command puts the line attachment into operational state. If the line attachment is not enabled, all commands but Enable, Disable, Dial, and TIC are rejected.

Disable

The Disable command takes the line attachment out of the operational state.

Dial

The Dial command enables the line attachment and performs a data transfer from the main storage locations specified in the address part to the Automatic Calling Unit (ACU).

Note: When using the Dial command in the Line Exerciser the CE must specify the number to be dialled (data). The program automatically fills in the address in the CCW. The line must not be enabled when starting the Dial Command.

Write

The Write command transfers data from the main storage locations specified in the address part of the CCW to the line attachment and transmits it over the line.

Note: When using the Write command in the Line Exerciser the CE must specify the data to be transmitted. The program automatically fills in the address in the CCW.

Read

The Read command receives incoming data on the line and transfers it from the line attachment to a main storage location specified in the address part of the CCW.

Note: When using the Read command in the Line Exerciser, the CE must specify a 'Length Count' i.e. the number of characters he expects to receive. The program automatically assigns an area where the data can be stored.

Prepare

The Prepare command checks the communication line for meaningful incoming signals, and thus finds out when a Read command should be given. The command is similar to the Read command although no data is transferred to a main storage.

Inhibit

The Inhibit command is similar to the Read command except that no timeouts are initiated. It is used when it is necessary for the line attachment to wait an unlimited period of time for data.

CA Line Exerciser (continued)

Break

The Break command stops transmission from a remote terminal.

Data must be specified.
The data itself is not used, but the lengthcount, generated by the program, is used when the CA sends the Break characters. I.e. the number of break characters transmitted is equal to the number of data characters.
Note: The Break command must only be used if the remote terminal has a receive interrupt feature.

TIC

The TIC command is a branch command which can be used to create a loop in the CCW chain.
Example: TIC XX
The next CCW command to be executed is number XX.

SDLC

The SDLC exerciser functions use the Set Mode command which changes the line status.

General Initialization CCW sequence for TS, TE, XID, SNRM.

Disable
Set mode
Enable (if Autocall feature is installed, the Enable CCW is replaced by the DIAL CCW. In this case, the CE will be prompted for the dialing number.
The Disable, Enable and Dial commands are described under S/S and BSC commands.

The Set Mode command takes care about 8 bytes which will be set to the following values:

Byte

0 = '00' No change of data poll and contact poll index
1 = '00' Data poll index
2 = '00' Contact poll index
3 = '00' Contact poll frequency
4 = '1E' Service seeking pause (3 seconds)
5 = '00' If operating as secondary station - TE on leased line -
Receive time out is infinite.
'0A' If operating as primary station - TS and XID -
1 second idle detect time out.
'03' If operating as secondary station - TE on SWNW -
3 seconds nonproductive time out.
6 = '00' Line is operating as primary station (TS, SNRM and XID functions)
'80' Line is operating as secondary station (TE function)
7 = SDLC address as secondary station (TE function).
The CE will be prompted for this value.

Execute (S/S, BSC and SDLC)

The Execute command must be the last command in the chain. It is used to start the execution of the CCW chain. XY, XN or X may be entered.

- XY - Starts execution of the CCW chain with the Trace function active. Extended Trace and the Line Exerciser will run on the same line. Information about the line activity will be recorded in the CA. Trace area (see Trace description for more details).
- XN - Starts execution of the CCW chain without Trace.
- X - If only X is entered, the CE will be prompted for Trace (Y/N) specification. He also has the option to respecify line and mode. Execution starts when Y and N for trace is entered.

CA Line Exerciser (continued)

TS (Test-Send)

The Test-Send function for SDLC lines will set the line to primary and perform a Write/Read CCW-chain after the initialization sequence. Up to 32 characters may be specified for the Write command which will be sent back by the secondary station and received by the Read command.

TE (Test-Echo)

The Test-Echo function for SDLC lines will set the line to secondary and perform a Read/Write CCW-chain after the Initialization sequence. Up to 32 characters can be received from the primary station and will be sent back by the Write command.

XID (Transmit ID)

The Transmit ID function for SDLC lines will set the line to primary and perform a Write/Read CCW-chain after the initialization sequence. The Write command will transmit the XID request to the secondary station and an ID will be sent back and received by the Read command.

Note: This function is possible only if the secondary station is able to send an ID.

SNRM (Set normal response mode)

The SNRM function for SDLC lines sets the line to primary and performs a write/read CCW chain after the initialization sequence. The write command transmits the SNRM request to the secondary station and a non sequenced acknowledge (NSA) is sent back and received by the read command.

General Ending for TS, TE, XID, SNRM

Disable

Note: Two of the TS, SNRM and XID functions may be combined with one line exercising invoke procedure (entered like a normal CCW sequence). In this case the CCW sequence initialization is followed by the data transfer parts of both functions which will be chained. The TE function can be used only as a single operation.

CA Line Exerciser

Data Syntac A-Dial,W-Write,B-Break Commands

a. Data can be entered in hex code or - if quoted - in 'directly readable' form.

b. /XX indicates repetition XX (hex) times of the previous character.

c. Quoted blanks are treated as data.

d. The first unquoted blank is treated as 'End of data'.

e. Maximum 3F (decimal 63) data characters in one CCW.

f. Quotes and slashes (if used as data) must be entered in hex notation.

Examples

a. Data can be entered in hex code or - if quoted - in 'directly readable' form.

W 02 5C5C5C5C5C 03
means: WRITE STX ••••• ETX to a BSC Terminal.

Data can be entered in 'directly readable' form if quoted.
For a BSC line

W 02' ••••• '03
is the same as W 025C5C5C5C5C 03

For an SS line

W16' ••••• '3D
is the same as W 16 9090909090 3D

Note: For all commands but Dial the Line Exerciser converts 'directly readable' data to PTTC/EBCD code - 2740/2741, if the line specified is defined as an S/S line. For a BSC line, 'directly readable' data is treated as ordinary EBCDIC.

b. /XX indicates repetition XX (hex) times of the previous character.
By entering /XX after a character - where XX is a hex figure - the character will be repeated XX times.

W02 5C /04 03
is teh same as W02 5C6C5C 5C 5C 03
or W02' 03
or W02 ' /0403

c. Quoted blanks are teated as data. All blanks in a data string must be witin quotes
W02 '• • •
'bb0123456789bb • • •' 03
b = blank

d. The first unquoted blank is treated as 'End of data'.

The data string is terminated simply by the first unquoted blank
W 02 '• • •' 03
W 025C5C5C

Note: An entered command is normally displayed in expanded from on line 8-17.
Entered command: W 02 '•'./04 03
Displayed: &W 025c5c5c5c5c 03
The compressed form is used only if the expnaded one takes more than one line.

Length count (R - Read, P - Prepare, I - Inhibit - Commands)

The length count is specified by a double figure in hex.

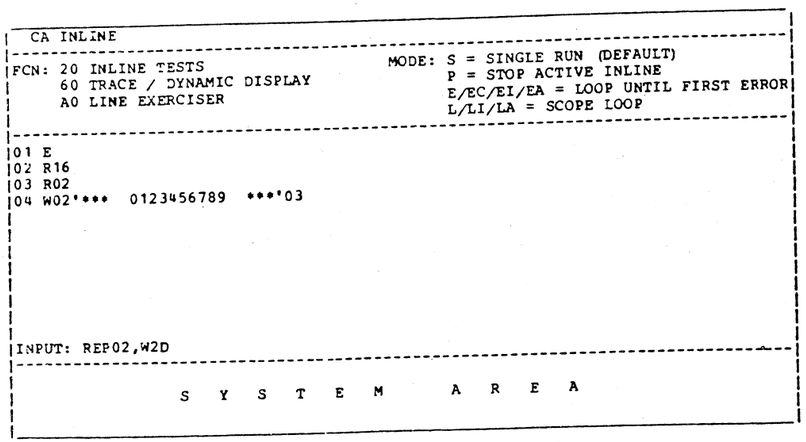
ROA means: Read 10 characters
R01 means: Read 1 character (minimum count)
R3F means: Read 63 characters (maximum count)
The lengthcount must be equal or greater than the number of characters received.

CA Line Exerciser

Editing

If the CE wants to change an existing CCW chain, the Edit commands are of valuable help. The Edit commands will first appear in the input field, as for the normal CCW commands, and be effected when the CE hits ENTER.

When an edit command is completed, an other edit command or a normal CCW command can be entered. If a CCW command is entered, it appears at the end of the chain.



Edit Commands:

a. *REPXX*
   - Replaces CCW with sequence number XX.
b. *INSXX*
   - Inserts a new CCW before CCW with sequence number XX.
c. *DELXX*
   - Deletes CCW with sequence number XX.
d. *CANCEL* (all line controls)
   - Cancels the CCW chain.

S/S and BSC only

Examples

a. *REP02*
   Replaces CCW no. 02
   When REP02 is entered, the CCW to replace CCW no. 02 must be entered next.
   W2D
   W2D is the new CCW no. 02.
   REP02, W2D
   The Replaces and the new CCW command may be entered at the same time. A comma must separate the two commands.
b. *INS04, R02*
   Inserts CCW R02 (Read 2 characters) before CCW no. 04.
   This can be done in two steps as for the REP command.
c. *DEL04*
   Deletes CCW no. 04 from the chain.

CA Line Exerciser

Error Messages

An error in the input field causes an error message on line 19. The cursor will normally be positioned where correction is necessary. Correct the error and re-enter.

Examples of error messages:

Message	*Explanation*
Invalid Line Invalid Mode	Line not installed Valid modes: S,E,L NOTE: Mode P valid only if a chain is already looping
Invalid Command Invalid SDLC command sequence	Valid S/S-BSC commands: E,D,A,W,R,P,I,B,T,X,REP,INS,DEL,CANCEL Valid SDLC commands: TS,TE,XID,SNRM,X,CANCEL TE can be used only as single operation
No Command(s) entered Too many Commands entered	X entered as first command Maximum 10 commands in a CCW chain. (S/S and BSC) Maximum 2 SDLC commands in one sequence
X or CANCEL is valid only	No command additions or changes are allowed if the A3 function (repeat last chain) is used for a SDLC line.
Command Requires Data Maximum Data Fld Length exceeded	A,W, and B commands require data. (S/S and BSC) Max. Length for S/S and BSC X'3F' for SDLC X'20'
Invalid Repeat Count Invalid Data Syntax	Valid count: hex 00-3F (for S/S and BSC for SDLC X'00'-'20' Unpaired hex digit or a character other than / (slash) or ' (quotes) outside quotes.
Unpaired Quotes Length count(01-3F) Required Length count Invalid - Must be 01-3F.	The number of ' (quotes) should be even. For S/S and BSC For S/S and BSC
Invalid CCW Count for REP Invalid CCW Count for INS Invalid CCW Count for DEL	The CCW sequence number given in a REP, INS or DEL command must be equal to one of the sequence numbers already in use. } S/S and BSC
REP Currently not Possible INS Currently not Possible DEL Currently not Possible	Previous edit command not completed (S/S and BSC).
Invalid Trace Specification Line Busy or not disabled	Valid Trace Specifications are: Y or N. The line must not be busy due to normal functional business. In case of SDLC the line must be disabled.

Prompting Messages for SDLC

Message	*Explanation*
Enter secondary station address in hex	For TS and XID address of remote station is required For TE own address is required
ACU to be used (Y/N)	Decision if Autocall Adapter is installed. 'N' is to be entered if an Autocall Unit (ACU) is not available, not operational or line is specified as leased. 'Y' is to be entered if line should operate with ACU.
Enter Data	The TS function requires data (max. 32)
Enter Dial Number	The number to be called must be entered for autocall feature
Establish Line Connection	The line connection on a switched network manual dialing has to be established.
Enter command (SDLC)	TS, TE, XID, SNRM, X or CANCEL has to be entered

CA Line Exerciser

Examples of CCW Chains

1 BSC Transmission code
Remote Terminal: 3275, 3277, 3274, 3276

1A Select Operation Sequence

Selects a terminal and writes a message.

```
01 E
02 W 37
03 W XXXXYYYY2D   Note
04 R 02
05 W 0227F5C3114040'Text'03
06 R 02
07 W 37
```

Note:
XXXX = Terminal Select Address
YYYY = Device Address

CA 327X

01 • Enable

02 • Write, Data = 37

	Hex	
Pad →	55	
Syn →	32	
Syn →	32	
EOT →	37	— Reset Terminals
Pad →	FF	

03 • Write, Data = XXXXYYYY2D

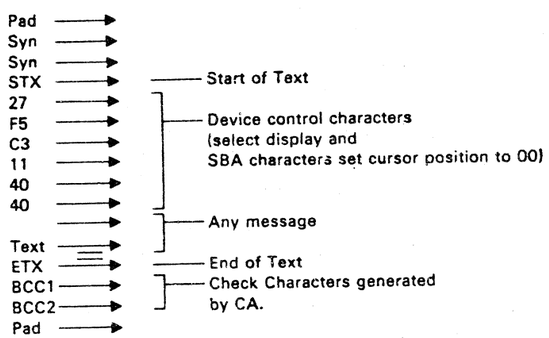
Pad →	
Syn →	
Syn →	
TS →	— Terminal Selection Address
TS →	
DA →	— Device Address
DA →	
ENQ →	ENQ Character
Pad →	

04 • Read, DL = 2

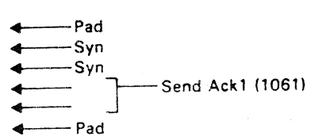
← Pad	
← Syn	
← Syn	
←	— Send Ack0 (1070)
← Pad	

CA Line Exerciser (continued)

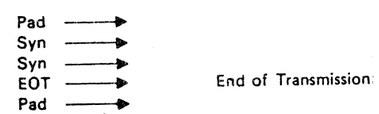
05 • Write, Data = 0227F5C3114040..Text.03



06 • Read, DL = 2



07 • Write, Data = 37



CA Line Exerciser (continued)

1B

Poll Operation Procedure

Polls a terminal and reads a message - if the terminal has anything to send.

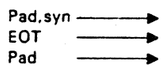
```
01 E
02 W 37
03 W XXXXYYYY2D    Note
04 R XX       XX = Lengthcount
05 W 1070
06 R 02
```

Note:

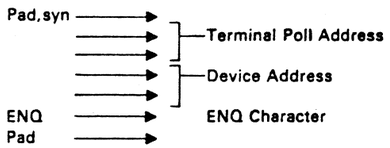
XXXX = Terminal Poll Address
YYYY = Device Poll Address

CA 3270

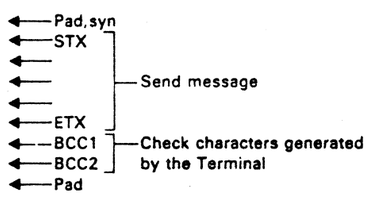
01 • Enable
02 • Write



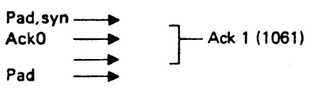
03 • Write, Data = XXXXYYYY2D



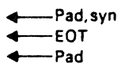
04 • Read, DL = 'message length'



05 • Write, Data = 1061



06 • Read, DL = 2



CA Line Exerciser (continued)

2 S/S Transmission Code

2A Remote Terminals:

2741
3767 in 2741 Mode
Line connection: point to point

Operating Sequence

Writes and reads messages

01 E
02 W 16'MESSAGE'1F
03 I 3F
04 T 02

CA — 2741 or 3767

← (D) — Power On
← (C) — Attention key Carrier Return

01 • Enable
02 • Write, Data = 16TEXT1F

(D) Text (C) → — End of Address; Any text message; End of Transmission

03 • Inhibit, DL = 63

← (D) Text (C) — Terminal generates D; Enter data on terminal; Press Attention or Carrier Return Key

04 • TIC - 16 (Back to Write)

2B Remote Terminal:

2740 Mod 1 or 2
3767 in 2740 Mod 1 or 2 mode

Poll operation procedure

Polls a terminal and reads a message

01 E
02 W 1FYY01 (NOTE: YY = Terminal Address)
03 R 63
04 W 76
05 R 01

CA — 2740 or 3767

01 • Enable
02 • Write, Data = 1FYY01

(C) → — Resets Terminals
A → — Terminal Address
S → — Space Character

03 • Read, DL = 63 (data length)

← (D) Text (B) LRC — End of Address; Any message; End of Block; Check character generated by the Terminal

04 • Write, Data = 76

(Y) → — Positive Reply

05 • Read, DL = 1

← (C) — End of Transmission

CA Line Exerciser (continued)

2C Remote Terminals:

2740 Mod 1
3767 in 2740 Mod 1 mode

Addressing Operation Sequence

Addresses a terminal and writes a message.

01 E
02 W 1F37YY01 (Note: YY = Terminal Address)
03 R 01
04 W 16'MESSAGE'3D
05 R 01
06 W 1F

Operation, Sequence

CA 2740 or 3767

01 • Enable
02 • Write, Data = 1F37YY01

Ⓒ →	Resets Terminals
Ⓢ →	Address Select
A →	Terminal Address
SP →	Space Character

03 • Read, DL = 1

← Ⓨ	Positive Reply (Ready to receive)

04 • Write, Data = 16TEXT3D

Ⓓ →	End of Address
Text →	Any message
Ⓑ →	End of Block
LRC →	Check Character generated by the CA.

05 • Read, DL = 1

← Ⓨ	Positive Reply (message OK)

06 • Write, Data = 1F

Ⓒ →	End of Transmission

2D Remote Terminals:

2740 Mod 2
3767 in 2740 Mod 2 mode

Addressing Operation Sequence

Addresses a terminal and writes a message.

01 E
02 W 1F37YY01 (Note: YY = Terminal Address)
03 R 02
04 W 16'MESSAGE'3D
05 R 01
06 W 1F

Operating Sequence

CA 2740 or 3767

01 • Enable

Ⓒ →	Reset Terminals

02 Write, Data = 1F37YY01

Ⓢ →	Address Select
A →	Terminal Address
SP →	Space Character

03 • Read, DL = 2

←	Sense Characters
← Ⓨ	Positive Reply (ready to receive)

04 • Write, Data = 16TEXT3D

Ⓓ →	End of Address
Text →	Any message
Ⓑ →	End of Block
LRC →	Check Character generated by the CA.

05 • Read, DL = 1

← Ⓨ	Positive Reply (message OK)

06 • Write, Data = 1F

Ⓒ →	End of Transmission

SDLC CCW Chains

General Initialization CCW Sequence

Leased line/SWNW-manual dialing

01	• Disable	Automatically set up before start of TS, TE, XID and SNRM	01	• Disable
02	• Set Mode		02	• Set Mode
03	• Enable		03	• DIAL

SWNW - Autocall

TS

04 • Write

Data=XX YY'TEXT'

		with NRZI Hex	w/o NRZI Hex
with B/M clock only	PAD	00	AA
	PAD	00	AA
	FLAG	7E	
	FLAG	7E	
	Address	secondary station address	
	Control field	F3	
	TEXT	any message	
	FCS	Check characters generated by CA	
	FCS		
	FLAG	7E	
	FLAG	7E	

05 • Read, DL=32

same sequence and data as for Write is expected, transmission will be done by the remote station.

Note: XX = secondary station Address (entered by CE)
YY = Command (set automatically)

For TS, XID and SNRM an address of 'FF' (all station address) can be used. In that case the remote station will response with its own station address. Only one secondary station must be powered on in a multipoint network when using the 'all station address' otherwise a data mix may be received.

TE

04 • Read, DL=32

←	PAD (with B/M clock only)
←	PAD
←	FLAG
←	FLAG
←	Address (own secondary station address or all station address X'FF')
←	Control field X'F3'
←	Any message sent by primary station
←	FCS (check characters)
←	FCS (generated by the primary station)
←	FLAG
←	FLAG

05 • Write, Data=Data of Input message field

With B/M clock only	PAD	
	PAD	
	FLAG	
	FLAG	
	Address	same as Input message field
	Control field	
	TEXT	
	FCS	
	FCS	
	FLAG	
	FLAG	

XID

04 • Write, DL=2, Data=XXYY

With B/M clock only	PAD	
	PAD	
	FLAG	
	FLAG	
	Address	secondary station address
	Control field	X'BF'
	FCS	check characters
	FCS	generated by CA
	FLAG	
	FLAG	

05 • Read, DL=22

←	PAD (with B/M clock only)
←	PAD
←	Flag
←	Flag
←	Address (secondary station)
←	Control field X'BF'
←	TEXT (Identifier of remote station)
←	FCS (check characters)
←	FCS (generated by the secondary station)
←	FLAG
←	FLAG

General Ending CCW

06 • Disable

Note: If two SDLC functions are combined the CCW numbering is expanded to 06 and 07 for the second data transfer part and 08 for the Ending disable command.

SNRM

04 • Write, DL=2, Data=XXYY

with B/M clock only	PAD	
	PAD	
	FLAG	
	FLAG	
	Address	secondary station address
	Control field	X'93'
	FCS	check character generated by CA
	FCS	
	FLAG	
	FLAG	

05 • Read, DL=2

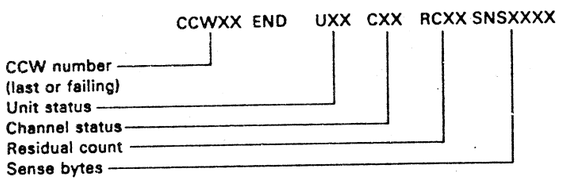
←	PAD	with B/M clock only
←	PAD	
←	FLAG	
←	FLAG	
←	Address	(secondary station)
←	Control	field X '73'
←	FCS	check character generated
←	FCS	by secondary station
←	FLAG	
←	FLAG	

CA Line Exerciser

Result Presentation

When the test stops, some test results are displayed on line 23 in the ILT status area. If the test reaches normal end, the *last* CCW number in the chain is displayed. At error halt the *failing* CCW number is displayed.

Result displayed on line 23 in the ILT status area.



Note: See page 3423 for SDLC CCW numbering.

Unit Status

Bit	Assignment
0	Not used in CA
1	Status Modifier Set by a positive acknowledgement to to a poll command.
2	Not used in CA
3	Busy Should always be off when displayed in the line exerciser. If on, microcode error.
4	Channel End
5	Device End Bit 4 and 5 are on whenever a command is ended. If bit 6 and 7 are off, the command was successfull.
6	Unit Check Set by sense byte 1
7	Unit Exception Remote terminal error, remote terminal handling error, CCW command sequence error - check your CCW chain-, line error. Unit Exception is also set if an EOT (BSC) or circle C (S/S) is received. This might be suppressed for S/S if Unit Exception Suppress is configured.

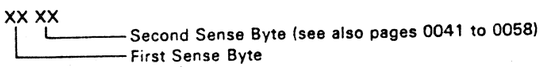
Channel Status

Bit	Assignment
0	Program Controlled Interrupt Should always be off when displayed in the line exerciser. If on, microcode error.
1	Incorrect length count Check that a sufficient length count is specified. If length count is correct line exerciser microcode error.
2	Program check
3	Protection check Bit 2 and 3: when displayed in the line exerciser: line exerciser microcode error.
4	Not used in CA
5	Channel Control Check CA-BA or CCA error
6	Not used in CA
7	Not used in CA

Residual Count

Valid for a Read command only. Tells the difference between the Length count and the number of received characters.

Sense Bytes



See CA Tools, Trace Data, Page 4304 for details.

CA TOOLS

General

CA Tools has three functions:

A = Update Configuration Table

This function is used when it is necessary to make changes in the configuration table.

B = UCW Display

This function is used to display the UCWs for all CA lines.

C = Display Trace Data

This function is used to display the data traced by the CA line trace.

How to Select the CA Tools Functions

1. Press the alternate key and hold it down and press the mode select button.

   The maintenance selection picture is displayed.

   Below the heading 'Tool' the option displayed is:
   CA

2. Enter option CA and press ENTER.
   The CA tools selection picture will be displayed.
   The function codes for the CA tools are shown:

   A Update configuration table
   B UCW display
   C Display trace data

3. Enter the desired function and press ENTER.

FCN = A. Update Configuration Table

General

The Configuration Table contains information on how each Line Adapter is operated. The table resides on the Control Program Diskette. Each CA line occupies 4 bytes (with some RPQ,s six (6) bytes. The information, based upon the feature codes, is set up by the link process in manufacturing. Some of the information can be changed in the field by the Configuration Table Update function.

The following parameters can be changed:

BSC Line Control

a. Non-switched or switched
b. Permanent request to send (duplex facility)
c. EIA/V35 interface card wrap disabled (external modem wrap)
d. Select Standby (for switched network backup)
e. Integrated modem answer tone select (2125 or 2025 Hz)
f. New Sync
g. EIB mode
h. Data signal rate select (low or high speed)
i. High-speed operation (enables an extra transmit buffer to be used, line address 30 only)
k. DTR (Data Terminal Ready) or CDSTL (Connect Data Set to Line) modem procedure
l. EBCDIC or ASCII transmission code

Note: Use of permanent RTS is recommended in Japan.

Start/Stop Line Control

a. Non-switched or switched
b. Permanent request to send (duplex facility)
c. EIA interface card wrap disabled (external modem wrap)
d. Select Standby (for switched network backup)
e. Integrated modem answer tone select (2125 or 2025 Hz)
f. Read interrupt
g. Write interrupt
h. Unit exception suppress
i. Turnaround delay select
k. Line speed (must correspond to the CCA clock strapping)

SDLC Line Control, same as BSC except:

g. Not NRZI instead of EIB-mode
l. Not used for SDLC

Line Selection

When function A is selected, the configuration for the first line (line address 30) is displayed. If the line is not installed, 'Line not installed' is displayed.

The PF4 key is used to swap to next line. When the last line (line address 37) is reached, PF4 swaps to the first line.

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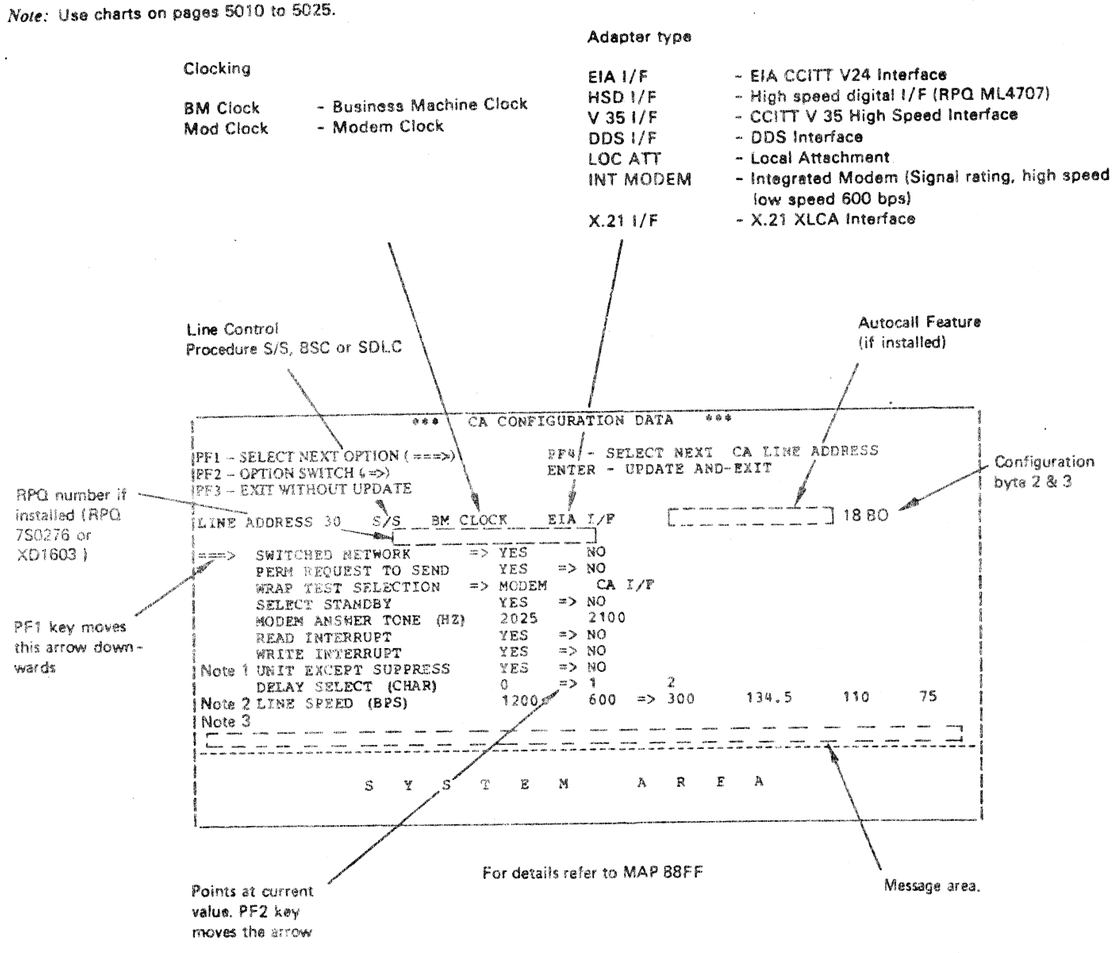
intentionally left blank

CA Tools (continued)

FCN = A. Update Configuration Table (continued)

Note: Use charts on pages 5010 to 5025.



Notes:

1. If RPQ 7S0276 is installed then unit exception suppress is exchanged by:
   Stopbit(s) one ---> two
2. If RPQ 7S0276 is installed then line speed 2400 bps is added.
3. If RPQ 7S0276 is installed then the following option is added:
   CR AS LN CTRL CHAR yes ---> no

Updating

When the line address to be updated is displayed, the necessary changes for this line can be done.

1. Use the PF1 key to put the large arrow ===> in front of the parameter to be updated.

2. Use the PF2 key to put the small arrow => in front of the desired value.

   Repeat steps 1-2 until all the parameters have the desired values. Then go to step 3.

   Note: If the small arrow is missing, the parameter is not relevant to this configuration. Some combinations of parameter values are invalid. If such a combination is entered, a warning message is given and the change is rejected.

3. Use the PF4 key to select the next communication line to be updated.

   Repeat steps 1-3 until all lines are updated. Then go to step 4.

4. Do you want to update the diskette with the new configuration table?

   Yes: Go to step 5. No: Go to step 6.

5. Hit ENTER.

   A warning message is displayed. If Enter is pressed again, the diskette is updated.
   The configuration table update routine is terminated.

   A RE-IML is required after this update procedure.

6. Use the PF3 key.

   The configuration table update routine is terminated. The diskette is not updated.

CA Tools

Configuration Table Layout and Description

BYTE 0

Bit assignment

BSC	S/S	SDLC
0 Permanent RTS	Permanent RTS	Permanent RTS
1 Switched Line	Switched Line	Switched Line
2 New SYNC	Unit Exception suppress	New SYNC
3 CDSTL	Write interrupt	CDSTL
4 Not used	Read interrupt	* Intergrated Modem
5 EIB mode	Delay Select 2	Not used
6 High Speed operation	Delay Select 1	High speed
* 7 38 LS Manual Answer	* 38 LS Manual Answer	* 38 LS Manual Answer

* Not changeable.

BSC

BYTE 0

Bit 0 Permanent Request To Send

Specifies Request To Send to be permanently in effect to avoid turn-around delay in Duplex facility. This used for: A four-wire leased line (non-switched); two-wire Duplex modems (switched or non-switched); or CPU is the master station in multipoint network.

Bit 1 Switched Line

Specifies Switched Line facility.

Bit 2 New SYNC

New SYNC is a special method of fast synchrinzation that allows faster turn-around recovery during Polling operation. It is used only in a multipoint network, and the modem must have the New SYNC feature installed. New SYNC is mandatory when the IBM 4872 Modem is attached and recommended when the IBM 3772/3874/3875 or Western Electric WE201B3 Modem is attached.

Bit 3 Connect Dataset to Line (CDSTL) Procedure

Bit ON specifies CDSTL procedure to be performed. The modem must have CDSTL feature.

Bit OFF specifies Data Terminal Ready procedure to be performed. The bit is set as specified by the customer.

Bit 4 Not used

Bit 5 Error Index Byte (EIB) Mode
If specified, an Error Index Byte is transferred to the Program Storage after each ITB, ETB and ETX character received.

Bit 6 High Speed Operation

Specifies High Speed operations. Valid for line address 30 only. Must be specified if the transmission rate is higher than 9,6 kbps (V35 or HSD I/F (RPQ ML4707) or High Speed DDS adapter types).

Bit 7 38 LS Manual Answer.

Indicates Manual Answer Facility of specific 38 LS Integrated Modem types (Not changeable).

CA Tools (continued)

S/S

BYTE 0

Bit 0 Permanent Request to Send

Specifies Request to Send to be permanently in effect to avoid turn-around delay in Duplex facility. This is used for: A four-wire leased line (non-switched); two-wire Duplex modems (switched or non-switched);break feature for 274X; or CPU is the master station in multipoint network.

Bit 1 Switched Line

Specifies Switched Line facility.

Bit 2 Unit Exception Suppress

Specifies that the Unit Exception bit in the Unit Status Byte (CCW 5 byte 0) will not be set if an EOT character is received. This bit must be active to allow chaining if the remote terminal is a 2741.

Bit 3 Write Interrupt

Indicates that the attachment can recognize a Break command (Stop communication) from the remote terminal. The line must have Duplex facility.

Bit 4 Read Interrupt

Specifies that the Break command can be used on this line. The remote terminal must have the Write Interrupt capability and the line must have Duplex facility.

Bit 5 and 6 Delay Select

These two bits specify the Termination Delay time for Read and Write type of operation. This delay is used to avoid picking up of noise during dropping of the carrier on the local or remote modem.

Bit:	*5*	*6*	*Delay Selected*
	0	0	No Delay
	0	1	One character time
	1	0	Two character time
	1	1	Two character time

- For READ type operations, the CA monitors receive data line to be quiet for the selected delay time before terminating the operation.
- For WRITE type operations, the CA waits for the selected delay time before terminating the operation after CTS has turned off.
- With Permanent RTS specified (byte 0, bit 0 = on), no delay is allowed to be specified except for multipoint configurations where the attached terminals operate in Switched RTS mode.
- The requirement for a one or two character time delay depends on the line and modem characteristic. It must be adjusted on a line specific base.

Bit 7 38 LS Manual Answer

Indicates Manual Answer Facility of specific 38 LS integrated modem types (Not changeable).

SDLC

Byte 0

Bit 0-3 and 6-7 see S/S or BSC.
Bit 4 is special indicator for under cover modem. (Equipment check instead of Intervention required).
Bit 5 is not used.

CA Tools (continued)

FCN A. Update Configuration Table (continued)

Byte 1

Bit assignment

S/S, BSC and SDLC

0 Select Standby
1 Data Signal Rate Select (not for S/S)
2 Not used
3 Not used
4 Not used
5 Not used
6 Short time out on DIAL (US)
7 Not used

The bits used can be changed by using the Configuration Table Update function.

Bit 0 Select Standby

This bit can be used if the modem has a switched network backup capability. If this bit is set, the signal Select Standby will be permanently on, and the modem will use the switched network instead of the leased line. The customer must change this bit when he wants to use the backup function.

Bit 1 Data Signal Rate Select (not for S/S)

Bit on: Half speed
Bit off: Full speed
Normally this bit is off - full speed.
If the line is bad, it might help to select half speed - bit on.
The bit is valid for external modems and for integrated Modem (USA).

Byte 2

Bit assignment

S/S, BSC and SDLC

0
1
2
3
4 — Hardware code

5 EIA/V35 card wrap disabled
6 Not used
7 Not used

Configuration byte 2 is a part of the reference code.
Ref.code: 88XXYY81
└┴── Configuration byte 2

It is also shown on the signal flow charts used in conjunction with the MAPS.

Bit 0-4 Hardware Code

These bits contain the hardware code in coded form, and are based upon the feature code. They are set in system linkprocess in mfg.

HEX VALUE CONFIGURATION

10	CCA w/o clock, EIA card wrap
14	CCA w/o clock, EIA Modem wrap
18	CCA with clock, EIA card wrap
1C	CCA with clock, EIA Modem wrap
20	CCA w/o clock, V35
24	CCA w/o clock, V35 Modem wrap
30	CCA w/o clock, X.21 XLCA
80	CCA w/o clock, DDS
90	CCA w/o clock, local attachment
A8	CCA with clock, US LLSM
B8	CCA with clock, WT LL
C8	CCA with clock, US LLSB
D8	CCA with clock, US SN AA
E8	CCA with clock, WT SNAA

Bit 5 EIA or V35 Card Wrap Disabled

This bit is set at installation time, if the user has a modem with wrap capability. If this bit is set the EIA of V35 Card must be jumpered for modem wrap.
See jumper options page 0060 for EIA card.
See jumper options page 0078 for V35 card.

Bit 6 and 7 Not used

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CA

CA Tools (continued)

FCN = A Update Configuration Table (continued)

BYTE 3

	Bit Assignment			
	SS		BSC	SDLC
SS Line Procedure - Bit on		= 0 =	Bit off - SYNC	= 0 = SYNC
Speed (000 75 BPS; 001 110 BPS; 010 134.5 BPS; 011 300 BPS; 100 600 BPS; 101 1200 BPS)	=	= 1 =	Bit on = ASCII Code	= — Bit off = NRZI / Bit on = not NRZI
		= 2 =	Bit off= EBDIC Code BM (CCA) Clocking	= 2 = BM (CCA) Clocking
		= 3 =	Not used	= 3 = Secondary station
ACA 1 Connected		= 4 =	ACA 1 Connected	= 4 = ACA 1 Connected
ACA 2 Connected		= 5 =	ACA 2 Connected	= 5 = ACA 2 Connected
Answer tone 2025 Hz Integrated modem only		= 6 =	Answer tone 2025 Hz Integrated modem only	= 6 = Answer tone 2025 Hz Integrated modem only
Not used		= 7 =	Bit off = BSC	= 7 = Bit on = SDLC

S/S

Bit 0: Line procedure
Bit on : SS line procedure
Bit off: SYNC
This bit cannot be changed.

Bit 1-3: For an SS line these bits specify the transmission rate (line speed) and can be changed. The bit settings must conform to the board wiring at the CCA card position. Also see page 0090.

Bits 1 2 3	— Transmission — Rate	Board Wiring CCA Card Pos
0 0 0	— 75 BPS	P04 to ground
0 0 1	— 110 BPS	P05 to ground
0 1 0	— 134.5 BPS	M02 to ground
0 1 1	— 300 BPS	G13 to ground
1 0 0	— 600 BPS	M04 to ground
1 0 1	1200 BPS	M05 to ground

BSC and SDLC

Bit 1: For a BSC line this bit specifies the transmission code to be used.
Bit on: ASCII code.
Bit off: EBCDIC code.
For SDLC: Bit off = NRZI
Bit on = not NRZI
This bit can be changed for BSC and SDLC.

Bit 2: For a BSC and SDLC line this bit specifies which clock is to be used.
Bit on: Business machine - BM - clocking.
The clock is supplied by the CCA card.
Bit off: Modem clocking.
The clock is supplied by the external modem or by the interface card - local ATT. and DDS Adapter.
This bit cannot be changed.

Bit 3: For an SDLC line this bit is on when secondary station is specified for the line.
This bit cannot be changed.

Bit 4: ACA 1 connected.
Specifies that autocall adapter 1 is connected to this line.
This bit cannot be changed.

Bit 5: ACA 2 connected.
Specifies that autocall adapter 2 is connected to this line.
This bit cannot be changed.

Bit 6: Answer tone 2025 Hz - integrated modem only.
This bit must be on if the remote modem is a WE202 modem type.
This bit can be changed.

Bit 7: Bit on: SDLC
Bit off: BSC
This bit cannot be changed.

BYTE 4

(Not used)

BYTE 5

(RPQ)
For RPQ XD 1603 (Swift)only bit 7 is significant.
Bit 7 on specifies that RPQ XD 1603 SWIFT to be used (BSC lines only). This bit cannot be changed.

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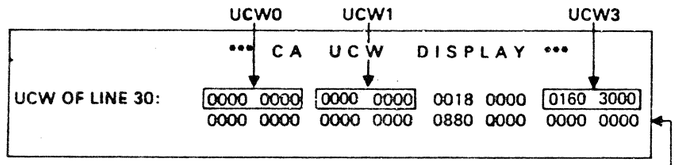
CA

CA Tools

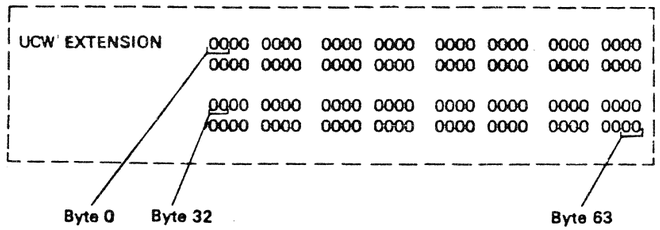
UCW Display, FCN = B.

This function displays all the Unit Control Words (UCWs) for all the installed CA-lines. The UCWs of one line are displayed at a time. PF3 key terminates the function.

Display format



with SDLC instaled the following 64 bytes are additionally displayed



UCW7

Word / Byte → 0 1 2 3

	0	1	2	3
0	CAW key	Real Storage Address of next data byte bit 8 - 20:Page Frame Address from MSD entry bit 21-31:Byte Address in Page Frame		
1	RAS Flags, Commands Ref. page 4316	Address of next Data Page bit 8 -20:Page Frame Address Pointer in MSD bit 21-31:Byte Address in Page Frame		
2	CCW Flags See page 4252	Miscellaneous Control See page 4252	CCW byte count Ref. page 4316	
3	Subchannel State See page 4252	AWA 0110 | Chnl. Addr. 0000 Note 2:	Device Address 30 - 37	1. Sense Byte Ref. page 4316
4	CAW key	Virtual address + 8 for the actual CCW		← CSW 1. Word
5	Unit Status Ref. page 3424	Channel Status Ref. page 3424	Residual Count — Note 1 — BCC 1	BCC2/ LRC Index ← CSW 2. Word/ FCS 1 & 2 for SDLC
6	Mode Ref. page 4318	Feature 1 Ref. page 4318	Feature 2 Ref. page 4320	Character Buffer Ref. page 4320
7	Control 1 Ref. page 4322	2. Sense Byte. Indic. for SDLC Ref. page 4324	UCW Modem Control Ref. page 4324	Control 2 Additional Char. Buffer for SDLC Ref. page 4324

Note 1: During a transmission these two bytes are used for data checking - BCC1 and BCC2/ LRC index and for FCS 1 & FCS 2.
When the transmission is terminated, the two bytes hold the residual count.

Note 2: AWA = Adapter Work Area

CCW Flags - Word 2, Byte 0

Bit

0 = Chain Data Flag
1 = Command Chainign
2 = Suppress Incorrect Length
3 = Skip
4 = Program Control Interrupt
5 = IDA -370 Mode Only
6 = Clear I/O Indicator
7 = Halt I/O Indicator

Miscellaneous Control - Word 2, Byte 1

Bit

0 = |
1 = |- Count Field for immediate commands
2 = |
3 = 1
4 = 1
5 = Command Chaining Init.
6 = Command Chaining Request
7 = Lenght Count Zero Indication

Subchannel State - Word 3, Byte 0

Bit

0 = Line not installed
1 = Subchannel Working
2 = Primary Interrupt Pending
3 = Logout Pending
4 = Not used
5 = Not used
6 = Not used
7 = CA Subchannel

UCW Extension for SDLC

Bytes 0 – 19 represent the Station Control Block (SCB). (The remaining bytes are used by the operating system.)

Byte 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Buffer offset	SDLC station address	Reserved always zero	Control flags	Current SDLC number of sent I-frame	Reserved always zero	SDLC number of sent I-frame acknowledged	SDLC number of next I-frame to be received	Identification field				Command received	Reserved always zero	Count of frames sent and acknowledged	Count of receive buffers used

Byte 16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Reserved always zero	Reserved always zero	Exception flags byte 1	Exception Flag 2	Actual 2nd sense byte (first one in UCW)	Actual 3rd sense byte	Remembered 2nd sense byte	Remembered 3rd sense byte	Current contact-poll index	Reserved	Contact-poll frequency	Current contact-poll frequency	Current autopoll index	Reserved	Residual Count update	

Byte 32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
Saved station address	Station address from last set mode or last SCB	Frame Length count		Reserved	Start of current buffer to store frame count or saved data address (virtuell) in autopoll.			Non-productive receive counter	Idle detection time value	Non-productive receive timer value (1 sec. units)	Service seeking pause value	Autopoll Offset: index times 12		Saved CCW count during autopoll	

Byte 48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
Command field received with last frame	Second sense byte for log routine	Third sense byte for log routine	Transient counter for used buffers or flush counter		Saved return address during enter pre-receive				Saved return address during split of trap routine			Reserved			

CA Tools UCW Display
SCB (Station Control Block) Description

Byte 0 Buffer offset

When data is transferred to main storage during the execution of a 'read-PIU' command, then this offset value is added to the data address of the CCW and the data is stored with this address as the starting point. Similarly, during a 'write-PIU' the data is transferred from main storage starting from an address, which is formed by adding the offset value to the CCW data address. The offset may have any value in the range 2 through 255.

If a SCB is transferred to the line attachment and its offset value is specified as 0 or 1, then the channel program terminates with data check.

Note: If during a 'read-PIU' command data is received, which is not an I-frame (this mechanism is primarily provided to handle I-frames) The same principle applies: the starting address for data in the buffer is determined with the use of the OFFSET field.

Byte 1 SDLC station address

The CA uses the address field when building outbound I-Frames or poll frames. Inbound, the address field of frames received in response to poll are checked against ADDRESS. In case of a mismatch, a soft error indication is set if the CA is running as primary; the frame is ignored if running as secondary.

Byte 2 Reserved field, must be zero.

Byte 3 Control flags; bit definition:

SKIP	x...	1 = Inactive station,do not poll at all 0 = Active station, perform polling
AUTOP	.x..	1 = Datapoll this station during 'autopoll' commands. 0 = Contactpoll this station during 'autopoll' commands.
SLOWOUT	..x.	1 = Send 'RNR' poll 0 = Send 'RR' poll
SLOWIN	...x	1 = 'RNR' reply expected to poll. 0 = 'RR' reply expected to poll.

Note: Whenever the expected reply is received from a station, the Autopoll operation continuss; it terminates with the channel end, device end, and status modifier bits set to one when an unexpected reply is received.

RESERVED .... xxxx Reserved, must be zero.

Byte 4 Current SDLC number of sent I-frame.

This field contains the SDLC number (modulo 8 number) of the next I-frame to be sent. It is set into the I-frame control field during 'write-PIU' commands. NSCUR is incremented by one modulo 8 after each I-frame transmitted. If NSCUR becomes equal to NSACK this indicates that outstanding I-frames must be acknowledged before any more I-frames may be sent. Any further 'write-PIU' command is therefore terminated with command reject, unit check condition.

Byte 5 Reserved byte; must be zero.

Byte 6 SDLC Number of sent I-frame acknowledged

This field contains the SDLC number (modulo 8 number) of the latest sent I-frame, which is acknowledged by the remote station. Whenever a response containing a NR field is received from a station the line attachment uses it to update NSACK (i.e. set it to NR minus 1). The absolute difference (NR minus NSACK minus 1) is also set into the CFRS field. If the received Nr is outside the range from NSACK + 1 to NSCUR (modulo 8), Unit Check is presented with sense information indicating an unexpected NR field. (The control byte received is set into the CMDIN field of the SCB.)

Byte 7 SDLC number of next I-frame to be received

This field contains the SDLC number plus one (modulo 8) of the last valid I-frame received.

The line attachment sets the contents of this field into the Nr part of the SDLC control field during polling and I-frame transmission. The NRACC field is also used when valid I-frames are received. The line attachment compares the received Ns field with the contents of NRACC.

The I-frame is accepted if they are equal. The NRACC field is then incremented by one modulo 8. If an invalid frame is received, NRACC will be frozen and no more I-Frames will be accepted until after a valid frame with the poll/final bit equal to one has been received or a timeout has occurred, whichever comes first. If the received Ns does not correspond with the NRACC value and the CA is not skipping invalid frames, then Unit Check is presented with sense information indicating that received I-frames were out of order. CMDIN will now contain the control field from the erroneous frame. The channel program is not terminated, however, until a valid frame with the poll/final bit equal to one is received or a timeout occurs.)

Byte 8-11 Identification field

This field is used by the access method to identify each SCB-entry. It is passed without any change between the access method and the line attachment.

Byte 12 Command received

The control byte in the frame received is stored in the CMDIN field for further examination by the access method. The control byte is stored in any case. Whether it is expected or unexpected is indicated by the CIUSE field. This is useful for NR or NS errors as it allows inspection of the improper value received.

Byte 13 Reserved byte, must be zero.

Byte 14 Count of frames sent and acknowledged.

This is a zero based field. When the line attachment changes NSACK based on a newly received NR, the absolute difference is accumulated into the CFRS-field. The contents of this field are used by the access method to release the appropriate 'write-PIU' buffers containing the frames acknowledged. If CFRS is not equal to the number of frames actually transmitted, the station missed some. The access method must now back NSCUR to NSACK +1 and modify the channel program accordingly to retransmit the frames lost.

Byte 15 Count of receive buffers used.

Byte 16 Reserved byte, must be zero.

Byte 17 Reserved byte, must be zero.

CA Tools UCW Display
SCB (Station Control Block) Description (continued)

Byte 18 Exception Flags Byte One

This field contains information about exceptional conditions which occurred during the excecution of the previous channel program. It is interrogated by the access method. If this field is all zeros, no exceptional conditions occurred.

Bit definitions:

SOFTERRx... ....Soft Error Indicator

This bit is set to one if any soft error occurred. The EXCFLAGS2 byte indicates the specific reason for this soft error.

LFNSI.x.. ....Last frame contains non-sequenced information

This bit is set to one if non-sequenced information was received during this channel program. The information is set into the last receive buffer used so that the access method can interrogate.

STRANS..x. ....Remote station transition occurred

This bit is set to one if RNR was received from the remote station, when the CTLFLAGS field indicates that the station is expected to send RR or vice versa.

CIUSE...x ....CMDIN field used

This bit is set to one when an SDLC command is set into the CMDIN field. This occurs when any unexpected command is received. The bit is not set when STRANS is set.

Direct .... x ... Line direction outbound

This bit is set to one when the line direction is outbound at execution time of the SENSE SCB command.

Byte 19 Exception Flag Two

This byte contains in encoded form the specific reason for the soft error indicated in summary bit SOFTRR.

All SCB fields, which are transferred from the access method to the line attachment, are intialized by the acces method. The following feilds are never altered by the line attachment: ADDRESS, OFFSET, CTLFLAGS and IDENT.

The following fields are only updated by the line attachment: CFRS, CRBUP, EXCFLAGS and CMDIN.
The remaining (NSCUR, NSACK, and NRACC) are normally managed entirely within the line attachment but they have to be altered by the access method in exceptional situations.

The reserved fields must be zero and the offset must be greater than one. The five leading bits of the sequence count fields are ignored on outbound and are undefined on inbound commands and instructions.

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CA Tools

FCN = C. Display Trace Data

This function will display the contents of the Trace area on the system console display, and if requested, clear the Trace data area.

The Trace area is divided into a number of display pages. The number depends on how many entries were made during the Trace operation. The minimum number of pages is one, the maximum is about twenty.

The latest Trace entries (most recent) appear on the last page. This page is always displayed first.

If the Trace area is wrapped during the Trace operation, the text 'Wrapped around' appears on page 01.

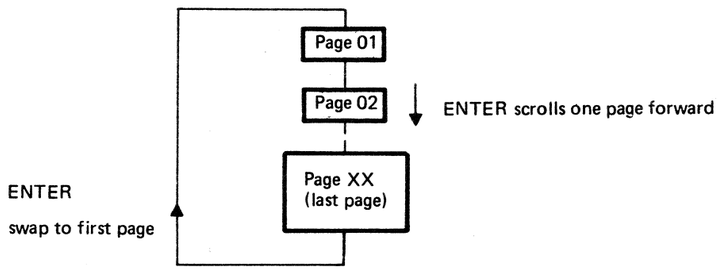
Note: The last entry is always the lower righthand entry.

Clear

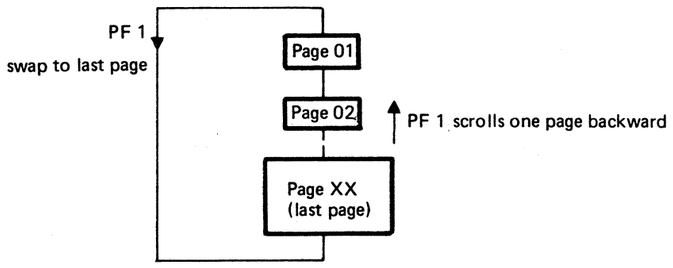
Use the PF2 key to clear the Trace data area. A warning message is displayed when PF2 is pressed. If PF2 is pressed again, the Trace data area is cleared.

Scrolling

Forward - ENTER The ENTER key is used to scroll forward one page at a time.
Pressing ENTER when the last page is on the screen, cases a swap to page 01.



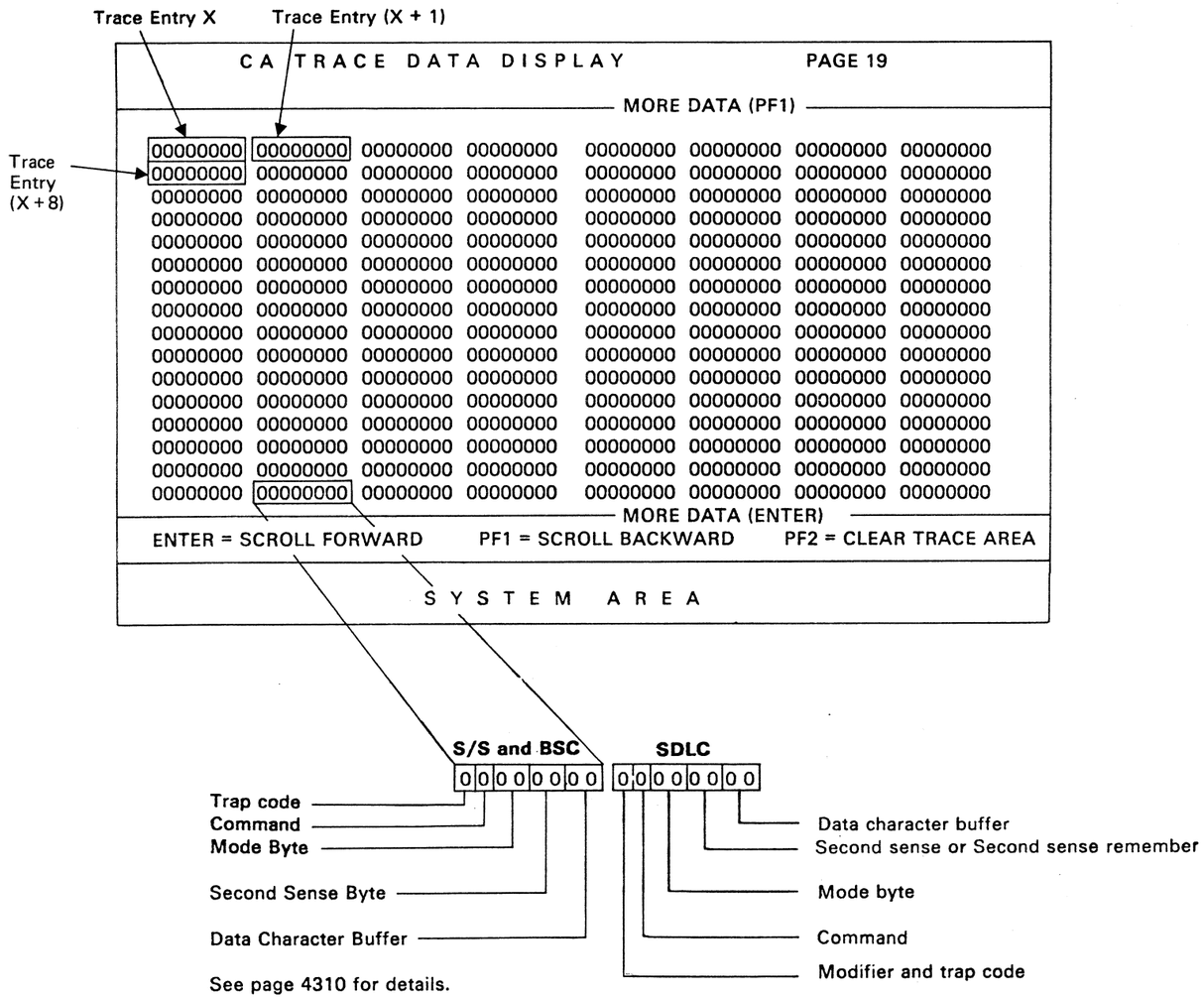
Backward - PF1
The PF1 key is used to scroll backward one page at a time.
Pressing PF1 when page 01 is on the screen, causes a swpag to the last page.



CA Tools

Display Format

Standard Trace/Dynamic Trace (four bytes)



See page 4310 for details.

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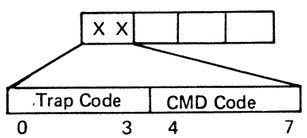
CA Tools

STANDARD LINE TRACE and DYNAMIC TRACE DATA

First Byte (S/S and BSC)



• Trap Code

Bit 0123

0001 = TRD trap. Set in respond to TRD bit in CA-BA
0010 = I/O instruction complete trap
0100 = NIR trap. Set by BA-Stat. bit 0
0101 = NOR trap. Set by B-Stat. bit 1.
0110 = Active B-Status available trap. Set by B-Stat. bits 2-5

These bits are controlled by the diagnostic programs.

• Command Code

This is a 4 bits code of the 1 byte CCW command.

Bit 4567

0000 = No command active
0001 = NOP command
0010 = Sense, Sense I/O command
0011 = Set Mode, BSC only
0100 = Dial command
0101 = Enable command
0110 = Disable command
0111 = Invalid command
1000 = Inhibit command, S/S only
1001 = Prepare command
1010 = Poll command
1011 = Break command, S/S only
1100 = Read command
1101 = Write command
1110 = Address compare command (BSC only)
1111 = Spare

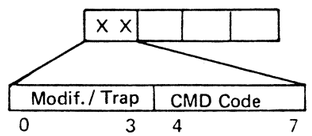
For details refer to Functional Characteristics.

Note: The line must be enabled before issuing commands with bit 4=1. The line must be disabled before using a DIAL command.

4331

CA 4391 0001

SDLC



• Modifier

Bit 0123

0XXX = Second sense byte is indicated
1XXX = Second sense byte remember is stored

• Trap Code

X001 = TRD Trap
X010 = PIO instruction complete trap
X100 = NIR trap
X101 = NOR trap
X110 = B-Stat. available trap

• Command Code

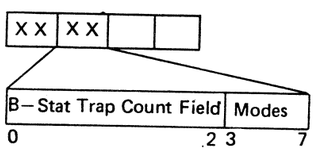
Bit 4567

0000 = No command
0001 = NOP
0010 = Sense, Sense I/O
0011 = Set mode
0100 = Dial
0101 = Enable
0110 = Disable
0111 = Invalid Command
1000 = Control SCB
1001 = Sense SCB
1010 = Autopoll
1011 = Poll
1100 = Read
1101 = Write
1110 = Read PIU
1111 = Write PIU

CA Tools

STANDARD LINE TRACE and DYNAMIC TRACE DATA (continued)

Mode Byte



B-Stat Trap Count Field

CA hardware check
Unexpected B-Stat traps, that is, traps which come on again immediately after being reset, are counted here. Overflow indicates that a hardware check cannot be reset. Second Sense byte is set to hex 61, and bit 3 in First Sense byte is set on to indicate Equipment Check.

• Modes

This is an internal microprogram control code. It is set by the microcode and is used for control of the microprogram.

Common SS BSC SDLC Modes

Hex value
05 Dial
06 Enable
07 Disable
08 Idle

SS Modes

Hex value
09 Read IBM control
0A Read LRC
0B Read IBM data
0C Read Poll1
0D Read Poll2
0E Prepare
0F Read end
11 Write shift remember
12 Write LRC
13 Write prepare end
14 Write poll initiate
19 Write data
1A Break data initiate
1B Break data
1C Write poll addr 1
1D Write poll addr 1
1E Write poll index

BSC Modes

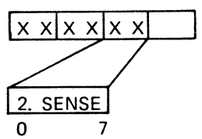
Hex value
0B Receive mode
0C Receive normal
0D Receive end BCC1
0E Receive end BCC2
0F Receive end PAD
10 Transmit init PAD2
11 Transmit init PAD3
12 Transmit init SYN1
13 Transmit init SYN2
14 Transmit normal
15 First SYN/DLE fill
16 Second DLE/fill
17 Second SYN/fill
18 Transmit end BCC1
19 Transmit end BCC2
1A Transmit end PAD1
1B Transmit end PAD2
1C Transmit end TERM1
1D Transmit end TERM2
1F Transmit terminate

SDLC Modes

Hex Value
09 No lead flag TCC. fill now
0A Next byte addr. field
0B Next byte control field
0C Next byte 1. I-field
0D Next byte 2. I-field
0E Next byte 3. I-field
0F Any further byte
10 Sec. pad at next NOR
11 1.lead. flag at next NOR
12 2.lead. flag at next NOR
13 Lead. flag after Abort
14 2.flag after Abort
15 Addr. field or control flag
16 Compl. contin. flag
17 Addr. field at next NOR
18 Contr. field at next NOR
19 I field byte at next NOR
1A 1. FCS byte at next NOR
1B 2. FCS byte at next NOR
1C Trail. flag at next NOR
1D All ones at next NOR
1E Transmission end with P/F or Abort
1F CTS has to drop

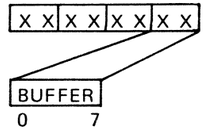
STANDARD LINE TRACE and DYNAMIC TRACE DATA (continued)

Second Sense Byte (For S/S and BSC and 2nd Sense byte or 2nd Sense byte remember for SDLC)



This byte holds an CA check code. Any bit on indicates an error. For detailed information refer to Unit Check Log page 0040

Character Buffer



The microcode uses this buffer when transferring characters from Main Storage to the line (Write command), and vice versa (Read command).
The CA generated SYN and PAD characters and flags and the second received SYN character also go through this buffer.
The character appearing in the buffer is the actual character transmitted or received on the line.

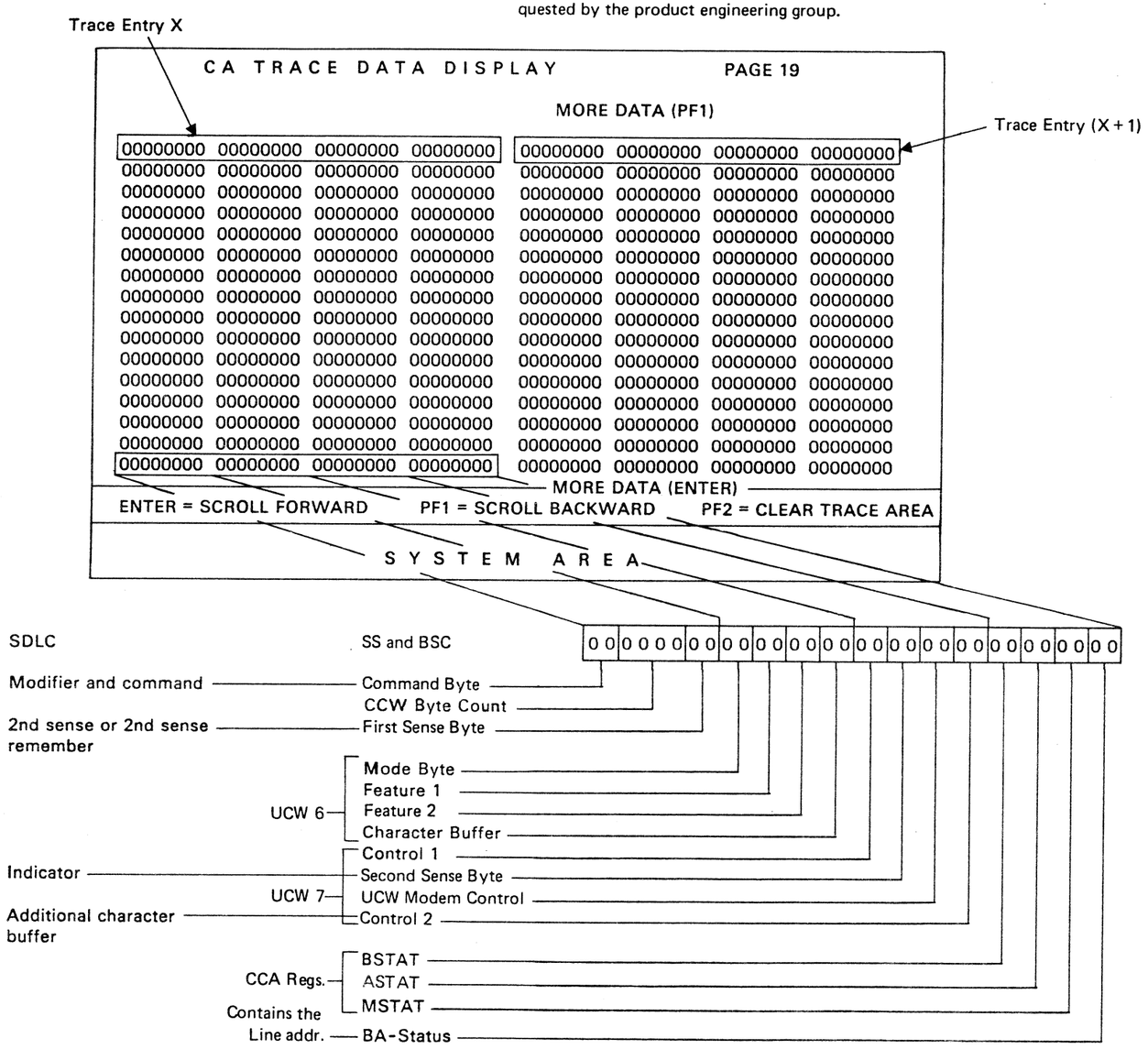
Note: In high speed (V35, DDS) the first generated SYN character does not use this buffer. Instead, a hardware buffer on the CA-BA card is used. In this case the last character transmitted will be a 'dummy' character.

CA Tools

Display Format

Extended Trace (16 Bytes)

The trace data collected in this mode is intended for detailed analysis of complex microcode/circuitry problems.
The use of this trace mode therefore is restricted to those cases where this type of information is requested by the product engineering group.

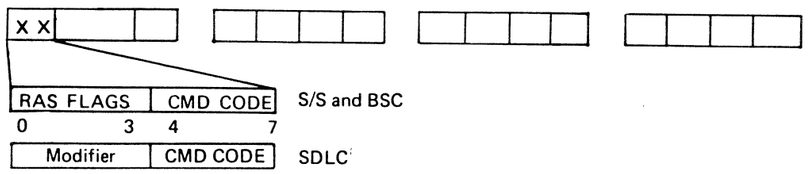


See page 4316 for details.

CA Tools
EXTENDED LINE TRACE DATA

The trace data collected in this mode is intended for detailed analysis of complex microcode/circuitry problems.
The use of this trace mode therefore is restricted to those cases where this type of information is requested by the product engineering group.

Command Byte



RAS Flags (S S and BSC)

Bit 0123
1001 = Inline test active
0100 = Extended trace active
0110 = Standard trace active
1000 = Line Exerciser active
1100 = Line Exerciser and Trace active

These bits are controlled by the diagnostic programs.

Modifier SDLC

Bit	0123
	0XXX = 2nd sense byte is stored
	1XXX = 2nd sense byte remember is stored

• Command Code (S/S and BSC)

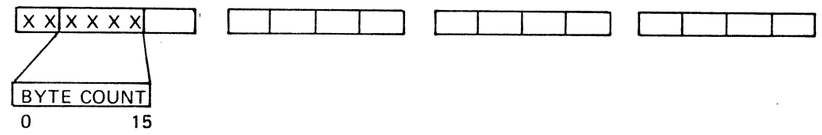
This is a 4 bit code of the 1 byte CCW command.
For details refer to Functional Characteristics.

HEX	Bit 4567
'00'	0000 = No command active
'01'	0001 = NOP command
'02'	0010 = Sense command
'03'	0011 = Set Mode, BSC only
'04'	0100 = Dial command
'05'	0101 = Enable command
'06'	0110 = Disable command
'07'	0111 = Invalid command
'08'	1000 = Inhibit command S/S only
'09'	1001 = Prepare command
'0A'	1010 = Poll command
'0B'	1011 = Break command, S/S only
'0C'	1100 = Read command
'0D'	1101 = Write command
'0E'	1110 = Address prepare command (BSC only)

• Command Code (SDLC)

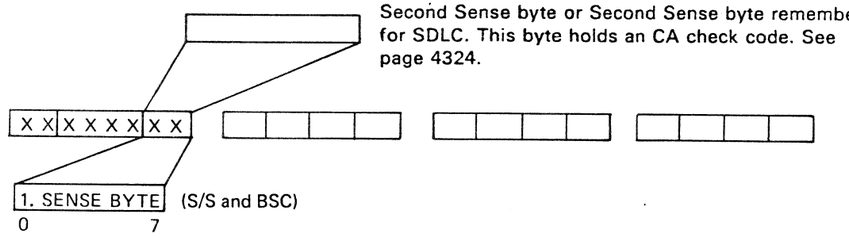
HEX	Bit 4567
'00'	0000 = No command active
'01'	0001 = NOP
'02'	0010 = Sense, Sense I/O
'03'	0011 = Set mode
'04'	0100 = Dial
'05'	0101 = Enable
'06'	0110 = Disable
'07'	0111 = Command reject
'08'	1000 = Control SCB
'09'	1001 = Sense SCB
'0A'	1010 = Autopoll
'0B'	1011 = Poll
'0C'	1100 = Read
'0D'	1101 = Write
'0E'	1110 = Read PIU
'0F'	1111 = Write PIU

CCW Byte Count



These two bytes contain the length count of the CCW (how many characters to be transmitted or received). It is decremented by one for each character transmitted or received.

First Sense Byte



Second Sense byte or Second Sense byte remember for SDLC. This byte holds an CA check code. See page 4324.

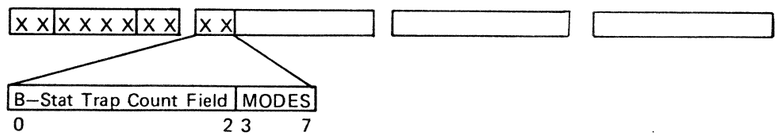
This byte contains error information and is controlled by the contents of the Second Sense byte. For good operation this byte should be 0.

Bit assignment:
0 = Command reject
1 = Intervention required
2 = Not used
3 = Equipment check
4 = Data check
5 = Overrun
6 = Lost data
7 = Timeout

CA Tools

EXTENDED TRACE DATA (continued)

Mode Byte



- B-Stat Trap Count Field

CA Hardware Check
Unexpected B-Stat traps, i.e. traps which reoccur immediately after being reset, are counted here. Overflow indicates that a hardware check cannot be reset situation. Second sense byte is set to hex 61, and bit 3 in First Sense byte is set on to indicate Equipment Check.

- Modes

This is an internal control mode. It is set by the microcode and is used for control of the microcode.

In case of Dial, Enable and Disable, additional mode information is shown in the Control 1 field.

Common SS/BSC and SDLC modes

Hex value
05 Dial
06 Enable
07 Disable
08 Idle

SS Modes

Hex value
09 Read IBM control
0A Read LRC
0B Read IBM data
0C Read Poll1
0D Read Poll2
0E Prepare
0F Read end
11 Write shift remember
12 Write LRC
13 Write prepare end
14 Write poll initiate
19 Write data
1A Break data initiate
1B Break data
1C Write poll addr 1
1D Write poll addr 1
1E Write poll index

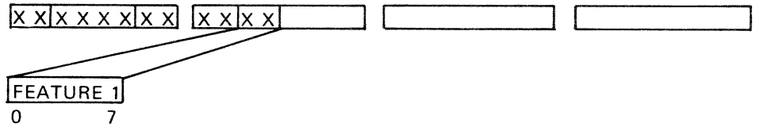
BSC modes

Hex value
0B Receive mode
0C Receive normal
0D Receive end BCC1
0E Receive end BCC2
0F Receive end PAD
10 Transmit init PAD2
11 Transmit init PAD3
12 Transmit init SYN1
13 Transmit init SYN2
14 Transmit normal
15 First SYN/DLE fill
16 Second SYN/fill
17 Second DLE fill
18 Transmit end BCC1
19 Transmit end BCC2
1A Transmit end PAD1
1B Transmit end PAD2
1C Transmit end TERM1
1D Transmit end TERM2
1F Transmit terminate

SDLC Modes

Hex Value
09 No lead flag TCC. fill now
0A Next byte addr. field
0B Next byte control field
0C Next byte 1. I-field
0D Next byte 2. I-field
0E Next byte 3. I-field
0F Any further byte
10 Sec. pad at next NOR
11 1.lead. flag at next NOR
12 2.lead. flag at next NOR
13 Lead. flag after Abort
14 2.flag after Abort
15 Addr. field or control flag
16 Compl. contin. flag
17 Addr. field at next NOR
18 Contr. field at next NOR
19 I field byte at next NOR
1A 1. FCS byte at next NOR
1B 2. FCS byte at next NOR
1C Trail. flag at next NOR
1D All ones at next NOR
1E Transmission end with P/F or Abort
1F CTS has to drop

Feature 1



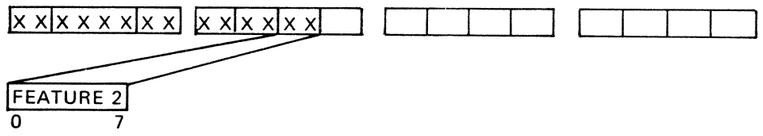
This is the first byte (byte 0) in the Configuration Table. It can be updated using the Configuration Table Update function in CA Tools.
The function is active if the corresponding bit is = 1.
See Configuration Table Update for details page 4220.

Bit assignment:

S/S Line		BSC Line		SDLC Line
Permanent request to send	= 0 =	Permanent request to send	= 0 =	PRTS (Permanent request to send)
Switched line	= 1 =	Switched line	= 1 =	Switched Line
Unit exception suppress	= 2 =	New Sync	= 2 =	New Sync
Write interrupt	= 3 =	CDSTL procedure	= 3 =	CDSTL Procedure
Read interrupt	= 4 =	Not used	= 4 =	Integr. Modem
Delay select 2	= 5 =	EIB	= 5 =	Not used
Delay select 1	= 6 =	High speed operation	= 6 =	High speed
38LS Manual Answer	= 7 =	38LS Manual Answer	= 7 =	38 LS Manual Answer

EXTENDED TRACE DATA (continued)

Feature 2

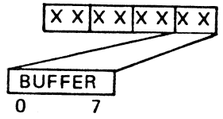


This is the last byte - byte 3 - in the Configuration Table. The bits are set in manufacturing. Some bits can, however, be changed in the field. See Configuration Table Update, page 4220 for details.

Bit assignment

	SS		BSC		SDLC
SS Line procedure - Bit on	= 0 =	Bit off Sync Control	= 0 =	Bit off - Sync Ctl	
Speed 000 75 BPS / 001 110 BPS / 010 134.5 BPS / 011 300 BPS / 100 600 BPS / 101 1200 BPS	= 1 =	Bit on = ASCII Code Bit off = EBCDIC Code	= 1 =	Not NRZI	
	= 2 =	BM (CCA) clocking	= 2 =	BM (CCA) clocking	
	= 3 =	Not used	= 3 =	Secondary station	
ACA 1 connected	= 4 =	ACA 1 connected	= 4 =	ACA 1 connected	
ACA 2 connected	= 5 =	ACA 2 connected	= 5 =	ACA 2 connected	
Answer tone 2025 Hz Integrated modem only	= 6 =	Answer tone 2025 Hz Integrated modem only	= 6 =	Answer tone 2025 Hz	
Not used	= 7 =	Bit off, BSC	= 7 =	Bit on SDLC	

Character Buffer



Character Buffer

S/S and BSC

The microcode uses this buffer when transferring characters from Main Storage to the line (Write command), and vice versa (Read command).
Likewise the CA generated SYN and PAD characters and the second received SYN character go through this buffer.
The character appearing in the buffer is the actual character transmitted or received on the line.

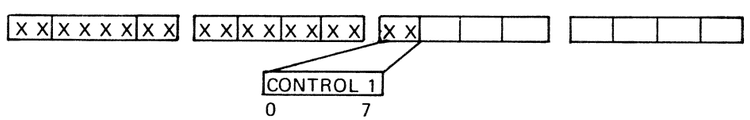
Note: In high speed (V35, DDS) the first generated SYN character does not use this buffer. Instead, a hardware buffer on the CA-BA card is used. In this case the last character transmitted will be a "dummy" character.

SDLC
This buffer contains the character of any outbound operation. In case of inbound operation this buffer takes the character from the 2nd buffer in UCW 7, byte 3.

CA Tools

EXTENDED TRACE DATA (continued)

Control Byte 1



Bit assignment:

SS

Buffer full	= 0 =	Buffer full
Break byte detected	= 1 =	Lost data remember
Poll indicator	= 2 =	Overrun remember
Receive indicator	= 3 =	Data Check remember
Timeout indicator	= 4 =	Unit exception remember
Timeout remember	= 5 =	Second write/ Address prepare control mode
Character received or transmitted	= 6 =	Transparent stop
Sense I/O indicator	= 7 =	Channel stop remember/ Sense I/O indicator

BSC: Bit on indicates an error.

BSC

SDLC

0 = Autopoll flush, SCB fetch
1 = Flush indicator
2 = Preflush indicator/Autopoll extension
3 = SCB exists
4 = P/F bit sent
5 = Data spanning
6 = Contact poll active/not enough buffer (Read PIU)
7 = Sense I/O indicator

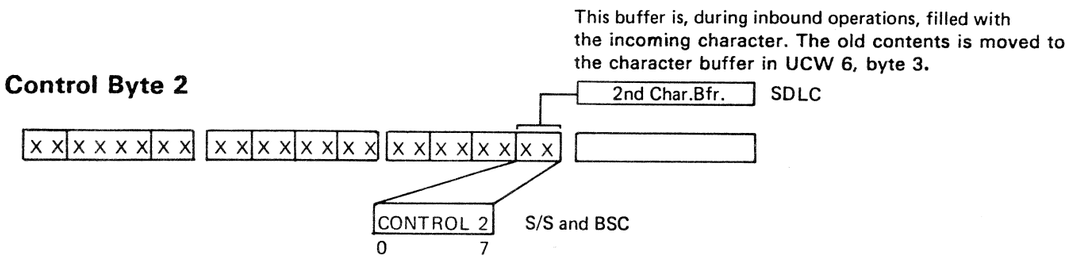
These bits are set by the microcode and are used to control the microcode operations.

Bit 4-7 contain additional mode information in case of DIAL, ENABLE and DISABLE (Mode 05, 06 and 07).

Bits 4567	DIAL	ENABLE	DISABLE
0000	Wait for hardware idling		
0001	Ending sequence	Wait for DCD	
0010	DSR-on sequence	Wait for RI	Wait before DISABLE starts
0100		Wait for DSR	Wait 25.4 ms for switched line
1000	PND-off sequence	50 ms additional for DSR	Wait 1 sec. before DISABLE terminates
1100	PND-on normal sequence		

EXTENDED TRACE DATA (continued)

Control Byte 2

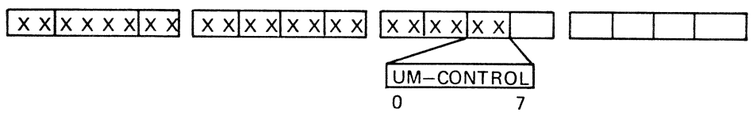


SS **BSC**

Character Indicator	= 0 =	Poll Remember/Address prepare initial SYNC remember
Monitor for CTS	= 1 =	ITB Remember
Write Initiate	= 2 =	SYN Remember
Line Quiet Initiate	= 3 =	DLE Remember
Line Quiet	= 4 =	Text Mode
Upshift	= 5 =	Transparent Mode
Text In	= 6 =	Timer Remember
Text Out	= 7 =	Read Command Active

These bits are set by the microcode and are used to control the microcode operations.

UCW Modem Control



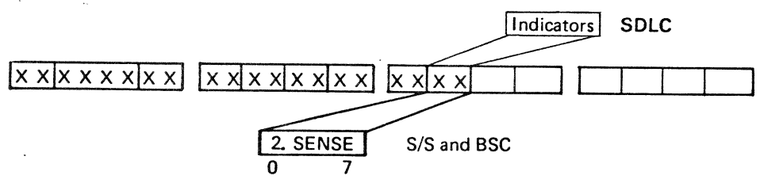
Bit assignment:

0 = Data Terminal Ready
1 = Request To Send
2 = Wrap
3 = Test
4 = Select Standby
5 = Select Half Speed
6 = New Sync
7 = DCE Interrupt Disable

These bits control the modem interface leads

Used for internal control

Second Sense Byte/SDLC Indicators



S/S and BSC

This byte holds an CA check code. Any bit on indicates an error.
For details refer to Unit Check Log Mapcharts.

SDLC

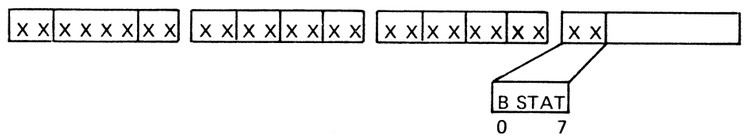
Bit assignment:

0 = Suppress DAX
1 = Data Rec./Transmit Remember
2 = Primary addr. mismatch
3 = Idle time out remember
4 = Lost data warning
5 = Unit check remember
6 = Skip remember/Autopoll active
7 = Not used

CA Tools

EXTENDED TRACE DATA (continued)

Basic Status



Bit assignment

0 - Input Request
1 - Output Request
2 - DCE Interrupt
3 - Timer Interrupt
4 - Exception bit on indicates an error
5 - Machine Check
6 - CCA Enabled
7 - Interrupt Request

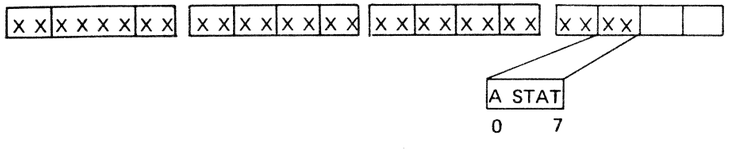
Bit 0-5 are set from the CCA hardware.
Bit 6 is controlled by the microcode.
Bit 7 is set if any bits 0-5 is set.
If the CCA is enabled (bit 6 on), bit 7 will set a trap code in the BA-status register.

This is one of the registers on the CCA card. It gives the microcode the information necessary to control the CCA card functions, together with the Adapter Status Register and Modem Status Register. The microcode reads this register in respond to a BA Status Trap to find the reason for the trap.

CA Tools

Extended Trace Data (continued)

Adapter Status



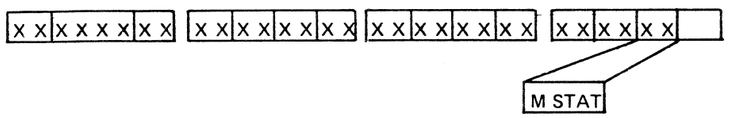
Bit assignment

- * 0 - Overrun ┐ bit on indicates error
- * 1 - Underrun ┘
  2 - Receive Clock Running (S/S)
- * 3 - Not used
- * 4 - Not used
- * 5 - Invalid Character - bit on indicates error
  7 - Adapter in Sync

* B - Stat bit 4 (Exception) is set

This is one of the registers on the CCA Card. All bits are set from the hardware. The Adapter Status, Basic Status and Modem Status Registers give the microcode the information about the CCA and the modem necessary to control the CCA functions.

Modem Status



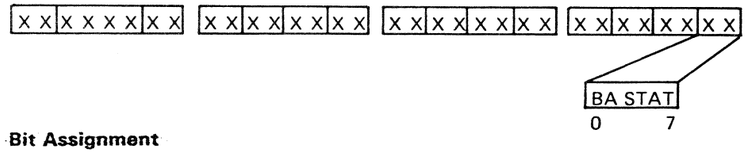
Bit Assignment

0 - Data Set Ready
1 - Clear to Send
2 - Carrier Detector
3 - Ring Indicator
* 4 - Data Set Ready Transitioned
5 - Not used
* 6 - Received Line Signal Detector Transitioned
* 7 - Clear to Send Transitioned

* B-Stat bit 2 (DCE interrupt) is set, a status change has occurred.

This is one of the registers on the CCA Card. All bits are set from the hardware. It holds information about the interface leads between the CCA Card and the Adapter Interface Card/Modem.
The Modem Status, Basic Status and Adapter Status can be sensed by the microcode which then obtain information necessary to control the CCA operation.

Bus Adapter Status



Bit Assignment

Bit
0 Check Trap, indicates error
1 ┐
2 ├ Trap code, normal traps
3 ┘
4 Not used
5 4 ┐
6 2 ├ Line addr.
7 1 ┘

This is a register on the CA-BA card. It gives information about the CA Bus Adapter to the microcode.

Bit Explanation

- Bit 0 - Check Trap - is set by the following error conditions:
  - Sense bus check
  - Common bus check
  - Processor bus parity check
  - Tag timeout

  When on, this bit generates a PU Trap Request.

- Bits 1,2,3 - Check Trap code
  001-TRD Trap - Set in respond to the TRD bit in the BA having been set by the microcode..
  010-IO Instruction Complete Trap - Set when an I/O instruction is completed.
  100-Normal Input Trap - Set by B-Stat bit 0 (Input request).
  101-Normal Output Trap - Set by B-Stat bit 1 (Output Request).
  110-B-Status Available Trap - Set by B-Stat bits 2-5.

- Bits 5,6,7 holds the address of the CCA (line address) which caused the trap.

  Address

  000 = 30
  001 = 31
  010 = 32
  011 = 33
  100 = 34
  101 = 35
  110 = 36
  111 = 37

CA Tools (continued)

- Bits 1, 2, 3 - Check Trap code
  - 001 - TRD Trap - Set in respond to the TRD bit in the BA having been set by the microcode.
  - 010 - IO Instruction Complete Trap - Set when an I/O instruction is completed.
  - 100 - Normal Input Trap - Set by B-Stat bit 0 (Input request)
  - 101 - Normal Output Trap - Set by B-Stat bit 1 (Output Request)
  - 110 - B-Status Available Trap - Set by B-Stat bits 2-5.

- Bits 5-7 holds the address of the CCA (line address) which caused the trap. Addr.

  000 = 30
  001 = 31
  010 = 32
  011 = 33
  100 = 34
  101 = 35
  110 = 36
  111 = 37

CA Customer Manual Operations (CMOs)

General

Customer Manual OPs have two functions:

- Temporary configuration change facility, which allows, temporary changing of some of the configuration parameters.
- Tributary station address(es) for BSC lines. This function is used to specify tributary station address(es) for each installed BSC line.

How to Select the CA - CMOs:

1. Press the MODE SELECT button. The mode selection picture will be displayed.
2. Enter 'E' for option 'communication lines and press ENTER.

   If at least one BSC line is installed, the CA-CMOs picture will be displayed showing the selection codes.

```
        *** CA - CUSTOMER MANUAL OPs ***
A  TEMPORARY CONFIGURATION CHANGE FACILITY
B  TRIBUTARY STATION ADDRESS(ES) FOR BSC LINES
                                        *** ENTER SELECTION ***

             370 TIMER:OFF        DATA:     ADDR:
             TOD:SEC
```

   If no BSC line is installed, the picture for the temporary configuration change facility will be displayed directly.

3. If the CA-CMOs picture is displayed, enter the desired function and press ENTER.

Temporary Configuration Change Facility

After selecting this facility, the changeable configuration parameters for the first ljne, line address 30, are displayed.

Updating of the displayed line address can now take place. See Updating.

If the line is not installed, a message is given, or if another line is to be updated, press PF4 key.

The next line is displayed.
Use the PF4 key until the desired line is displayed.

Updating

When the line address to be updated is displayed, make the necessary changes for this line.

1. Use the PF1 key to put the large arrow ===> in front of the parameter to be updated.
2. Use the PF2 key to put the small arrow => in front of the desired value.

   Repeat steps 1-2 until all the parameters have the desired values. Then go to step 3.

   If the small arrow is missing, the parameters is not relevant for this configuration.

3. Use the PF4 key to select the next line to be updated.

Repeat step 1-3 until all lines are updated.
Then go to step 4.

4. Do you want to save the updates?

   Yes: Go to step 5   No: Go to step 6

5. Hit ENTER.

   The configuration updates are now saved. The temporary configuration change facility is terminated.

6. Hit the PF3 key.

   The temporary configuration change facility is terminated.

CA Customer Manual OP S - CMO S

BSC

1. Data code - transmission code.

   This is the configuration byte 3, bit 1.
   Bit on : ASCII code
   Bit off: EBCDIC code

2. EIB mode

   This is configuration byte 0, bit 5.
   If specified, an error index byte is transferred to the program storage after each ITB, ETB and ETX character received.

3. Select standby

   This is configuration byte 1, bit 0.
   This bit can be used if the modem has a switched network backup capability. If this bit is set, the signal select standby will be on permanently, and the modem will use the switched network instead of the leased line.

4. Modem answer tone (Hz)

   This is configuration byte 3, bit 6.
   Bit on : 2025 Hz
   Bit off : 2100 Hz
   This bit must be on if the remote modem is a WE202 modem type. The bit is valid for integrated modems only.
   For other adapter types the default value - bit off 2100 Hz - is used.

5. Data signal rate select

   This is configuration byte 1, bit 1.
   Bit on : Half speed
   Bit off : Full speed
   Normally this bit is off - full speed.
   If the line is bad, it might help to select half speed - bit on.

SS

1. Unit exception suppress

   This is configuration byte 0, bit 2.
   Specifies that the unit exception bit in the unit status byte will not be set if an EOT character is received.
   This bit must be on to allow chaining if the remote terminal is a 2741.

2. Read interrupt

   This is configuration byte 0, bit 4.
   Specifies that the break command can be used on this line.
   The remote terminal must have the write interrupt capability and the line must have duplex facility.

3. Write interrupt

   This is configuration byte 0, bit 3.
   Indicates that the line adapter can recognize a break command (stop communication) from the remote terminal.
   The line must have duplex facility.

4. Select standby

   This is configuration byte 1, bit 0.
   This bit can be used if the modem has a switched network backup capability. If this bit is set, the signal select standby will be on permanently, and the modem will use the switched network instead of the leased line.

5. Modem answer tone (Hz)

   This is configuration byte 3, bit 6.
   Bit on : 2025 Hz
   Bit off : 2100 Hz
   This bit must be on if the remote modem is a WE202 modem type.
   The bit is valid for integrated modems only.
   For the other adapter types the default value (bit off 2100 Hz) is used.

SDLC

1. Select standby

   This is configuration byte 1, bit 0.
   This bit can be used if the modem has a switched network backup capability. If this bit is set, the signal select standby will be on permanently, and the modem will use the switched network instead of the leased line.

2. Data signal rate select

   This is configuration byte 1, bit 1.
   Bit on : Half speed
   Bit off : Full speed
   Normally this bit is off - full speed.
   If the line is bad, it might help to select half speed - bit on.

3. NRZI

   Configuration byte 3 bit 1
   Bit on = not NRZI
   Bit off = NRZI
   This bit is normally 'off' (NRZI)

4. Modem answer tone Hz

   This is configuration byte 3, bit 6.
   Bit on : 2025 Hz
   Bit off : 2100 Hz
   This bit must be on if the remote modem is a WE202 modem type. The bit is valid for integrated modems only.
   For other adapter types the default value (bit off 2100 Hz) is used.

CA Customer Manual Operations (CMOs)

Tributary Station Address(es) for BSC Lines

Only lines specified for BSC line control are displayed. Two tributary station addresses can be specified for each BSC line. The default values are '40bb'.

```
                *** TRIBUTARY STATION ADDRESS(ES) FOR BSC LINES ***

ENTER TRIBUTARY STATION ADDRESS(ES) IN HEX:

                                        LINE 30 ** XXXX **
                                        LINE 31 ** XXXX **
                                        LINE 32 ** XXXX **
                                        LINE 33 ** XXXX **
                                        LINE 34 ** XXXX **
                                        LINE 35 ** XXXX **
                                        LINE 36 ** XXXX **
                                        LINE 37 ** XXXX **


ENTER - ACTIVATE ADDRESS(ES)  /  PF3 - EXIT WITHOUT UPDATE
                                 370 TIMER:OFF          DATA:        ADDR:
                                 TOD:SEC
```

Any EBCDIC or ASCII character can be used to specify the address except the following:

SOH, STX, ETX, ETB, EOT, ENQ, DLE, NAK, SYN or ITB and characters with bit 2 on. The address specifying character is in hexadecimal notation.

Note: Bit 0 must be 'off' when line is specified for ASCII.

If the positions for the second address are left blank, the first address is used as the second address.

Updating

1. Enter the desired tributary station addresses for all required lines.

2. Press enter, 'UPDATE IN PROCESS' is displayed.

3. Upon completion of updating, 'UPDATE DONE' is displayed.
   The address updates are saved (diskette) and made available to the program. No IML is required.

4. Press PF3 key

   The tributary station address updating is terminated.

CA Configuration Chart Line Address: 30

HARDWARE

CONFIGURATION BYTE 2 AND 3 _____ LINE CONTROL PROCEDURE ( ) S/S ( ) BSC ( ) SDLC

CLOCKING	( ) MODEM	( ) BUSINESS MACHINE				
ADAPTER TYPE	( ) EIA	( ) V35	( ) LOCAL	( ) 38LS	( ) DDS	( ) X.21
LINK TYPE	( )SWITCHED	( ) LEASED	( ) LEASED SWITCHED BACKUP			
IF LEASED:	( ) 2 WIRE	( ) 4 WIRE				
LINE SPEED FOR BSC/SDLC	( ) BPS					

COMMON

LINE CONNECTION	( ) POINT TO POINT	( ) MULTIPOINT
DUPLEX	( ) HALF	( ) FULL
PERM REQUEST TO SEND	( ) YES	( ) NO
WRAP TEST SELECTION	( ) MODEM	( ) CA I/F
AUTO/MANUAL ANSWER	( ) AUTO	( ) MANUAL
SELECT STANDBY	( ) YES	( ) NO
MODEM ANSWER TONE (HZ)	( ) 2025	( ) 2100
AUTO CALL ADAPTER	( ) YES	( ) NO
IF YES: ACU INTERFACE	( ) 1	( ) 2

SYNCHRONOUS (COMMON)

NEW SYNC	( ) YES	( ) NO
DATA SIGNAL RATE SELECT	( ) LOW	( ) HIGH
HIGH SPEED OPERATION	( ) YES	( ) NO
MODEM PROCEDURE	( ) CDSTL	( ) DTR

SYNCHRONOUS (BSC)

EIB MODE	( ) YES	( ) NO
DATA CODE	( ) ASCII	( ) EBCDIC

SYNCHRONOUS (SDLC)

NRZI	( ) YES	( ) NO

ASYNCHRONOUS (S/S)

READ INTERRUPT	( ) YES	( ) NO				
WRITE INTERRUPT	( ) YES	( ) NO				
UNIT EXCEPT SUPPRESS	( ) YES	( ) NO				
DELAY SELECT (CHAR)	( ) 0	( ) 1	( ) 2			
LINE SPEED (BPS)	( ) 1200	( ) 600	( ) 300	( ) 134.5	( ) 110	( ) 75

REMOTE TERMINAL (S) INFORMATION

POLL ADDR	REMOTE SEL ADDR	TERM TYPE	REMOTE MODEM TYPE	LOCAL MODEM TYPE	CUSTOMER OFFICE PHONE NBR	REMOTE PHONE NBR (SWITCHED)	LOCAL PHONE NBR (SWITCHED)

CA Configuration Chart Line Address: 31

HARDWARE

CONFIGURATION BYTE 2 AND 3 _____ LINE CONTROL PROCEDURE ( ) S/S ( ) BSC ( ) SDLC

CLOCKING	( ) MODEM	( ) BUSINESS MACHINE				
ADAPTER TYPE	( ) EIA		( ) LOCAL	( ) 38LS	( ) DDS	( ) X.21
LINK TYPE	( )SWITCHED	( ) LEASED	( ) LEASED SWITCHED BACKUP			
IF LEASED:	( ) 2 WIRE	( ) 4 WIRE				
LINE SPEED FOR BSC/SDLC	( ) BPS					

COMMON

LINE CONNECTION	( ) POINT TO POINT	( ) MULTIPOINT
DUPLEX	( ) HALF	( ) FULL
PERM REQUEST TO SEND	( ) YES	( ) NO
WRAP TEST SELECTION	( ) MODEM	( ) CA I/F
AUTO/MANUAL ANSWER	( ) AUTO	( ) MANUAL
SELECT STANDBY	( ) YES	( ) NO
MODEM ANSWER TONE (HZ)	( ) 2025	( ) 2100
AUTO CALL ADAPTER	( ) YES	( ) NO
IF YES: ACU INTERFACE	( ) 1	( ) 2

SYNCHRONOUS (COMMON)

NEW SYNC	( ) YES	( ) NO
DATA SIGNAL RATE SELECT	( ) LOW	( ) HIGH
HIGH SPEED OPERATION	( ) YES	( ) NO
MODEM PROCEDURE	( ) CDSTL	( ) DTR

SYNCHRONOUS (BSC)

EIB MODE	( ) YES	( ) NO
DATA CODE	( ) ASCII	( ) EBCDIC

SYNCHRONOUS (SDLC)

NRZI	( ) YES	( ) NO

ASYNCHRONOUS (S/S)

READ INTERRUPT	( ) YES	( ) NO				
WRITE INTERRUPT	( ) YES	( ) NO				
UNIT EXCEPT SUPPRESS	( ) YES	( ) NO				
DELAY SELECT (CHAR)	( ) 0	( ) 1	( ) 2			
LINE SPEED (BPS)	( ) 1200	( ) 600	( ) 300	( ) 134.5	( ) 110	( ) 75

REMOTE TERMINAL (S) INFORMATION

POLL ADDR	REMOTE SEL ADDR	TERM TYPE	REMOTE MODEM TYPE	LOCAL MODEM TYPE	CUSTOMER OFFICE PHONE NBR	REMOTE PHONE NBR (SWITCHED)	LOCAL PHONE NBR (SWITCHED)

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CA Configuration Chart Line Address: 32

HARDWARE

CONFIGURATION BYTE 2 AND 3 _____ LINE CONTROL PROCEDURE ( ) S/S ( ) BSC ( ) SDLC

CLOCKING	( ) MODEM	( ) BUSINESS MACHINE				
ADAPTER TYPE	( ) EIA		( ) LOCAL	( ) 38LS	( ) DDS	( ) X.21
LINK TYPE	( )SWITCHED	( ) LEASED	( ) LEASED SWITCHED BACKUP			
IF LEASED:	( ) 2 WIRE	( ) 4 WIRE				
LINE SPEED FOR BSC/SDLC	( ) BPS					

COMMON

LINE CONNECTION	( ) POINT TO POINT	( ) MULTIPOINT
DUPLEX	( ) HALF	( ) FULL
PERM REQUEST TO SEND	( ) YES	( ) NO
WRAP TEST SELECTION	( ) MODEM	( ) CA I/F
AUTO/MANUAL ANSWER	( ) AUTO	( ) MANUAL
SELECT STANDBY	( ) YES	( ) NO
MODEM ANSWER TONE (HZ)	( ) 2025	( ) 2100
AUTO CALL ADAPTER	( ) YES	( ) NO
IF YES: ACU INTERFACE	( ) 1	( ) 2

SYNCHRONOUS (COMMON)

NEW SYNC	( ) YES	( ) NO
DATA SIGNAL RATE SELECT	( ) LOW	( ) HIGH
HIGH SPEED OPERATION	( ) YES	( ) NO
MODEM PROCEDURE	( ) CDSTL	( ) DTR

SYNCHRONOUS (BSC)

EIB MODE	( ) YES	( ) NO
DATA CODE	( ) ASCII	( ) EBCDIC

SYNCHRONOUS (SDLC)

NRZI	( ) YES	( ) NO

ASYNCHRONOUS (S/S)

READ INTERRUPT	( ) YES	( ) NO				
WRITE INTERRUPT	( ) YES	( ) NO				
UNIT EXCEPT SUPPRESS	( ) YES	( ) NO				
DELAY SELECT (CHAR)	( ) 0	( ) 1	( ) 2			
LINE SPEED (BPS)	( ) 1200	( ) 600	( ) 300	( ) 134.5	( ) 110	( ) 75

REMOTE TERMINAL (S) INFORMATION

POLL ADDR	REMOTE SEL ADDR	TERM TYPE	REMOTE MODEM TYPE	LOCAL MODEM TYPE	CUSTOMER OFFICE PHONE NBR	REMOTE PHONE NBR (SWITCHED)	LOCAL PHONE NBR (SWITCHED)

CA Configuration Chart Line Address: 33

HARDWARE

CONFIGURATION BYTE 2 AND 3 _____ LINE CONTROL PROCEDURE ( ) S/S ( ) BSC ( ) SDLC

CLOCKING	( ) MODEM	( ) BUSINESS MACHINE				
ADAPTER TYPE	( ) EIA		( ) LOCAL	( ) 38LS	( ) DDS	( ) X.21
LINK TYPE	( )SWITCHED	( ) LEASED	( ) LEASED SWITCHED BACKUP			
IF LEASED:	( ) 2 WIRE	( ) 4 WIRE				
LINE SPEED FOR BSC/SDLC	( ) BPS					

COMMON

LINE CONNECTION	( ) POINT TO POINT	( ) MULTIPOINT
DUPLEX	( ) HALF	( ) FULL
PERM REQUEST TO SEND	( ) YES	( ) NO
WRAP TEST SELECTION	( ) MODEM	( ) CA I/F
AUTO/MANUAL ANSWER	( ) AUTO	( ) MANUAL
SELECT STANDBY	( ) YES	( ) NO
MODEM ANSWER TONE (HZ)	( ) 2025	( ) 2100
AUTO CALL ADAPTER	( ) YES	( ) NO
IF YES: ACU INTERFACE	( ) 1	( ) 2

SYNCHRONOUS (COMMON)

NEW SYNC	( ) YES	( ) NO
DATA SIGNAL RATE SELECT	( ) LOW	( ) HIGH
HIGH SPEED OPERATION	( ) YES	( ) NO
MODEM PROCEDURE	( ) CDSTL	( ) DTR

SYNCHRONOUS (BSC)

EIB MODE	( ) YES	( ) NO
DATA CODE	( ) ASCII	( ) EBCDIC

SYNCHRONOUS (SDLC)

NRZI	( ) YES	( ) NO

ASYNCHRONOUS (S/S)

READ INTERRUPT	( ) YES	( ) NO				
WRITE INTERRUPT	( ) YES	( ) NO				
UNIT EXCEPT SUPPRESS	( ) YES	( ) NO				
DELAY SELECT (CHAR)	( ) 0	( ) 1	( ) 2			
LINE SPEED (BPS)	( ) 1200	( ) 600	( ) 300	( ) 134.5	( ) 110	( ) 75

REMOTE TERMINAL (S) INFORMATION

POLL ADDR	REMOTE SEL ADDR	TERM TYPE	REMOTE MODEM TYPE	LOCAL MODEM TYPE	CUSTOMER OFFICE PHONE NBR	REMOTE PHONE NBR (SWITCHED)	LOCAL PHONE NBR (SWITCHED)

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CA Configuration Chart Line Address: 34

HARDWARE

CONFIGURATION BYTE 2 AND 3 _____ LINE CONTROL PROCEDURE ( ) S/S ( ) BSC ( ) SDLC

CLOCKING	( ) MODEM	( ) BUSINESS MACHINE				
ADAPTER TYPE	( ) EIA		( ) LOCAL	( ) 38LS	( ) DDS	( ) X.21
LINK TYPE	( )SWITCHED	( ) LEASED	( ) LEASED SWITCHED BACKUP			
IF LEASED:	( ) 2 WIRE	( ) 4 WIRE				
LINE SPEED FOR BSC/SDLC	( ) BPS					

COMMON

LINE CONNECTION	( ) POINT TO POINT	( ) MULTIPOINT
DUPLEX	( ) HALF	( ) FULL
PERM REQUEST TO SEND	( ) YES	( ) NO
WRAP TEST SELECTION	( ) MODEM	( ) CA I/F
AUTO/MANUAL ANSWER	( ) AUTO	( ) MANUAL
SELECT STANDBY	( ) YES	( ) NO
MODEM ANSWER TONE (HZ)	( ) 2025	( ) 2100
AUTO CALL ADAPTER	( ) YES	( ) NO
IF YES: ACU INTERFACE	( ) 1	( ) 2

SYNCHRONOUS (COMMON)

NEW SYNC	( ) YES	( ) NO
DATA SIGNAL RATE SELECT	( ) LOW	( ) HIGH
HIGH SPEED OPERATION	( ) YES	( ) NO
MODEM PROCEDURE	( ) CDSTL	( ) DTR

SYNCHRONOUS (BSC)

EIB MODE	( ) YES	( ) NO
DATA CODE	( ) ASCII	( ) EBCDIC

SYNCHRONOUS (SDLC)

NRZI	( ) YES	( ) NO

ASYNCHRONOUS (S/S)

READ INTERRUPT	( ) YES	( ) NO				
WRITE INTERRUPT	( ) YES	( ) NO				
UNIT EXCEPT SUPPRESS	( ) YES	( ) NO				
DELAY SELECT (CHAR)	( ) 0	( ) 1	( ) 2			
LINE SPEED (BPS)	( ) 1200	( ) 600	( ) 300	( ) 134.5	( ) 110	( ) 75

REMOTE TERMINAL (S) INFORMATION

POLL ADDR	REMOTE SEL ADDR	TERM TYPE	REMOTE MODEM TYPE	LOCAL MODEM TYPE	CUSTOMER OFFICE PHONE NBR	REMOTE PHONE NBR (SWITCHED)	LOCAL PHONE NBR (SWITCHED)

CA Configuration Chart Line Address: 35

HARDWARE

CONFIGURATION BYTE 2 AND 3 _____ LINE CONTROL PROCEDURE ( ) S/S ( ) BSC ( ) SDLC

CLOCKING	( ) MODEM	( ) BUSINESS MACHINE				
ADAPTER TYPE	( ) EIA		( ) LOCAL	( ) 38LS	( ) DDS	( ) X.21
LINK TYPE	( )SWITCHED	( ) LEASED	( ) LEASED SWITCHED BACKUP			
IF LEASED:	( ) 2 WIRE	( ) 4 WIRE				
LINE SPEED FOR BSC/SDLC	( ) BPS					

COMMON

LINE CONNECTION	( ) POINT TO POINT	( ) MULTIPOINT
DUPLEX	( ) HALF	( ) FULL
PERM REQUEST TO SEND	( ) YES	( ) NO
WRAP TEST SELECTION	( ) MODEM	( ) CA I/F
AUTO/MANUAL ANSWER	( ) AUTO	( ) MANUAL
SELECT STANDBY	( ) YES	( ) NO
MODEM ANSWER TONE (HZ)	( ) 2025	( ) 2100
AUTO CALL ADAPTER	( ) YES	( ) NO
IF YES: ACU INTERFACE	( ) 1	( ) 2

SYNCHRONOUS (COMMON)

NEW SYNC	( ) YES	( ) NO
DATA SIGNAL RATE SELECT	( ) LOW	( ) HIGH
HIGH SPEED OPERATION	( ) YES	( ) NO
MODEM PROCEDURE	( ) CDSTL	( ) DTR

SYNCHRONOUS (BSC)

EIB MODE	( ) YES	( ) NO
DATA CODE	( ) ASCII	( ) EBCDIC

SYNCHRONOUS (SDLC)

NRZI	( ) YES	( ) NO

ASYNCHRONOUS (S/S)

READ INTERRUPT	( ) YES	( ) NO				
WRITE INTERRUPT	( ) YES	( ) NO				
UNIT EXCEPT SUPPRESS	( ) YES	( ) NO				
DELAY SELECT (CHAR)	( ) 0	( ) 1	( ) 2			
LINE SPEED (BPS)	( ) 1200	( ) 600	( ) 300	( ) 134.5	( ) 110	( ) 75

REMOTE TERMINAL (S) INFORMATION

POLL ADDR	REMOTE SEL ADDR	TERM TYPE	REMOTE MODEM TYPE	LOCAL MODEM TYPE	CUSTOMER OFFICE PHONE NBR	REMOTE PHONE NBR (SWITCHED)	LOCAL PHONE NBR (SWITCHED)

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CA Configuration Chart Line Address: 36

HARDWARE

CONFIGURATION BYTE 2 AND 3 _____ LINE CONTROL PROCEDURE ( ) S/S ( ) BSC ( ) SDLC

CLOCKING	( ) MODEM	( ) BUSINESS MACHINE				
ADAPTER TYPE	( ) EIA		( ) LOCAL	( ) 38LS	( ) DDS	( ) X.21
LINK TYPE	( )SWITCHED	( ) LEASED	( ) LEASED SWITCHED BACKUP			
IF LEASED:	( ) 2 WIRE	( ) 4 WIRE				
LINE SPEED FOR BSC/SDLC	( ) BPS					

COMMON

LINE CONNECTION	( ) POINT TO POINT	( ) MULTIPOINT
DUPLEX	( ) HALF	( ) FULL
PERM REQUEST TO SEND	( ) YES	( ) NO
WRAP TEST SELECTION	( ) MODEM	( ) CA I/F
AUTO/MANUAL ANSWER	( ) AUTO	( ) MANUAL
SELECT STANDBY	( ) YES	( ) NO
MODEM ANSWER TONE (HZ)	( ) 2025	( ) 2100
AUTO CALL ADAPTER	( ) YES	( ) NO
IF YES: ACU INTERFACE	( ) 1	( ) 2

SYNCHRONOUS (COMMON)

NEW SYNC	( ) YES	( ) NO
DATA SIGNAL RATE SELECT	( ) LOW	( ) HIGH
HIGH SPEED OPERATION	( ) YES	( ) NO
MODEM PROCEDURE	( ) CDSTL	( ) DTR

SYNCHRONOUS (BSC)

EIB MODE	( ) YES	( ) NO
DATA CODE	( ) ASCII	( ) EBCDIC

SYNCHRONOUS (SDLC)

NRZI	( ) YES	( ) NO

ASYNCHRONOUS (S/S)

READ INTERRUPT	( ) YES	( ) NO				
WRITE INTERRUPT	( ) YES	( ) NO				
UNIT EXCEPT SUPPRESS	( ) YES	( ) NO				
DELAY SELECT (CHAR)	( ) 0	( ) 1	( ) 2			
LINE SPEED (BPS)	( ) 1200	( ) 600	( ) 300	( ) 134.5	( ) 110	( ) 75

REMOTE TERMINAL (S) INFORMATION

POLL ADDR	REMOTE SEL ADDR	TERM TYPE	REMOTE MODEM TYPE	LOCAL MODEM TYPE	CUSTOMER OFFICE PHONE NBR	REMOTE PHONE NBR (SWITCHED)	LOCAL PHONE NBR (SWITCHED)

CA Configuration Chart Line Address: 37

HARDWARE

CONFIGURATION BYTE 2 AND 3 _____ LINE CONTROL PROCEDURE ( ) S/S ( ) BSC ( ) SDLC

CLOCKING	( ) MODEM	( ) BUSINESS MACHINE				
ADAPTER TYPE	( ) EIA		( ) LOCAL	( ) 38LS	( ) DDS	( ) X.21
LINK TYPE	( )SWITCHED	( ) LEASED	( ) LEASED SWITCHED BACKUP			
IF LEASED:	( ) 2 WIRE	( ) 4 WIRE				
LINE SPEED FOR BSC/SDLC	( ) BPS					

COMMON

LINE CONNECTION	( ) POINT TO POINT	( ) MULTIPOINT
DUPLEX	( ) HALF	( ) FULL
PERM REQUEST TO SEND	( ) YES	( ) NO
WRAP TEST SELECTION	( ) MODEM	( ) CA I/F
AUTO/MANUAL ANSWER	( ) AUTO	( ) MANUAL
SELECT STANDBY	( ) YES	( ) NO
MODEM ANSWER TONE (HZ)	( ) 2025	( ) 2100
AUTO CALL ADAPTER	( ) YES	( ) NO
IF YES: ACU INTERFACE	( ) 1	( ) 2

SYNCHRONOUS (COMMON)

NEW SYNC	( ) YES	( ) NO
DATA SIGNAL RATE SELECT	( ) LOW	( ) HIGH
HIGH SPEED OPERATION	( ) YES	( ) NO
MODEM PROCEDURE	( ) CDSTL	( ) DTR

SYNCHRONOUS (BSC)

EIB MODE	( ) YES	( ) NO
DATA CODE	( ) ASCII	( ) EBCDIC

SYNCHRONOUS (SDLC)

NRZI	( ) YES	( ) NO

ASYNCHRONOUS (S/S)

READ INTERRUPT	( ) YES	( ) NO				
WRITE INTERRUPT	( ) YES	( ) NO				
UNIT EXCEPT SUPPRESS	( ) YES	( ) NO				
DELAY SELECT (CHAR)	( ) 0	( ) 1	( ) 2			
LINE SPEED (BPS)	( ) 1200	( ) 600	( ) 300	( ) 134.5	( ) 110	( ) 75

REMOTE TERMINAL (S) INFORMATION

POLL ADDR	REMOTE SEL ADDR	TERM TYPE	REMOTE MODEM TYPE	LOCAL MODEM TYPE	CUSTOMER OFFICE PHONE NBR	REMOTE PHONE NBR (SWITCHED)	LOCAL PHONE NBR (SWITCHED)

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Factory Wiring for CA

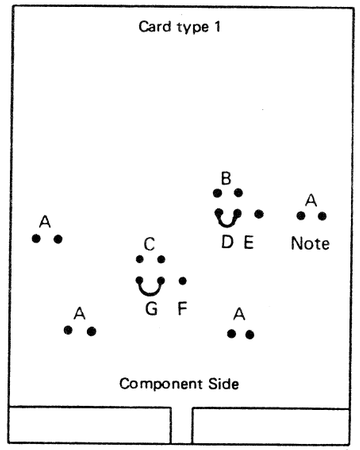
Board 1A - C2 wiring (CCA with clock)

Lines 1 - 8

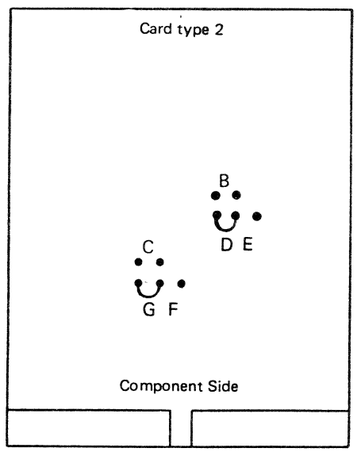
S/S	BSC	SDLC
134,5 BPS	1200 BPS	1200 BPS

For jumper locations see pages
PA 360 in Binder A01

Auto Call Adapter (ACA) Interface



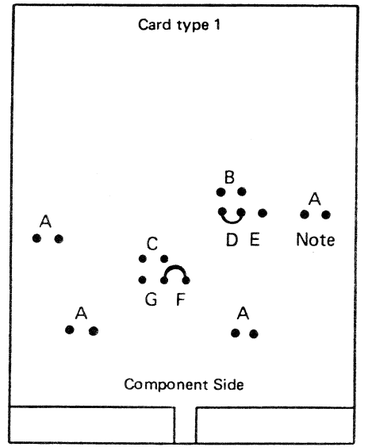
Voltage: See Note
Card Wrap
DCE Clocking



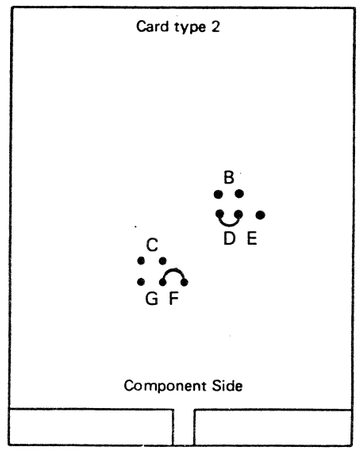
Voltage: Automatic Adaptation
Card Wrap
DCE Clocking

Note: If four or more lines are installed or if A1 board is installed, than jumper A is installed

EIA Interface



Voltage: See Note
Card Wrap
DCE Clocking



Voltage: Automatic Adaptation
Card Wrap (16U - 14U)
DCE Clocking (21U - 23U)

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If you wish a reply, give your name and mailing address:

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Document Title: _____ P/N: _____

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