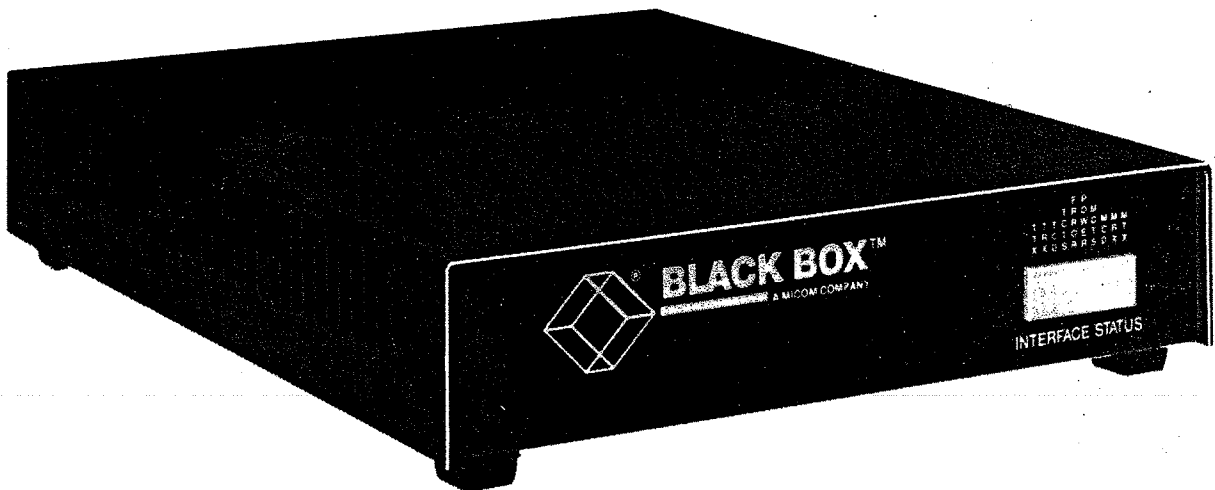


BSC/SDLC PROTOCOL CONVERTER (BSC/SDLC)



- **CONNECTS BISYNC IBM® 2780/3780 TERMINALS TO SDLC SYSTEM** (Host) *work station*

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This equipment generates, uses and can radiate radio frequency energy and if not installed and used properly, that is in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

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1.0 General Information

The BSC/SDLC is an SNA protocol converter capable of a wide variety of conversions and adaptation tasks. Listed below are just a few of the tasks the BSC/SDLC performs:

- * Bit oriented protocol, SDLC
- * Byte oriented protocol, BISYNC
- * Serial Data Transfer and Conversion
- * Emulation of BISYNC 2780/3780 devices
- * Speed conversions
- * Protocol conversions
- * Character conversions
- * Communication conversions

The BSC/SDLC is a two port 3776 or 3777 ^{look}~~work~~-alike work station with one LUI console, printer, card reader, card punch or disk. This allows an IBM 2780/3780 Bisync terminal or emulator to communicate over a SNA/SDLC link. For purposes of simplicity, this manual refers to Bisync 2780/3780 terminals and emulators with the generic acronym of VDU (Visual Display Unit).

Either port may be configured as data terminal equipment (DTE) or data communications equipment (DCE). This gives the system designer great flexibility in determining what type devices he will use and where the BSC/SDLC can be installed.

Most of BSC/SDLC's operating parameters (address, baud rate and operating options) may be changed by the use of switches on the bottom of the unit. Once programmed, the BSC/SDLC retains it's settings in non-volatile memory until changed by the user.

2.0 Specifications

Standard and nonstandard baud rates: 800, 1200, 1800, 2200,
2400, 4800, 9600, 19.2K

Physical Dimensions: 1 1/2" Height X 6 1/2" Width X 8 1/4"
Length

Weight: 3 pounds (including frame & cover)

Indicators: Power
Terminal Transmit Data
Terminal Receive Data
Terminal Carrier Detect
Terminal Clear-to-Send
Modem Transmit Data
Modem Receive Data
Modem Carrier Detect
Modem Clear-To-Send
Error

Environmental: Operating temperature 0 to 50 degrees C
Storage temperature -25 to 70 degrees C

Humidity: Up to 95% relative humidity without condensation

Power: 99-130 VAC or 200-230 VAC with a special order
transformer 50 or 60 Hz, 5% tolerance
less than 10 watts of power consumption

Connectors: All ports DB25s (25 pin female)

CAUTION

This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user, at his own expense, will be required to take the necessary measures to correct the interference.

3.0 Installation

3.1 General Installation

The BSC/SDLC options are set by the operator through the use of switches. The BSC/SDLC provides a very flexible package of options so as to work with any terminal or terminal emulating device (such as a personal computer). Due to the great numbers of options provided, it may take a little time to set up the BSC/SDLC unit, however once complete, the options need not be set up again. All options are battery protected for when the unit is turned off.

The BSC/SDLC unit is designed to ease installation as much as possible in today's complex world of data communications. Instead of jumpers, straps and switches located inside of the unit, the BSC/SDLC uses external switches to set up the unit.

The BSC/SDLC is shipped from the factory ready to run with no changes if a DTE device (Bisync 2780/3780 terminal) is attached to the BSC/SDLC's terminal port and the BSC/SDLC's modem port is connected to a synchronous modem for SNA/SDLC. If this is not your application, only a few switches need be changed. Refer to Section 4.0 for switch settings of other devices.

To install BSC/SDLC:

1. Connect cables to devices
2. Set Switch bank 8 for the PU address. Section 7.5
3. Plug in BSC/SDLC unit

If the BSC/SDLC doesn't answer to the attached SNA host computer refer to Section 11.

3.2 Modem Interface Options

The modem port can be configured for several types of hardware communications. The BSC/SDLC is shipped with the options set for the RS232C EIA standard. The modem port can be configured for NRZI for some IBM installations by setting the switch on the rear of the BSC/SDLC unit to the NRZI position.

3.3 Synchronizer Option

The BSC/SDLC can run SDLC over asynchronous modems, therefore providing a low cost dial up system. This is possible by the use of a hardware synchronizer circuit that derives clocks from the data. To use this feature, set the modem port switches as listed in Section 4.0 for an Asynchronous Modem.

4.0 Switches

The BSC/SDLC is equipped with 8 banks of dip switches, all of which are accessed from the bottom of the unit. The general functions of these switches are as follows:

Terminal Interface Configuration	SW2, SW3, SW6
Terminal Speed	SW6
Modem Interface Configuration	SW4, SW5, SW7
Modem Speed	SW7
Changing Operating Options	SW9
PU Address (Customer Options)	SW8

4.1 Terminal Switches

The terminal port switches for Female DB-25 Terminal Connector are as follows:

Switch Bank S2, Switch:

- 1-On connects pin 4 of connector to BSC/SDLC's input of CLEAR-TO-SEND
- 2-On connects pin 5 of connector to BSC/SDLC's input of CLEAR-TO-SEND, for attaching DCE device
- 3-On connects pin 11 of connector BSC/SDLC's input of CLEAR-TO-SEND, for devices with busy on pin 11
- 4-On connects pin 19 of connector to BSC/SDLC's input of CLEAR-TO-SEND, for devices with busy on pin 19
- 5-On connects pin 20 of connector to BSC/SDLC's input of CLEAR-TO-SEND, for devices with busy on pin 20
- 6-On connects pin 6 of connector to BSC/SDLC's input of CARRIER DETECT
- 7-On connects pin 8 of connector to BSC/SDLC's input of CARRIER DETECT
- 8-On connects pin 15 of connector to BSC/SDLC's input of TRANSMIT CLOCK for Synchronous operation

Bisync
~~Async~~
DTE
or
DCE

Switch Bank S3, Switch:

- 1-On connects pin 2 of connector to BSC/SDLC's output of Transmit Data, for attaching DCE devices
- 2-On connects pin 3 of connector to BSC/SDLC's output of Transmit Data, for attaching DTE devices
- 3-On connects pin 2 of connector to BSC/SDLC's input of Receive Data, for attaching DTE devices
- 4-On connects pin 3 of connector to BSC/SDLC's input of Receive Data, for attaching DCE devices
- 5-On connects pin 4 of connector to BSC/SDLC's output of REQUEST-TO-SEND, for attaching DCE devices
- 6-On connects pin 5 of connector to BSC/SDLC's output of REQUEST-TO-SEND
- 7-On connects BSC/SDLC's REQUEST-TO-SEND to BSC/SDLC's CLEAR-TO-SEND so that no external signals are needed. Used for Burroughs TDI and non-hardware throttle devices
- 8-On connects pins 4 and 5 of connector so external devices throttle itself

Switch Bank S6, Switch:

- 1-On supplies internal clocking for BSC/SDLC's input of Transmit Clock
- 2-On connects pin 17 of connector to BSC/SDLC's input of Receive Clock, for synchronous operation
- 3-On supplies internal clocking for BSC/SDLC's input of Receive Clock
- 4-On connects pin 20 of connector to BSC/SDLC's output of DATA-TERMINAL-READY, for attaching DCE devices
- 5-On connects pin 20 of connector to BSC/SDLC's input of CARRIER DETECT
- 6-For modem port, see Section 4.4
- 7, 8, 9 and 10 - Set up terminal baud rate, only if Bisync device is directly connected and BSC/SDLC must supply clocks on pins 15 and 17.

7	8	9	10	BAUD RATE
ON	ON	ON	ON	800
ON	ON	ON	OFF	1200
ON	ON	OFF	ON	1800
ON	ON	OFF	OFF	2200
ON	OFF	ON	ON	2400
ON	OFF	ON	OFF	4800
ON	OFF	OFF	ON	9600
ON	OFF	OFF	OFF	19.2K

4.2 How to Set Terminal Port Switches for Different Devices

DEVICES

SYNC MODEM

Switch 2

1 OFF
2 ON
3 OFF
4 OFF
5 OFF
6 ON
7 OFF
8 ON

Switch 3

1 ON
2 OFF
3 OFF
4 ON
5 ON
6 OFF
7 OFF
8 OFF

Switch 6

1 OFF
2 ON
3 OFF
4 ON
5 OFF
6 OFF

Switch 9

9 OFF
10 OFF

DIRECT

Switch 2

1 OFF
2 OFF
3 OFF
4 OFF
5 ON
6 ON
7 ON
8 ON

Switch 3

1 OFF
2 ON
3 ON
4 OFF
5 OFF
6 OFF
7 OFF
8 ON

Switch 6

1 ON
2 ON
3 ON
4 OFF
5 ON
6 OFF

Switch 9

9 OFF
10 OFF

4.3 Modem Switches

Modem port switches for Female DB-25 Modem Connector

Switch Bank S4, Switch:

- 1-On connects pin 4 of connector to BSC/SDLC's input of CLEAR-TO-SEND
- 2-On connects pin 5 of connector to BSC/SDLC's input of CLEAR-TO-SEND, for attaching DCE devices
- 3-On connects pins 25 on both terminal and modem connectors to +5 volts DC.
- 4-On connects pin 19 of connector to BSC/SDLC's input of CLEAR-TO-SEND, for devices with busy on pin 19
- 5-On connects pin 20 of the connector to BSC/SDLC's input of CLEAR-TO-SEND, for devices with busy on pin 20
- 6-On connects pin 6 of connector to BSC/SDLC's input of CARRIER DETECT
- 7-On connects pin 8 of connector to BSC/SDLC's input of CARRIER DETECT
- 8-On connects pin 15 of connector to BSC/SDLC's input of Transmit Clock for synchronous operation

Switch Bank S5, Switch:

- 1-On connects pin 2 of connector to BSC/SDLC's output of Transmit Data, for attaching DCE devices
- 2-On connects pin 3 of connector to BSC/SDLC's output of Transmit Data, for attaching DTE devices
- 3-On connects pin 2 of connector to BSC/SDLC's input of Receive Data, for attaching DTE devices
- 4-On connects pin 3 of connector to BSC/SDLC's input of Receive Data, for attaching DCE devices
- 5-On connects pin 4 of connector to BSC/SDLC's output of REQUEST-TO-SEND, for attaching DCE devices
- 6-On connects pin 5 of connector to BSC/SDLC's output of REQUEST-TO-SEND
- 7-On connects BSC/SDLC's REQUEST-TO-SEND to BSC/SDLC's CLEAR-TO-SEND so that no external signals are needed. Used for Burroughs TDI and non-hardware throttle devices
- 8-On connects pins 4 and 5 of connector so external devices throttle itself

Switch Bank S7, Switch:

- 1-On supplies internal clocking for BSC/SDLC's input of Transmit Clock
- 2-On connects pin 17 of connector to BSC/SDLC's input of Receive Clock, for synchronous operation
- 3-On supplies internal clocking for BSC/SDLC's input of Receive Clock
- 4-On connects pin 20 of connector to BSC/SDLC's output of DATA-TERMINAL-READY, for attaching DCE devices
- 5-On connects pin 20 of connector to BSC/SDLC's input of CARRIER DETECT
- 6-On supplies 1X clock for internal modem port use
- 7, 8, 9 and 10 - set up modem port baud rate only if the SDLC device is directly connected and the BSC/SDLC is providing the clock.

7	8	9	10	BAUD RATE
ON	ON	ON	ON	800
ON	ON	ON	OFF	1200
ON	ON	OFF	ON	1800
ON	ON	OFF	OFF	2200
ON	OFF	ON	ON	2400
ON	OFF	ON	OFF	4800
ON	OFF	OFF	ON	9600
ON	OFF	OFF	OFF	19.2K

Switch Bank S6, Switch:

- 6-On supplies 16X clock for internal modem port use, for synchronization of synchronous data over async modems

4.4 How to Set Modem Port Switches for Different Devices

DEVICES

ASYNCR MODEM

Switch 4

- 1 OFF
- 2 ON
- 3 OFF
- 4 OFF
- 5 OFF
- 6 ON
- 7 OFF
- 8 OFF

Switch 5

- 1 ON
- 2 OFF
- 3 OFF
- 4 ON
- 5 ON
- 6 OFF
- 7 OFF
- 8 OFF

Switch 6

- 6 ON

Switch 7

- 1 ON
- 2 OFF
- 3 ON
- 4 ON
- 5 OFF
- 6 OFF

Switch 9

- 9 OFF
- 10 OFF

SYNC MODEM

Switch 4

- 1 OFF
- 2 ON
- 3 OFF
- 4 OFF
- 5 OFF
- 6 ON
- 7 OFF
- 8 ON

Switch 5

- 1 ON
- 2 OFF
- 3 OFF
- 4 ON
- 5 ON
- 6 OFF
- 7 OFF
- 8 OFF

Switch 6

- 6 OFF

Switch 7

- 1 OFF
- 2 ON
- 3 OFF
- 4 ON
- 5 OFF
- 6 OFF

Switch 9

- 9 OFF
- 10 OFF

FRONT END PROCESSOR

Switch 4

- 1 OFF
- 2 OFF
- 3 OFF
- 4 OFF
- 5 ON
- 6 ON
- 7 ON
- 8 ON

Switch 5

- 1 OFF
- 2 ON
- 3 ON
- 4 OFF
- 5 OFF
- 6 OFF
- 7 OFF
- 8 ON

Switch 6

- 6 OFF

Switch 7

- 1 ON
- 2 ON
- 3 ON
- 4 OFF
- 5 ON
- 6 ON

Switch 9

- 9 OFF
- 10 OFF

4.5 Option Switches

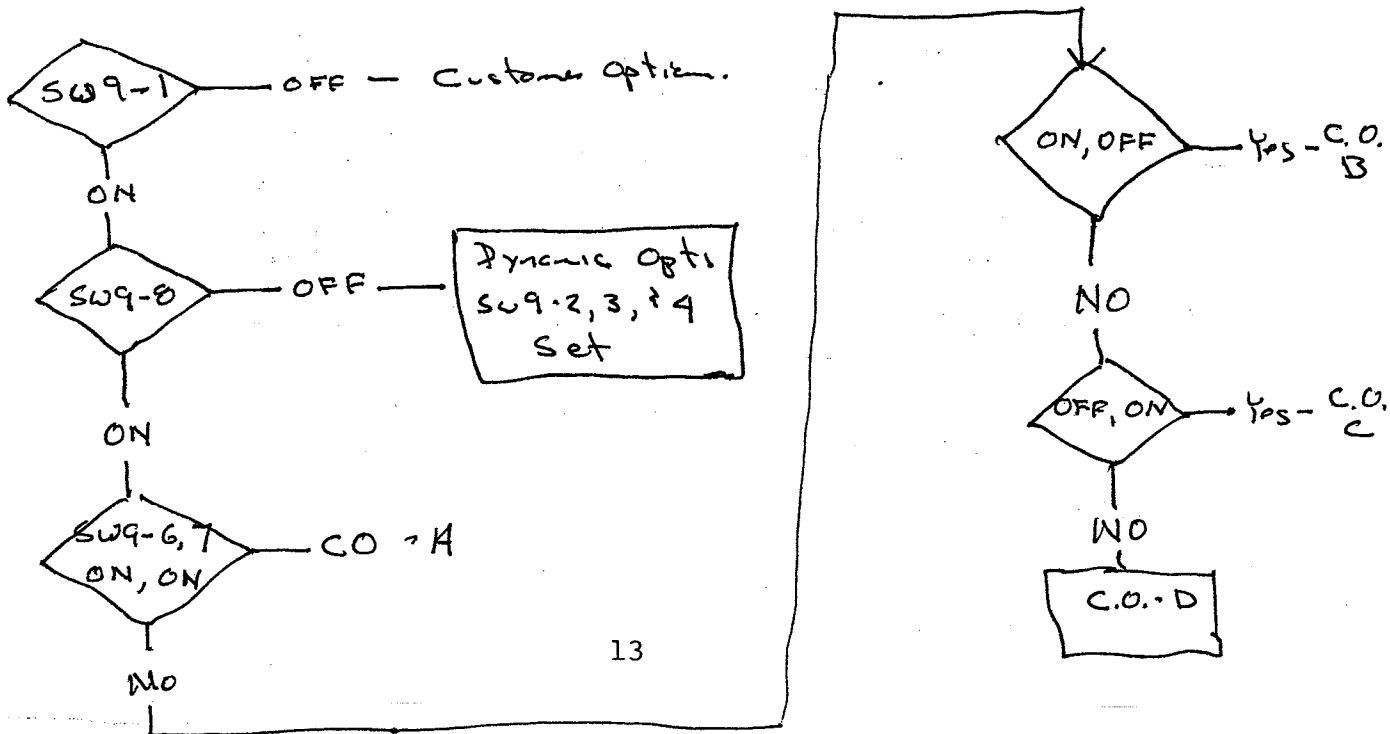
Switch Bank S8, Switch:

- 1-Most Significant Bit
- 2-
- 3-Physical Unit (PU) Address
- 4-
- 5- OFF = 1 page 23
- 6- ON = 0
- 7-
- 8-Least Significant Bit
- 9-On connects pins 9 on both terminal and modem connectors to +10 Volts DC.
- 10-On connects pins 10 on both terminal and modem connectors to -10 Volts DC.

Switch Bank S9, Switch:

Switch Number	Function	Switch ON	Set OFF
1	Select Option	ENABLE	DISABLE*
2	Answer Phone if no LU active	*YES	NO
3	Handle Bisync data if no LU active	YES	NO*
4	Handle Bisync data if no LU-LU session	*YES	NO
5	3780 Bisync Emulation	*YES	NO
6	Used with switch 7 to select Customer Option group	*	
7		*	
8	Set Customer Option	YES	NO*
9	TDI Transmit	ENABLE	DISABLE*
10	TDI Receive	ENABLE	DISABLE*

* = Factory Setting



5.0 LED Indicators

The front of BSC/SDLC enclosure provides 10 light emitting diodes (LED) indicators. The indicators are arranged and labeled in the following order, from left to right.

TTX	Terminal Transmit Data
TRX	Terminal Receive Data
TCD	Terminal Carrier Detect
TCTS	Terminal Clear To Send
ERROR	Error Condition
POWER	Power On
MCTS	Modem Clear to Send
MCD	Modem Carrier Detect
MRX	Modem Receive Data
MTX	Modem Transmit Data

TTX	Flashes as data is transmitted by the BSC/SDLC out the terminal port.
TRX	Flashes as data is received by the BSC/SDLC from the terminal port.
TCD	Lights when the BSC/SDLC's input of Carrier Detect is high on the terminal port. This light must be on while TRX is flashing for BSC/SDLC to process received data.
TCTS	Lights when the BSC/SDLC's input of Clear to Send is high on the terminal port. This light must be on for the BSC/SDLC to transmit data on the terminal port.
ERROR	Error Condition Exists - Memory error, or blinks during changing of options.
POWER	Lights when the BSC/SDLC is plugged in and the +5 Volt power supply is operating properly.
MCTS	Lights when the BSC/SDLC's input of Clear to Send is high on the modem port. This light must be on for the BSC/SDLC to transmit data on the modem port.
MCD	Lights when the BSC/SDLC's input of Carrier Detect is high on the modem port. This light must be on while the MRX is flashing for the BSC/SDLC to process received data.
MRX	Flashes as data is received by the BSC/SDLC from the modem port.
MTX	Flashes as data is transmitted by the BSC/SDLC out the modem port.

6.0 Power Up

To start installing your BSC/SDLC unit only the host SNA link need be connected. Connect to host, making sure all the following steps have been followed.

1. Switch Bank 8 has been selected for the correct PU Address. Section 7.5.
2. Set switches SW4, SW5, SW6 and SW7 unit for type of modem port connection, see Section 4.4. The factory default switch settings are for a Sync Modem DCE device.
3. Make sure that switch SW9/1 is in the OFF position, Run program mode.
4. Plug the power transformer into any standard 110 volt AC power outlet. Plug the connector on the other end of the power cord into the mating connector on the back of the unit. Insert the connector so the small beveled lip faces up for ease of insertion. The beveled lip can be inserted up or down and the unit will work fine with no harm to the BSC/SDLC.
5. Plug an RS232-C cable from the modem or SNA host into the modem connector. Pins 2-8, 15, 17 and 20 are required.
6. Plug an RS232-C cable from the VDU to the terminal connector on the back of the BSC/SDLC. Pins 2-8, 15, 17 and 20 are required.

After the above procedure has been completed the BSC/SDLC should have at least two lights on: power and MCD. If the SNA link is activated, the MCTS, MRX and MTX lights should blink. If these lights are not all ON, the BSC/SDLC will not communicate with the SNA host properly.

With the SNA host in communication with the BSC/SDLC, call into the BSC/SDLC with the Bisync terminal. Once the phone call is established the TCD light should come on. At this time, the Bisync terminal will transmit a line bid and the BSC/SDLC will acknowledge it or reject it with a DLE EOT depending on the activity of the Logical Unit (see Section 7.3). During this transfer of data the TCTS, TRX and TTX lights will blink.

7.0 Changing Options

The BSC/SDLC unit provides a very flexible package of options so to allow any Bisync 2780/3780 device or emulator to function as an IBM SNA 3770 work station. Because of the great number of options provided, it may take a little time to set up the unit, but once complete the options need not be set up again. All options are battery protected for when the unit is turned off.

Switch Bank 8 (SW8) and Switch Bank 9 (SW9) are used to select the many different options. Switch Bank 8 holds the configuration for the customer options described in Section 7.1. Switch Bank 9, Figure 1, is used to set the new options in the BSC/SDLC battery protected memory.

Before any option (except emulation type 2780/3780) can be changed, switch 1 of SW9 must be set to the ON position. The changing of this switch from off to ON will put the BSC/SDLC into change option mode and keeps the BSC/SDLC from responding to the SNA host and the Bisync terminal. When switch 1 of SW9 is in the ON position the ERROR indicator of the BSC/SDLC will blink, staying on for about 2 seconds and off for one second. This indicates the unit is in change option mode. With Switch 1 ON, the three dynamic customer options will automatically set depending on switches 2, 3 and 4 of SW9 (refer to Section 7.3).

Switch Bank 9, Program Options

SW9 Switch:

- 1 ON = Select Option
OFF = Run
- 2 If no active LU during 3780/2780 call in
ON = Answer Phone
OFF = No DTR to modem (phone will just ring)
- 3 If no active LU during call in or connection period
ON = Answer 3780/2780 line bid like LU is active
OFF = Send "DLE-EOT" and hang up phone
- 4 If no active LU-to-LU session during 3780/2780 call in
ON = Answer phone (handle data)
OFF = No DTR to modem (phone will just ring)
- 5 ON = 3780 Emulation
OFF = 2780 Emulation
- 6 & 7 - ON ON = Set Customer Option A
ON OFF = Set Customer Option B
OFF ON = Set Customer Option C
OFF OFF = Set Customer Option D
- 8 ON = Set Customer Options A, B, C or D
OFF = Set three Dynamic Customer Options
- 9 OFF = TDI Disabled
- 10 OFF = TDI Disabled

7.1 Changing Customer Options

The Customer Options are divided into four separate groups, A, B, C and D. These options are changed by the combination of switch bank 8 (SW8) and switch bank 9 (SW9). Switch bank 8 holds the configuration of the specific customer option being changed and switch bank 9 assigns which option group you are changing (A, B, C or D) and sets the new option in battery protected memory. The customer options are described later in this section. When the unit is shipped from the factory all the customer options are set to their default values (as noted in the description of each option) and the Component Selection Feature is disabled. To enable the Component Selection Feature proceed as follows:

1. Record the switch settings of SW8. This switch bank has the Physical Unit (PU) address that the SNA host is talking with.
2. Set SW8 for the options in the specific group. Example: Customer Option B to enable Component Selection Feature and leave other options unchanged. Switch 1, 2, 3, 4, 5 and 6 of SW8 should be in the ON position. Switch 7 and 8 should be OFF. The Component Selection Feature is controlled by switch 7. With switch 7 OFF, the option is enabled.
3. Now select Customer Option B group by using switches 6 and 7 of SW9, by setting switch 6 ON and switch 7 OFF. This will tell the BSC/SDLC that switch bank 8 (SW8) has the option settings for Customer Option B in it.
4. Put switch 1 of SW9 to the ON position. This will put the BSC/SDLC into change option mode and the ERROR indicator will continuously light for two seconds and go off for one second.
5. Once switch 1 of SW9 is ON, we can save the new options selected by switches 6 and 7 of SW9, and all the switches of SW8. To save the new options in the BSC/SDLC's battery protected memory, switch 8 of SW9 must be turned ON at the time the new options are loaded. After a complete cycle of the ERROR indicator coming ON and OFF, turn switch 8 of SW9 back OFF. With switch 8 OFF, the new options are then saved in the battery protected memory.
6. Before exiting this change option routine, set switch bank 8 (SW8) for the BSC/SDLC's PU address recorded earlier in step 1. This will insure the SNA host will communicate with the BSC/SDLC.
7. After Setting SW8 back to the PU address, exit the change option routine by setting switch 1 of SW9 to the OFF position. The ERROR indicator will go off and stay that way. The new customer options are selected and the BSC/SDLC is ready to operate.

7.2 Customer Terminal Options

7.2.1 Customer 3780/2780 Option A

- SW8 - 1 Terminate message to terminal (Transmit ETX)
ON = Terminate message when bracket ended
*OFF = Terminate message when chain ended
- SW8 - 2 NOT USED
*ON = Leave switch on when changing this option
- SW8 - 3 & 4 - If modem hangs up; drops Data-Set-Ready (DSR)
ON ON = Leave LU active
*ON OFF = Send RSHUTD to host (unbinds session)
OFF ON = Send LU disconnected (0831) LUSTAT to host
Option makes sure last customer session is terminated
so next customer cannot receive last customer's data.
- SW8 - 5 Data-Set-Ready (DSR) down; no 3780/2780 terminal
connected
*ON = Accept LU BIND from host
OFF = Reject LU BIND from host
Option keeps application from being bound when no
customer has connected up.
- SW8 - 6 If no active LU during 3780/2780 call in
*ON = Answer Phone
OFF = No DTR to modem (phone will just ring)
Option keeps customer from dialing in when SDLC
line is down.
- SW8 - 7 If no active LU during call in or connection
period
ON = Answer 3780/2780 line bid like LU is active
*OFF = Send "DLE-EOT" and hang up phone
Option gives 3780/2780 indication that host is down.
Option used with Customer Option A SW8-3 if DLE-EOT
required on call in.
- SW8 - 8 If no active LU-to-LU session during 3780/2780
call in
*ON = Answer Phone
OFF = No DTR to modem (phone will just ring)
Option keeps customer from dialing in when there is
no session between application program and logical
unit.

* = Default (Factory) Setting

7.2.2 Customer 3780/2780 Option B

- SW8 - 1 Pass 3780/2780 data with no changes to 3770 host CPU *inbound SNA data*
*ON = No Conversion
OFF = Convert 3780 space compression into 3770 space compression and adds SCLs if needed
Option allows 3780/2780 data to be transferred to the 3770 host with no changed done to data
- SW8 - 2 Hang up switches SDLC line when 3780 line is terminated
*ON = Do nothing
OFF = Hang up switched SDLC line (drop DTR) when 3780/2780 host goes away
Option is used when BSC/SDLC is located at a 3780/2780 host computer site and the 3780 CPU calls a remote SDLC/SNA computer.
- SW8 - 3 Handling of received space characters *outbound SNA data*
*ON = Do nothing
OFF = Space characters received from Host are converted into 3780 space compression bytes. 3780 space compression bytes are converted into space characters when transmitted to host
Option allows 3770 programs to run under CICS which has no 3770 compression or compaction capabilities
- SW8 - 4 Timeout terminal option
*ON = Do nothing
OFF = Send EOT every 4 seconds to bisync terminal to keep it from timing out
Option keeps 3780/2780 unit on line if 3780/2780 unit has a SYN, SYN time out feature.
- SW8 - 5 Check for terminal hang up
*ON = Do nothing
OFF = Check if terminal terminated connection to BSC/SDLC, if so hang up phone
A few phone systems do not drop remote modems DSR when session is terminated so this option is needed to prevent an off hook unused phone
- SW8 - 6 Activity timer option
*ON = Do nothing
OFF = No activity will cause 3780/2780 to hang up phone
Option terminates phone call if customer is not using line so that one customer will not tie up a line all day. Length of time is defaulted to 5 minutes.

* = Default (factory) setting

Note: Space Compression

Customer 3780/2780 Option B (Continued)

SW8 - 7 Component Selection Feature

- *ON = Component Selection Disabled
- OFF = Component Selection Enabled
- 3780 - DC2 (Punch), DC1 (Printer)
- 2780 - ESC 4 (Punch), ESC / (Printer)

SW8 - 8 Transmit Temporary Text Delay (TTD) to remote

- ON = Do Nothing
 - *OFF = Transmits TTD to remote while waiting for more data from host
- Option keeps some 3780/2780 emulators from timing out on the number TTD's received

7.2.3 Customer 3780/2780 Option C

SW8 - 1 Convert new line (NL) char received from SNA host into a Escape (Ec) Slash (/) character pair

- *ON = No conversion
 - OFF = Convert NL \$15 into a Ec \$27 and / \$61 pair
- Option allows SNA host to emulate some Perkin Elmer 3780 devices: Ec/ = Single line feed, EcS = double line feed
Ect = triple line feed, EcHt = define tab.

SW8 - 2 Use 3780 Multiple Transparent Record Mode

- *ON = Do nothing
 - OFF = Permits up to six records (480 characters) to be transmitted before a line turnaround occurs.
- Option only valid when operating in 3780 mode. Normal 3780 operation allows one transparent record per turnaround.

SW8 - 3 Convert outbound host transparent data into 3780/2780 normal data.

- *ON = No conversion.
 - OFF = Convert host transparent data into 3780/2780 normal data.
- Option allows some 3780/2780 emulators that do not support transparent data to receive transparent data from host.

SW8 - 4 Convert new line (NL) character received from SNA host into a record separator (IRS) character.

- *ON = No conversion.
 - OFF = Convert NL \$15 into an IRS \$1E.
- Option allows some 3780/2780 emulators to receive SNA printer data as card records.

* = Default (factory) setting

SW8 - 5 NO OPTION

SW8 - 6, 7 & 8 Number of RU's Per Chain transmitted to Host

* ON ON ON (000) = Option OFF ON = 0 OFF = 1
ON ON OFF (001) = thru OFF OFF OFF (111) = Number of
RU's Per Chain 1 thru 7

7.2.4 Customer 3780/2780 Option D

SW8 - 1 Use 2780 Multiple Record Transmission feature

*ON = Not Selected

OFF = Allows up to seven records (400 characters max)
to be transmitted before a line turnaround occurs

Option only valid when operating in 2780 mode. Normal
2780 operation allows up to two records (200 characters
max) to be transmitted before a line turnaround occurs.

SW8 - 2 NO OPTION

*ON

SW8 - 3 NO OPTION

*ON

SW8 - 4 NO OPTION

*ON

SW8 - 5 NO OPTION

*ON

SW8 - 6 NO OPTION

*ON

SW8 - 7 NO OPTION

*ON

SW8 - 8 NO OPTION

*ON

* = Default (factory) setting

7.3 Changing Three Dynamic Customer Options

Three of the most commonly used customer options can be changed easier than the procedure detailed in section 7.1. These options affect the answer of an incoming Bisync call depending on the status of the SNA logical unit (LU).

SW9 - 2 LU not active on call in: Answer Phone or no DTR

SW9 - 3 LU not active on call in: Handle Data or transmit DLE-EOT

SW9 - 4 LU-to-LU not active on call in: Handle data or no DTR

NOTE

The BSC/SDLC will not answer to the SNA host or the Bisync terminal when switch 1 of SW9 is ON.

Switch 2 of SW9 if ON (when Switch 1 of SW9 is ON) will set the option to allow the BSC/SDLC to answer the phone on the Bisync side of the box when the Logical Unit (LU) is not active. If switch 2 is OFF, no Data Terminal Ready (DTR) will be supplied to the modem. This does not allow the modem to answer an incoming call.

Switch 3 of SW9 if ON (when switch 1 of SW9 is ON) will set the option to allow the BSC/SDLC to handle data from the Bisync terminal when the LU is not active. The received data is thrown away never transmitted to the SNA host. If switch 2 is set OFF, the BSC/SDLC will transmit the Bisync terminate line command string (DLE-EOT) when the Bisync terminal calls in.

Switch 4 of SW9 if ON (when switch 1 of SW9 is ON) will set the option to allow the BSC/SDLC to handle data from the Bisync terminal when no LU-to-LU session is active. The received data is transmitted to the SNA host going to SSCP, like a logon would be handled. If switch 4 is set OFF the BSC/SDLC will not raise DTR on the Bisync port, keeping a dial-up modem from answering an incoming call.

When switch 1 of SW9 is turned OFF, the options will be saved and switches 2, 3 and 4 will have no effect on the BSC/SDLC's operations. The unit will start answering SNA polls and Bisync commands.

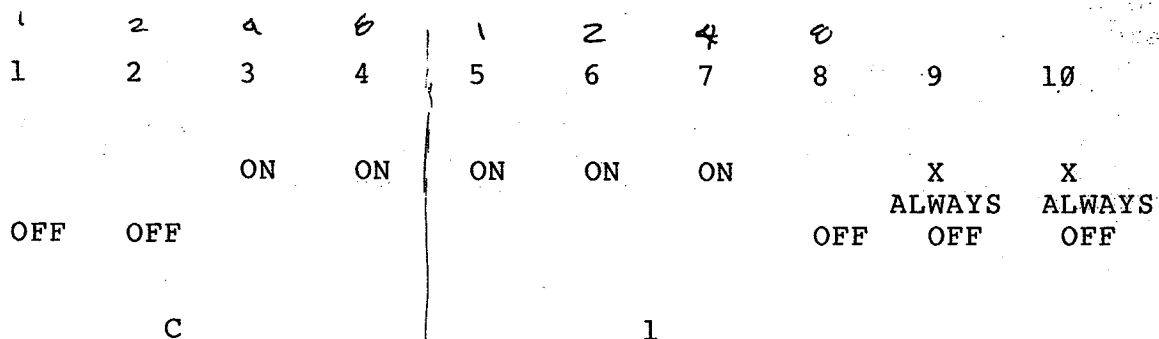
7.4 Changing Bisync Emulation Mode: 3780 or 2780

The BSC/SDLC can emulate two different Bisync devices, an IBM 3780 Data Communication Terminal and an IBM 2780 Data Transmission Terminal. For the BSC/SDLC to determine which mode it will operate, switch 5 of switch bank 9 must be checked.

If switch 5 of SW9 is ON (during power up or when switch 1 of SW9 is ON) the BSC/SDLC will emulate an IBM 3780 device. If switch 5 is OFF, the IBM 2780 emulation program will run in the BSC/SDLC.

7.5 Changing the Physical Unit (PU) Address

The BSC/SDLC looks like an IBM 3776/77 work station to the SNA host. this work station has an address that the host knows it by, called the Physical Unit (PU) address. For the SNA host to communicate with the BSC/SDLC this PU address must be present. To select the BSC/SDLC for a PU address of a hexadecimal value of "C1", switch bank 8 (SW8) must be set for the hex equivalent of "C1". When a switch is in the ON position this is a 0. If the switch is OFF, it is a 1. Refer to the following diagram for SW8 set for PU address of "C1".



Switch Bank 8 (SW8)
PU address "C1"

ON = 0
OFF = 1

The PU address is set when the BSC/SDLC powers up or when switch 1 of SW9 is turned ON.

8.0 Batch 3770 Operation

The BSC/SDLC emulates an IBM 3776 Model 3 and 4 RJE work station supporting one logical unit type 1 (LU.T1). The logical unit is the attached 2780/3780 Bisync terminal which handles console, printer, reader, punch and exchange disk data.

When outbound (from host) data is received, it is examined for the SNA character string (SCS), transparency, SNA compression and the use of string control bytes (SCBs). This received data is then decompressed and transmitted to the 2780/3780 terminal (transparent or non transparent) with the SNA data converted to Bisync so the 2780/3780 terminal can process it. Function Management Headers (FMHs) are used by the BSC/SDLC to determine the destination device (punch or printer) of the outbound data.

The 2780/3780 data transmitted inbound (to host) is arranged for the use of SCBs, SNA compression and transparency if selected by the received bind and the selection of some Customer Options. Data received from the 2780/3780 is considered to be card reader data, so a card FMH will precede the data going into the host.

9.0 Battery RAM

All operating parameters selected from the configuration menus are saved in battery backed-up RAM (Random Access Memory). If AC power to the BSC/SDLC is interrupted, it is unnecessary to reenter the parameters previously selected. If the unit is powered off for seven days or more, the parameters will probably be lost.

10.0 System/Line Gen for Batch

The following is a VTAM/NCP/JES line gen for a 3776 model 3 or 4. For more information on specific parameters, refer to the appropriate IBM manuals.

IBM 3770 SNA Installation Guide - GC30-3064
Component Description for the IBM 3776 and 3777 Communication Terminals - GA27-3145
VTAM Generation Manuals - MANY
NCP Generation Manuals - MANY

NCP & VTAM Parameters: Most values are defaults

----- HOST MACRO -----

UNITSZ = 384 VTAM'S data buffer size

----- (LINE (GROUP) MACRO -----

DIAL = NO	No for leased line or yes for dial-up BSC/SDLC operation
LNCTL = SDLC	For SDLC line
TYPE = NCP	For NCP
* CLOCKING = EXT or INT	Modem or BSC/SDLC supplies clocks
** DISCNT = NO or YES	If switched SDLC line should drop if no active LU sessions
DUPLEX = FULL or HALF	Full or half duplex line
INTRPI = 2	
*** NEWSYNC = NO	No new sync on modem
* NRZI = YES or NO	NRZI coding can be used
PAUSE = 2	Time between xmitting operation (poll) 200 ms
POLLED = YES	Polled Line
REPLYTO = 1	Time between retries of operation (polls) if not answered 1 second, maybe 2 or 3
* Option selected by BSC/SDLC switch settings	
** Option is available but not installed	
*** Option not supported	

RETRIES = (1,2,5)	Retry 1, wait 2 seconds, do it 5 times
SERVLIM = 4	Number of regular Scans of NCP order table before a special scan (PU not responding to SNRM)
SPEED = 4800	Line Speed (300 to 19.2K baud)
TRANSFER = 7	
MODETAB = INSTINCLM	Name of table used by VTAM for line bind parameters
SSCPFM = USSSCS	3770 RJE log-on is a character-coded log-on
VPACING = 2	

----- PU MACRO -----

ADDR = C1	Line hardware hex address value
IRETRY = YES	Retry poll operation on idle PU, maybe no
MAXDATA = 265 or 521	Maximum amount of (PIU) data NCP will xmit to the terminal
MAXOUT = 7 if MAXDATA = 265 4 if MAXDATA = 521	Maximum number of data blocks (PIUs) that NCP can xmit to PU before requesting an SDLC data link acknowledgement
MODETAB = RJEMODE	Name of table used by VTAM for PU bind parameters
PASSLIM = 7 if MAXDATA = 265 4 if MAXDATA = 521	Maximum number of PIUs that NCP can xmit at one time
PUTYPE = 2	Physical Unit type 2
RETRIES = (1,3,5)	Retry 1, wait 3 seconds, do it 5 times
SSCPFM = USSSCS	3770 RJE logon is a character-coded logon
DLOGMOD = BUF256 if MAXDATA = 265 BUF512 if MAXDATA = 521	Logmode entry used

ANS = STOP

Stop on automatic network shutdown,
maybe CONTINUE

----- LU MACRO -----

BATCH = YES

Informs NCP that this is a BATCH LU

BUFFLIM = 2

The product determines how many PPBUF elements VTAM will receive from a LU until VTAM can transfer the data to the application

LOCADDR = 1 to 1

Local address of this LU on the PU
BSC/SDLC supports only one LU

* PACING = 3

NCP to send 3 request units (RUs) before waiting for pacing response

USSTAB = RJEINCDT

Table used by VTAM to interpret user logons

VPACING = 6

VTAM sends 6 RUs to NCP before response

ISTATUS = ACTIVE

LU comes up active, can be INACTIVE

----- APPLICATION VTAM PARAMETERS -----

BUFFACT = 10

Parameter used with BUFFLIM

----- JESX Parameters -----

TERMINAL (3776)

RMTnnn

SNA Remote Terminal

LUTYPE 1

Logical Unit type 1 use SCS data

BUFFSIZE = 256 if MAXDATA = 265
512 if MAXDATA = 521

Buffer size of terminal LU

NOCMPCT

Compaction may not be used on this terminal

COMP or NOCOMP

Blank and multiple character compression may or may not be used

CONDEST = nnn

Console responses are to be directed to another terminal

* Option determined by max RU size. BSC/SDLC available buffer size = 2100 characters

CONSOLE or NOCON	Device other than a console printer may or may not receive console messages
* DISCINTV = 0	Terminal disconnect on idle condition, off
LINE = nnn	Logical connection between JESX and the terminal
NUMPR = 1	Number of logical printers at terminal
NUMPU = 1	Number of logical card punches at terminal
NUMRD = 1	Number of logical card readers at terminal
PASSWORD = cccccccc	Line password
ROUTECD = nn	Specify that input from this terminal will have the return destination specified
SETUPMSG	Message telling operator to mount special forms
SETUPINF	Message telling operator to mount special forms is displayed at his terminal and not at host console, maybe SETUPACT to display message at host also
WAITIME = 01	Number of seconds between completion of printing before JES will initialize print of the next output data set

----- PRINTER ATTACHED TO 3776 -----

Rnnn.PR1	SNA Remote Printer one
OPERATOR	Remote terminal operator uses a \$DF JES command to check the forms queue and than uses a \$TRPn, F=form, Q=class command to set the printer for special forms
CCTL	Carriage control chars are in the data stream xmitted to printer
CKPTLNS = 0	Maximum number of lines in a logical page

* Option not supported

CKPTPGS = 0	Number of logical pages to be printed before each checkpoint is taken.
CLASS = C(1)...C(n)	Chain size is the logical page number Output class used to group all output of a particular type
* CMPCT	Specifies that printer has compaction capabilities
COMP	Specifies that printer has compression/expansion capabilities
COMPACT = n	Default compaction table number
START	Printer is active
NOFCBLD	Printer cannot recv forms control buffer (FCB) images from host
LRECL = 132	Logical record length of data xmitted to printer form host
SEP	3776 has a separate console than printer
NOSUSPND	Not used for SNA devices
PRWIDTH = 132	Maximum number of characters to be printed on one line
ROUTECD = nnn	Route code for printer
SELECT = PRINT1	This device is a printer with a sub-address of zero
UCS = ccccccc	Not used for SNA devices

----- PUNCH ATTACHED TO 3776 -----

Rnnn.PUL	SNA Remote Punch one
OPERATOR	
CCTL	
CKPTLNS = 100	Number of cards to be punched per logical page
CKPTPGS = 10	
CLASS = C(1)...C(n)	
* Option not supported	

* CMPCT

COMP

COMPACT = n
START

Punch is active

NOSEP

SELECT = PUNCH1

Device is a card punch with a sub-
address of zero

----- READER ATTACHED TO 3776 -----

Rnnn.RD1

SNA Remote Card Reader one

CLASS = C(1)...C(n)

MSGCLASS = C(n)

NOHOLD

NOSEP

START

Card reader active

PRDEST =

PRIOINC =

PRIOLIM = 1

PRLCL

PRNODE

PRRNT

PUDEST = 0

PULCL

PUNODE

XEONODE =

----- LINE -----

LINEnnn

Line number

ADISCON

CODEA

*Option not supported

COMP

EBCDIC

EBCDIC character code

IFACEA

LOWSPEED

PASSWORD = cccccccc

TRANSP

Line supports transparent data

UNIT = SNA

----- JESX SYSTEM-WIDE PARAMETERS -----

APPLID = JES2

Name used in logon and in VTAM configuration list

* COMPACT = n,n

compaction tables

PASSWORD = cccccccc

VTAM password for JESX

&MAXSESS = 1

Number of active sessions at any point in time

&NUMBUFF = nnn

JESX I/O buffer count

&NUMCMB's=nnn

Number of JESX Console Buffers

&NUMJOES = nnn

Number of Job Output Elements

&NUMLMES = nnn

Number of Data Communication Lines should equal the largest LINEnnn

&NUMRJE = nnn

Number of Remote Job Definitions should equal the largest terminal ID number RMTnnn

&NUMTPBF = nnn

Number of JESX Data Communications Buffers

&PRTRANS = YES

Print Line Translation Option, looks for chars less than X '40' and if so sends data as transparent

* Option not supported

The following is a the suggested LOGMODE table for use by the BSC/SDLC:

```
RJEMODE          MODETAB

BATCH            MODEENT LOGMODE=BATCH,FMPROF=X'03',TSPROF=X'03',
                  PRIPROT=X'A3',SECPROT=X'A1',COMPROT=X'7080'

MLU1            MODEENT LOGMODE=MLU1,FMPROF=X'03',TSPROF=X'03',
                  PSNDPAC=2,SRVCPAC=1,
                  PRIPROT=X'A8',SECPROT=X'A1',COMPROT=X'7080'

MLU2            MODEENT LOGMODE=MLU2,FMPROF=X'03',TSPROF=X'33',
                  PSNDPAC=4,SRVCPAC=2,
                  PRIPROT=X'A3',SECPROT=X'A1',COMPROT=X'7080'

MLU3            MODEENT LOGMODE=MLU3,FMPROF=X'93',TSPROF=X'03',
                  PSNDPAC=6,SRVCPAC=3,
                  PRIPROT=X'A3',SECPROT=X'A1',COMPROT=X'7380'

INTERACT        MODEENT LOGMODE=INTERACT,FMPROF=X'03',TSPROF=X'03',
                  PRIPROT=X'B1',SECPROT=X'A0',COMPROT=X'3040'

NOCOMP          MODEENT LOGMODE=NOCOMP,FMPROF=X'03',TSPROF=X'03',
                  PRIPROT=X'A1',SECPROT=X'A1',COMPROT=X'7080'

COMP            MODEENT LOGMODE=COMP,FMPROF=X'03',TSPROF=X'03',
                  PRIPROT=X'A3',SECPROT=X'A1',COMPROT=X'7080'

BUF512          MODEENT LOGMODE=BUF512,FMPROF=X'03',TSPROF=X'03',
                  RUSIZES=X'8686',
                  PRIPROT=X'A3',SECPROT=X'A3',COMPROT=X'7080'

BUF256          MODEENT LOGMODE=BUF256,FMPROF=X'03',TSPROF=X'03',
                  RUSIZES=X'8585',
                  PRIPROT=X'A3',SECPROT=X'A3',COMPROT=X'7080'

COMPACT         MODEENT LOGMODE=COMPACT,FMPROF=X'03',TSPROF=X'03',
                  RUSIZES=X'8585',
                  PSERVIC=X'01106000F100808000010040',
                  PRIPROT=X'A3',SECPROT=X'A1',COMPROT=X'7080'

MODEEND
END
```

The following is a copy of the suggested USSTAB table for use by the BSC/SDLC.

```
RJEINCDT      USSTAB

LOG           USSCMD  CMD=LOGON,REP=LOGON,FORMAT=BAL
             USSPARM  PARM=P1,REP=APPLID
             USSPARM  PARM=P2,REP=LOGMODE
             USSPARM  PARM=P3,REP=DATA

SIGNON       USSCMD  CMD=SIGNON,REP=LOGON,FORMAT=BAL
             USSPARM  PARM=APPLID,DEFAULT=JES2
             USSPARM  PARM=LOGMODE,DEFAULT=BUF512
             USSPARM  PARM=USER,REP=DATA

RMT101       USSCMD  CMD=RMT101,REP=LOGON,FORMAT=BAL
             USSPARM  PARM=APPLID,DEFAULT=JES2
             USSPARM  PARM=LOGMODE,DEFAULT=BUF512
             USSPARM  PARM=DATA,REP=RMT101

RMT102       USS   CMD=RMT102,REP=LOGON,FORMAT=BAL
             USSPARM  PARM=APPLID,DEFAULT=JES2
             USSPARM  PARM=LOGMODE,DEFAULT=BATCH
             USSPARM  PARM=DATA,REP=RMT102

RMT103       USSCMD  CMD=RMT103,REP=LOGON,FORMAT=BAL
             USSPARM  PARM=APPLID,DEFAULT=JES2
             USSPARM  PARM=LOGMODE,DEFAULT=MOCOMP
             USSPARM  PARM=DATA,REP=RMT103

LOGOFF       USSCMD  CMD=LOGOFF,FORMAT=BAL
             USSPARM  PARM=APPLID
             USSPARM  PARM=TYPE,DEFAULT=COMD
             USSPARM  PARM=HOLD,DEFAULT=YES

EOD          USSCMD  CMD=EOD,FORMAT=BAL
             USSPARM  PARM=APPLID
             USSPARM  PARM=TYPE,DEFAULT=UNCOND
             USSPARM  PARM=HOLD,DEFAULT=NO

SIGNOFF      USS   CMD=SIGNOFF,FORMAT=BAL
             USSPARM  PARM=APPLID
             USSPARM  PARM=TYPE,DEFAULT=COND
             USSPARM  PARM=HOLD,DEFAULT=YES

             USSEND
             END
```

11. Trouble Shooting and Odd Installation Problems

Listed below are some of the common problems found with installation and operation of the BSC/SDLC unit. Find the problem you are experiencing and try the remedies listed to fix the problem.

PROBLEM	SYMPTOM	POSSIBLE REMEDIES
1. No Power	Power light on front of BSC/SDLC is OFF	<ul style="list-style-type: none"> a. check wall power outlet for proper operation. b. Check to make sure the power transformer for the BSC/SDLC is plugged into the wall and into the unit all the way.
2. SNA host does not communicate with unit	No MCD light on front of BSC/SDLC	<p>BSC/SDLC switches SW4, SW5, SW7 for modem port are not set correctly, refer to Section 4.0.</p> <p><u>Leased Line</u></p> <ul style="list-style-type: none"> a. Modem or leased line is down. b. Line has not been activated by SNA host operator. <p><u>Dial-Up Line</u></p> <ul style="list-style-type: none"> a. Phone line between BSC/SDLC and SNA host has not been established. b. Default XID xmitted by BSC/SDLC does not match and XID in SNA host tables. c. Line has not been activated by SNA host operator.
3. SNA host tries to talk with unit but indication is PU is not active	MRX and MTX lights blink every 2 or 3 seconds	BSC/SDLCs PU address is not set for value needed by SNA host. Change PU address Section 7.5.

PROBLEM	SYMPTOM	POSSIBLE REMEDIES
4. SNA host talks with unit but logical unit inactivate	MRX and MTX lights blink every second	BSC/SDLCs LU address does not match value needed by SNA host. LU address is 01.
5. Data xmitted from Bisync device gets a response "INVALID COMMAND SYNTAX"		A LU-LU session has not been established. Send logon message to SNA host from Bisync terminal.
6. Bisync terminal does not communi- cate with unit	No TCD light on front of BSC/SDLC	<ul style="list-style-type: none"> a. BSC/SDLCs switches SW2, SW3, and SW6 for terminal port are not set correctly, refer to Section 4.0. b. Cable between terminal and BSC/SDLC doesn't have correct pin assignment. Needs 2-8, 15, 17 and 20. c. Phone line between SNA host and BSC/SDLC has not been established d. Bisync terminal does not have any data to xmit. Will not xmit initial line bid to start communications.
7. Bisync terminal calls in, xmits line bid and hangs up phone line	TRX, TTX and TCTS lights blink	<ul style="list-style-type: none"> a. SNA logical unit is not active and the BSC/SDLC xmits DLE EOT which hangs up phone. Get SNA host operator to activate logical unit. b. BSC/SDLCs customer option may be set to hang phone up if no LU-LU session is present. Get SNA host operator to activate a LU-LU session or change customer option, Section 7.2.



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