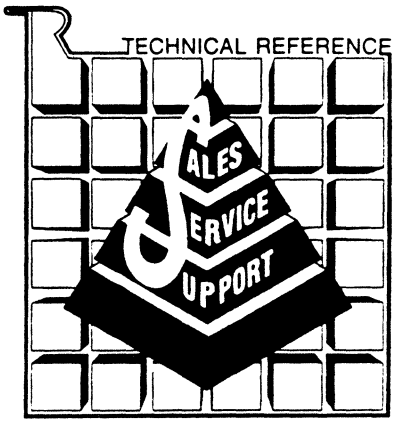
6740
Technical Reference



Notice

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6740 DCP TECHNICAL REFERENCE

Insert the attached change pages into your manual to replace the pages listed here.

Replace pages:	*With pages:*	*Add pages:*
1-1 and 1-2	1-1 and 1-2	1-25 through 1-80

Note: Remove unnumbered Protocol State Diagrams and unnumbered message formats from Section 1. Updated Protocol State Diagrams have been added to Section 9.

5-1 and 5-2	5-1 and 5-2	5-8 through 5-17
6-1 and 6-2 6-7 and 6-8	6-1 and 6-2 6-7 and 6-8	6-9
8-1 and 8-2	8-1 and 8-2	8-3 and 8-4
		9-1 through 9-81
11-1 and 11-2	11-1 and 11-2	11-5
12-1 and 12-2 12-5 and 12-6	12-1 and 12-2 12-5 and 12-6	12-13 through 12-34

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Section 1.0
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Contents

1.1 Introduction

This section describes generic system information for the Codex 6740 DCP (Distributed Communications Processor). It also resolves any presales design, configuration, and performance issues before installation. The 6740 DCP is explained, providing a complete network and systems perspective.

All Codex product and vendor product considerations, such as compatibilities and discrepancies, are explained in this section. Product interconnectivity requirements are detailed according to the ISO (International Organization for Standardization) model layers.

1.2 6740 Applications Information and Solutions

During initial customer interviews, a customer profile that describes the key problems, application and reliability needs, future growth plans, and requirements of his existing or proposed network is developed.

Review these requirements and determine if a statistical multiplexer meets all or some of the customer's requirements, and if the 6740 DCP is the best network solution.

Paragraph 2.3, Section 2.0, of this Technical Reference contains the 6740 Product Specification Sheet which describes 6740 features and capabilities. You should compare these specifications with all 6740 nodal configuration possibilities to ensure that the basic requirements are met prior to installation.

Section 12.0 of this Technical Reference contains the Preorder Planning Worksheet that is used to record customer account and application information. You will reference this information during the 6740 network analysis, node building, and node programming processes.

1.2.1 Vendor Product Applications (To Be Supplied)

1.2.2 Codex Product and Systems Information (To Be Supplied)

1.4 CMMP White Paper Report

1.4.1 Scope

This report describes the differences between Codex Multilink Multiplex Protocol (CMMP) and Codex Multiplex Protocol (MP) used on 6740s from an application and service point of view. Features and limitations of CMMP are discussed. It is assumed that the reader has a working knowledge of MP and the 6740.

1.4.2 References

The following documents were used as references:

- CMMP Functional Specification
- CMMP Protocol Specification
- *6740 Operator's Guide*

1.4.3 CMMP Features

The major difference between CMMP and MP is the *multilink* feature of CMMP. Multiple links may be connected between two nodes and then treated as a single logical link. Each individual physical link is referred to as a muxport link or network link. The group of muxport or network links that are treated as a single logical link are referred to as a CMMP Group.

Both physical links in a CMMP Group must be either muxport protocol links or network protocol links. Both links should have exactly the same configurations. All features available on a MP link are available on a CMMP Group. In general, when a frame is ready to be transmitted, it may be transmitted on either physical link in the CMMP Group.

The maximum number of links allowed in a 6740, 6745, or 6720 CMMP Group is two. This is because the 6745/6720 NP cards support a maximum of two physical links, but 6740 NP cards support a maximum of four links. If more than two links were allowed, customers upgrading from a 6740 to a 6745 would lose functionality.

1.4.3.1 CMMP Benefits

CMMP support provides several advantages in terms of nodal connectivity via network protocol and muxport protocol links:

- Improved reliability
- Additional link capacity
- Load balancing.

Improved reliability can most easily be seen by comparing CMMP applications to those without CMMP. For example, in a linear topology (see Figure 1-12) both physical links in a CMMP Group must go down before the node is isolated.

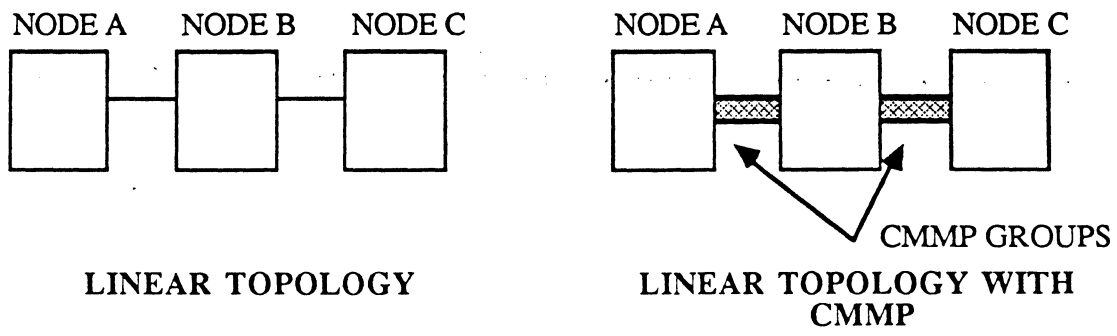


Figure 1-12. Linear Topologies

Another example of improved reliability is shown by the parallel topology in Figure 1-13. The loss of two links disconnects the two nodes, and users will lose calls and data. With CMMP support, however, both physical links on both CMMP Groups must go down concurrently before the nodes can become disconnected.

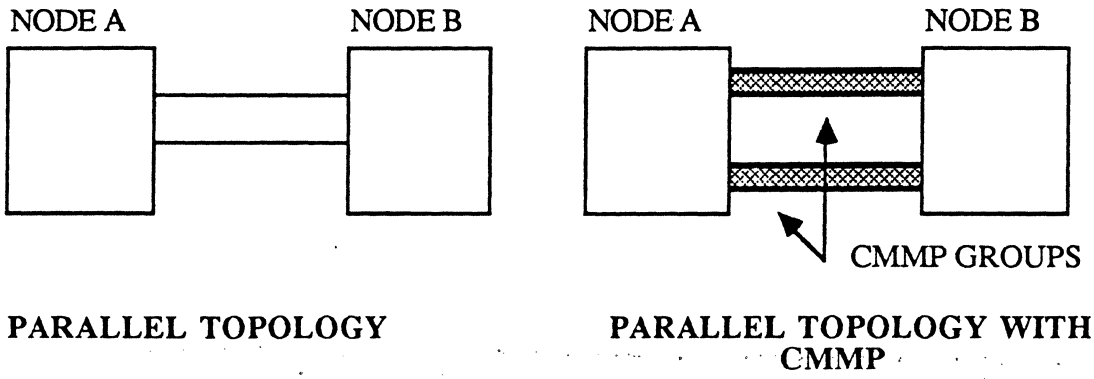


Figure 1-13 . Parallel Topologies

A third example of CMMP's improved reliability is shown by the delta topologies in Figure 1-14. Without CMMP support, failure of a single NP link forces rerouting of all threads from that link. There is a significant amount of processing overhead associated with this process, both during and after the reroutes, since the rerouted data must be processed by an intermediate node. Delay is typically larger for users routed through an intermediate node, and congestion on the remaining links can result. Furthermore, if two NP links fail concurrently, a node will be isolated.

With CMMP support, however, failure of a single NP link does not force rerouting of all threads from that logical link. Typically, less than half the users will be rerouted by the congestion controller through the intermediate node, while all remaining data is simply passed over the remaining physical link in the CMMP Group. Since the congestion controller sees a CMMP Group as one NP link, both physical links in one CMMP Group must fail concurrently before all users are rerouted through an intermediate node. Similarly, failure of two NP links does not result in isolated nodes; all links in two out of the three CMMP Groups must go down concurrently to cause a node to become isolated.

CMMP also improves reliability in situations which require added muxport links. Without CMMP support, if a muxport link suffers congestion, users must be reconfigured manually at the CTP to use a different link. If the muxport link fails, user calls will be disconnected.

However, with CMMP support, both muxport links in the group must fail before user calls are disconnected. If a single link suffers congestion, the second link of the CMMP group may be brought online without configuring user threads. In fact, one of the two physical links in a CMMP Group may be a dial-up type link, which may be manually booted online in case of congestion.

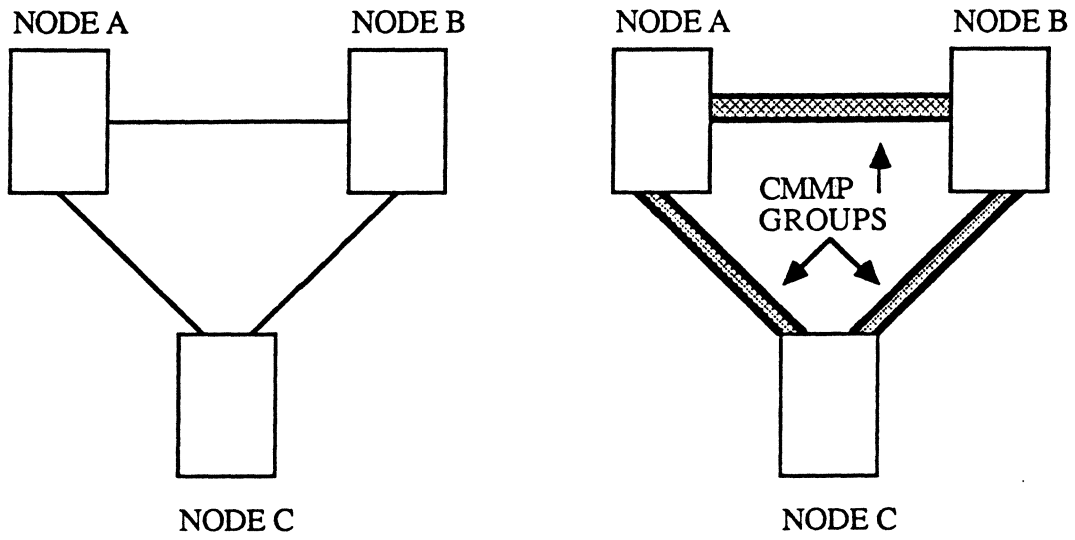


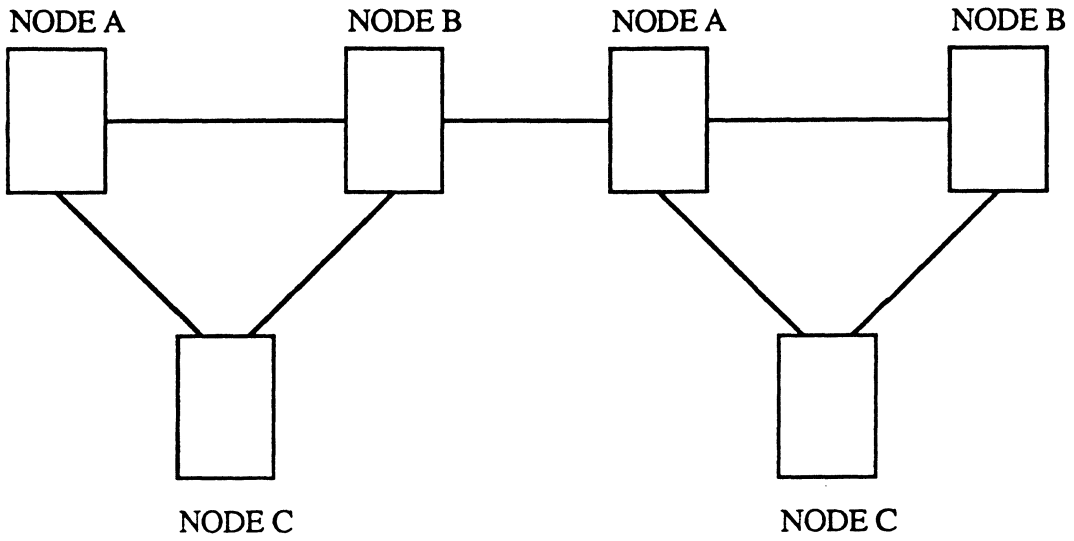
Figure 1-14. Delta Topologies

Another example of CMMP's improved reliability is shown by the delta topologies in Figure 1-14. Without CMMP support, the failure of the muxport link between the two deltas resulted in isolated networks.

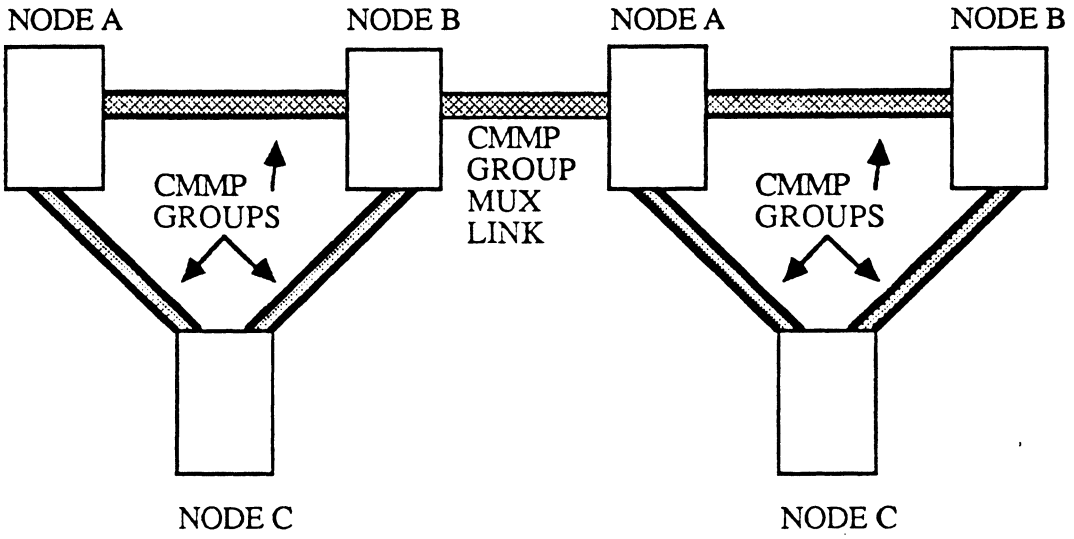
With CMMP support, however, failure of one group of muxport links does not isolate the two neworks from each other. Instead, all data is passed over the remaining group muxport link, and there is still a connection between the two delta networks.

A final example of CMMP's improved reliability is shown by the delta topologies in Figure 1-15. Without CMMP support, the failure of the muxport link between the two deltas resulted in isolated networks.

With CMMP support, however, failure of one group muxport link does not isolate the two networks from each other. Instead, all data is passed over the remaining group muxport link and there is still a connection between the two delta networks.



DELTA TOPOLOGY



DELTA TOPOLOGY WITH CMMP

Figure 1-15. Internetworking Delta Topologies

Additional link capacity is also gained with CMMP support. Because CMMP allows a single logical link to be established across two lines, the nodes can pass more information. The bandwidth can be doubled using a CMMP Group instead of a single physical link, assuming both physical links in the CMMP group are of equal speed.

Load balancing is another benefit of using CMMP. This load balancing is independent of the delay minimization that the congestion controller provides. Loads are balanced by simply transmitting frames on the next available physical link within the CMMP Group in a round-robin fashion. Actual performance data is TBD.

1.4.3.2 CMMP Limitations

The following are limitations associated with CMMP:

1) The NP card is still a single point of failure; if the card fails, both links go down.

2) The maximum number of threads through a NP card stays the same: 85 for 6740s.

3) For CMMP Groups of muxport protocol links, there is only one backup link rather than the three backup links of a parallel topology using CMMP network links.

4) One 6740 EIA-232 NP card supports a maximum of two CMMP Groups. The two groups are fixed and defined as Link 1 and Link 2 assigned to one group, and Link 3 and Link 4 assigned to the other group. One V.35 NP card supports one CMMP Group, with both links assigned to one group.

5) Maximum parallel topology GNet link bandwidth capacity (not data throughput) is 256 kbps (four links at 64 kbps) for group band speed links, or 76.8 kbps (four links at 19.2 kbps) for standard EIA-232C links.

6) Maximum linear topology GNet link bandwidth capacity (not actual user data throughput) is 128 kbps (two links at 64 kbps) for group band speed links, or 38.4 kbps (two links at 19.2 kbps) for standard EIA-232C links.

7) Maximum delta topology GNet link bandwidth capacity (not actual user data throughput) is 128 kbps (two links at 64 kbps) for group band speed links, or 38.4 kbps (two links at 19.2 kbps) for standard EIA-232C links.

7) Maximum delta topology GNet link bandwidth capacity (not actual user data throughput) is 128 kbps (two links at 64 kbps) for group band speed links, or 38.4 kbps (two links at 19.2 kbps) for standard EIA-232C links.

8) The maximum number of group band speed GMux links, with two physical links per NP card times four NP cards per node, is four GMux groups (eight physical links). Maximum number of EIA-232-C GMux links, with four physical links per NP card times four NP cards per node, is eight GMUX groups (16 physical links). For GMux links, there is more bandwidth to split between the muxport threads.

9) Equal static link delays are assumed on all physical links in a CMMP Group because the static link delay parameters are forced equal at configuration time. If the actual static link delays are significantly different on physical links in a CMMP Group, data may suffer long delays and bursts.

10) If unequal link speeds are used or if excessive restransmission or line errors exist on one line in a CMMP Group, delays will result and burst data may be seen on TP threads routed over both lines in the group.

11) The maximum number of outstanding frames allowed on a CMMP Group is 127. The 127-frame limit was designed into CMMP so it could be used in the future. However, since the 6740 NP allows only up to 30 frames per physical link to be outstanding, the CMMP Group limit for a 6740 is 60 frames outstanding.

12) CMMP GNet links and non-CMMP single net links may not be configured on the same NP. On the 6740, an error report is generated and either the Net link or the GNet group defaults to empty.

13) Links in CMMP Groups do not boot automatically. For example, suppose the second link in a CMMP Group is a dial-up type link to be used in case of link failure or congestion. The dial-up link must be manually booted online. The links will not dial automatically.

1.4.3.3 CMMP Applications Design Considerations

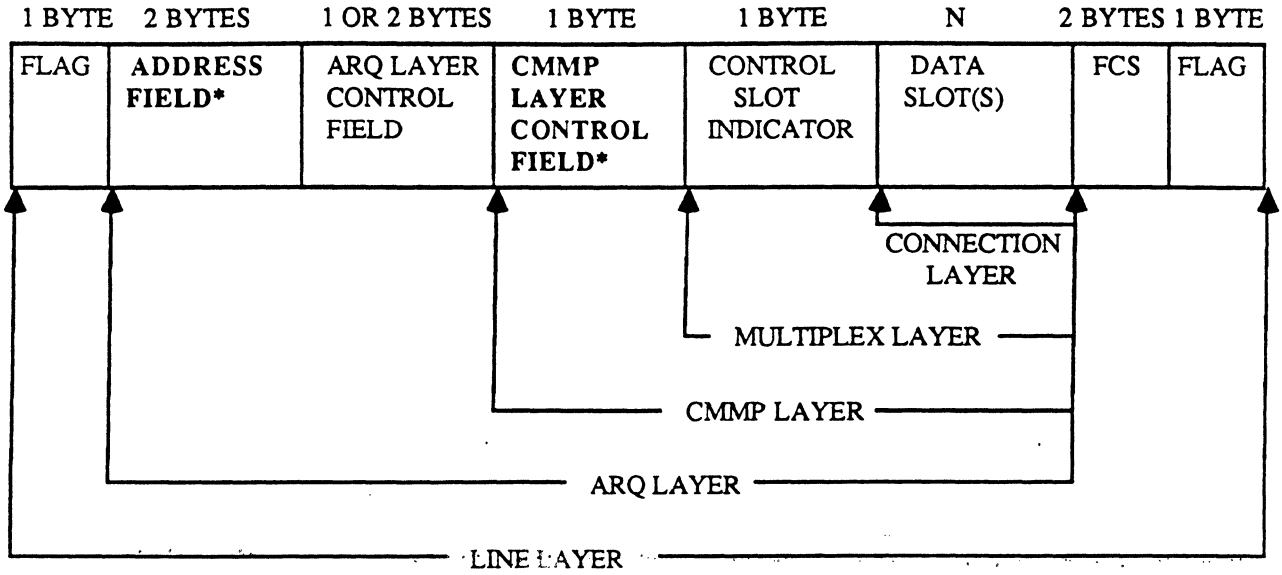
Be sure to use separate modems and lines to ensure that there are no single points of failure. The link redundancy feature is of no use if both links use the same modem, and the modem fails.

For best results, use the same physical link characteristics. If Link 1 is a satellite link and Link 2 is a terrestial link, the actual static link delays for each link are significantly different, and Link 2's performance will degrade to that of the satellite link. This is an example of limitation #9 noted in the previous section. If different links must be used in the application, a dual network link configuration is a better choice.

A single 19.2-kbps link will provide slightly better throughput and delay than two 9600-bps links in a CMMP Group. A CMMP Group of net links will provide better load balancing (and therefore better overall performance) than two single net links in most point-to-point applications.

1.4.4 Protocol

With CMMP, a new layer has been added to MP. As shown in the Figure 1-16 , the CMMP layer has been added between the muxport multiplex and the muxport ARQ layers. The CMMP frame format has been changed to accommodate the new CMMP layer. Basically, the range of acceptable values in the address field of all MP frames (information, supervisory, and unnumbered) has been expanded. In addition, a one-byte CMMP control field has been added to the MP I-frame format.



Note: The asterisk(*) indicates the fields that are different from muxport protocol frame format.

Figure 1-16. CMMP Information Frame Format

The address field consists of one byte that represents four different address values: A, B ,C , or D. This address is used by the protocol only; users will still choose between A or B with the CH NPxLy command. The address field identifies each of the two multiplexer units communicating over the link. Each unit on the link must use the same protocol, either MP or CMMP. Addresses A and B are used for MP links, and addresses C and D are used for CMMP links.

As in MP, the CMMP protocol is defined in terms of commands and responses. Each command or response frame carries the address field according to the following rules:

- Frames containing commands have their address equal to the address of the receiving unit.
- Frames containing responses have their address equal to the address of the transmitting unit.

Figure 1-17 shows address field bit definitions. Note that bits seven and six contain the 6740 path number on Net and GNet links.

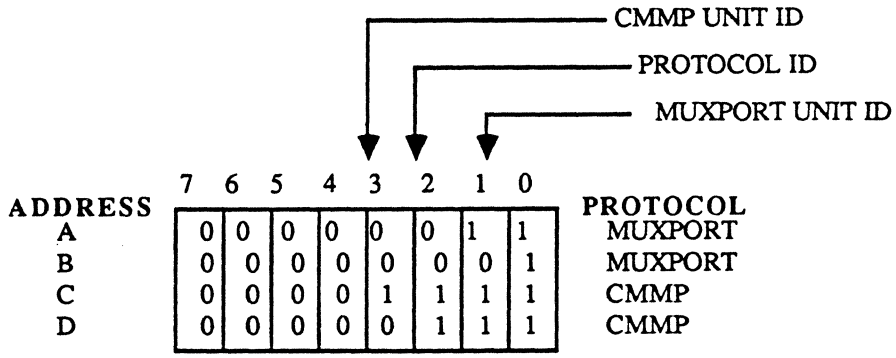


Figure 1-17. Address Field Bit Definitions

The CMMP layer control field contains a one-byte send sequence number. The values 0 through 254 (hex FE) are used to sequence CMMP I-frames. The value 255 (hex FF) is reserved for special CMMP initialization I-frames.

1.4.5 CMMP Installation

Installation of CMMP requires hardware changes and different software configuration procedures as described below.

1.4.5.1 Hardware Configuration

The new 7.10 NP IPL ROMs must be installed on the NP card. The NP card must have 256K of RAM to run CMMP. The factory ships only cards with 256K of RAM, but some prototypes had only 128K of RAM (half as many RAM chips). There should be four rows of 64K-RAM chips on the NP card.

All the ROMS on the EPROM card have also been changed. To load the new software using the turbo load procedure, install the new hardware and hit the system reset button on the master processor. After the Status LED lights on the master processor card, hit the reset button again for turbo load. The software will load in a much shorter time.

1.4.5.2 Software Configuration

The link type parameter has two new parameters: **GN** for CMMP Group NP links, and **GM** for CMMP Group muxport links. As stated before, links 1/2 and 3/4 are the only possible CMMP Groups allowed on a 6740 NP. The following general rules apply for the GN and GM commands:

- If Link 1 is configured as a group type link, then Links 1 and 2 will automatically be treated as a CMMP Group. Link 1's configuration overrides Link 2's configuration. If Link 2 is configured as a type other than the same type as Link 1 (GN or GM) or empty, an error report will be generated by the NP for Link 2, but Link 2 will still default to Link 1's parameters.

- If Link 1 is configured as a single link and Link 2 is configured as a group link, Link 1 will come up properly as a single link. Link 2 will come up as an empty default link, and an error report will be sent to the CTP.

- When a link is configured as a CMMP muxport link (GM), thread records must only be configured for Link 1. If muxport thread records are configured for Link 2, error reports will be sent to the CTP. Similarly, if a terminal port attempts to establish a call to a thread on Link 2, the call will not be accepted and an error report will be generated. For this reason, it is recommended that muxport links be configured on Links 1 or 3, if possible. This way, upgrading to GMux links later will be easier because all the thread records won't have to be typed in at the CTP.

- Links 3 and 4 may be substituted for Links 1 and 2, respectively, in the above paragraphs.

T2 Timer/Idle Timer. The T2 Timer parameter also takes on added significance when CMMP links are used. The T2 Timer specifies the timeout period, in seconds, before a link is declared down due to not receiving an acknowledgment for a previously transmitted frame. It is recommended that the T2 timer for CMMP Group links be set to 6 seconds to avoid excessive delays due to a single link failure. The T2 Timer may now be configured from 3 to 63 seconds, instead of the previous 6 to 63 seconds.

The T2 timer default is 20 seconds for GNet, GMux, and Net links; the default is NO for MUX links. If the default value is used and one of the links in the CMMP Group goes down, data will probably be lost. Since the link is not declared down until 20 seconds have passed, data is not routed over the other link quickly enough, and buffer overflows may occur. It is recommended that T2 timers be configured for three seconds, if possible.

The T2 Timer cannot be set to NO for GMUX links; for this case, the link would never be declared down and data would never be routed over the other link.

The idle timer has also been changed. The idle timer specifies the timeout period, in seconds, before an idle frame is sent on the link. The idle timer for links had been

set to 4 seconds. With the range of the T2 timer being expanded, the idle timer is now a function of the T2 timer as follows:

T2 Timer (seconds)	Idle Timer (seconds)
3 to 4	1
5 to 6	2
7 to 8	3
9 to 63	4

1.4.5.3 Booting

Links may be booted either with a NP port boot or NP link boot. There are two new commands in the CTP for NP link boots: "BOOT GROUP" and "BOOT LINK OFFLINE". Both of these commands have entries of YES or NO and a default of NO.

When a NP link is booted, the new sequence of commands is as follows:

"BOOT GROUP Y/N?"	(Octothorpe number #9)
"BOOT LINK OFFLINE Y/N?"	(Octothorpe number #8)
"SEND REMOTE RESET SEQUENCE Y/N?"	

Group Boot. When booting a link, either network or muxport protocol, the CTP operator will be asked if the group should be booted. This feature is useful if group link parameters or link type has been changed.

If the operator boots either Link 1 or Link 2 on a NP processor and issues the boot group command, then both Link 1 and Link 2 will be booted.

WARNING

Both links will be booted whether they are configured as group links or not. The same rule holds for Links 3 and 4.

Along with this "BOOT GROUP" command, there is a new response:

"BOOT GROUP ACKNOWLEDGED, [a]PORTj STATUS:x"

where a = node name or number

j = any valid NP link
x = 1 for a successful operation
x = -1 for an unsuccessful operation.

If the answer is no to the group boot command, then only the link specified will be booted. If only one link is booted, parameter changes will be updated only on the booted link. The user will receive a report that only one link has been booted:

"WARNING!! ONLY ONE LINK BOOTED"

Offline Boot. The boot command has also been expanded to allow the user to boot a link offline. This may be used for any type of link: Net, Mux, GNet, or GMux. Its practical use is most evident with GMux and GNet links. If a user is experiencing severe line problems with one CMMP link, the performance of both links will suffer. Performance will improve on the group if a link with excessive retransmissions is booted offline at the local end. After the problem link is fixed, it can be booted in a normal fashion to bring it back online.

Along with this "BOOT LINK OFFLINE" command, there is a new response:

"BOOT LINK OFFLINE ACKNOWLEDGED, [a]PORTj STATUS:x"

where a = node name or number

j = any valid NP link
x = 1 for a successful operation
x = -1 for an unsuccessful operation.

The offline link will not return to an online state until the link is rebooted with an answer of NO. The state can be seen by examining processor and link statistics, which will show the link state as OFFLINE if it has been booted offline.

If a link has been booted offline, the LU LED should extinguish immediately. NP and link statistics should immediately show that the link state is OFFLINE. Node statistics will show the link as EMPTY and LINK DOWN. At the remote site, the link will go down after the T2 timer expires.

WARNING

Links should be booted offline only at the local end. If a remote link is booted offline and there are no other links by which the local CTP may communicate with the remote end, then the user may be unable to boot the link back online from the local CTP. The ability to boot the remote link online depends upon the remote reset strap settings on the quad NP card. If the remote NP is strapped to enable remote resets (see the hardware reference section of *6740 Operator's Guide*) then activating the "SEND REMOTE RESET SEQUENCE" will boot the remote link back online.

1.4.6 CMMP Troubleshooting

Links do not come up for the following reasons:

- If one end is configured as network protocol and the other end is configured as muxport protocol, only CTP information will be passed on the NP link(s). The query link state will be shown on statistics for the net end; the info link state will be shown on statistics for the mux end. There is no change in this aspect of the 6740 whether the N/M or GN/GM types are used.

- The links must be both configured and cabled as shown in Figure 1-18.

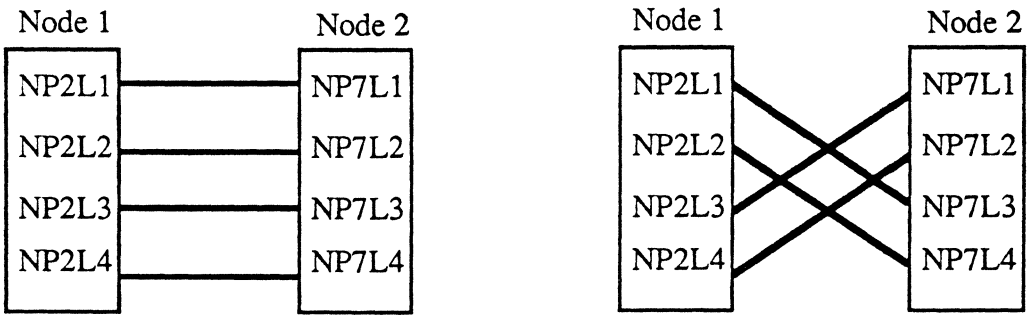


Figure 1-18. Correct Examples of CMMP Group Link Cabling

Now refer to Figure 1-19. If one link in the local CMMP Group goes to one remote CMMP Group while the other link in the local CMMP Group goes to a different remote CMMP Group, various results will be seen.

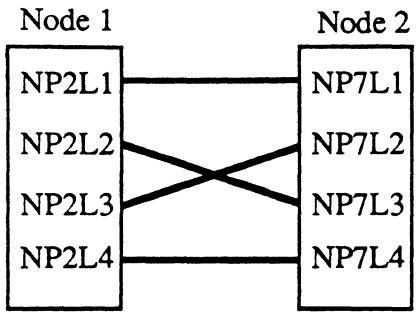


Figure 1-19. Incorrect Example of CMMP Group Link Cabling

- Proper operation depends on which link in the CMMP Group gets established first. If the first link to attempt initialization is misconfigured, such as a network-protocol-to-muxport-protocol mistake or both ends using the same address, then both links will default to allow only CTP information to be passed. However, if the first link to attempt initialization is established correctly but the second is wrong, then the first link will operate properly, but the second link will not be allowed to come up and "CMMP ERROR 000" will be sent to the CTP. This indicates that there is a cabling (rather than configuration) problem because both links in a CMMP Group use the same parameters.

1.4.6.1 Statistics

A new field labeled "link type" has been added to the network statistics display. It displays the values "Net" or "GNet." Mux and GMux links will not be displayed. Since network statistics are generated by tables maintained by the routing manager and since the routing manager is made aware of only the low-numbered link in a CMMP Group, the display will show only the low-numbered link in a group. The high-numbered link in a group will not be shown. Since this is somewhat confusing, *be sure to look at processor or link statistics to get the real state of the individual links*. The new field will remind the user if the link is part of a group and therefore represents the connectivity of a pair of links.

The new link type field has also been added to the node statistics display since the display shows the state and connectivity of the links on the specified node. As in the network statistic display, only the low-numbered link in a CMMP Group will be displayed. The high-numbered link in a group will be shown as empty. Since this is somewhat confusing, be sure to *look at processor or link statistics to get the real state of the individual links.*

The network port processor statistics display also contains the extended link type field. This display shows individual link statistics, such as speed, utilization, and throughput, as well as link type. If the link has been booted offline, the link state will be shown as offline.

The network port link statistics display shows to which remote node, port, and link number the specified link is connected. The extended link type field is also displayed. If the link has been booted offline, the link state will be shown as offline.

When requesting network port link thread statistics, the user must specify the lower link number in the CMMP Group. This is because only the low-numbered link in a group is configured. The destination thread will also be displayed as configured on the low-numbered link in the remote group although traffic for this thread may be routed over both links in the group.

1.4.6.2 Reports

The following are new reports for CMMP:

- **CONFIGURATION ERROR 014** means there is a mismatched link type in a CMMP Group. Either the high-numbered link in a CMMP Group is not configured as empty or it is not configured as the same type as the low-numbered link. Both links in the group will come up as a CMMP Group.

- **CONFIGURATION ERROR 015** means a GNet and Net link are configured on the same port processor, which is an invalid configuration. The link number contained in the report has been defaulted to empty. If the link was configured as GNet, both links will default to empty.

- **CMMP ERROR 000** means there is a group cabling problem; the two links in a CMMP group are connected to two different groups. Both links will keep going through initialization and will continue to fail; hence, this report will be generated repeatedly until the cabling problem is corrected.

- **CMMP ERROR 001** means an unexpected CMMP initialization LR-frame was received. Initialization will be tried again.

- **CMMP ERROR 002** means an unexpected CMMP initialization GR-frame was received after CMMP initialization was complete. No action is taken.

- **CMMP ERROR 003** means that the maximum number of CMMP initialization retries was exceeded. The link will be forced down and CMMP initialization will start again.

- **CMMP ERROR 004** means that both links in a CMMP Group defaulted to empty due to Inital Program Load (IPL), miscabling, or misconfiguration. The CMMP link will pass only CTP information. If the links defaulted to empty due to IPL, the condition will fix itself when IPL is finished. If the links defaulted to empty due to miscabling or misconfiguration, the link will have to be reconfigured before it can pass user data.

- **CMMP GROUP INIT COMPLETE** means that at least one link in the CMMP Group has completed initialization. The link is operational when a "FRAMING ACQUIRED" message follows this.

- **CMMP GROUP DOWN** means that both links in the group are down. No user data or CTP information will be passed.

- **WARNING!! ONLY ONE LINK BOOTED** means the user should examine both links in configuration zero to verify that all parameters match. If the parameters are the same, then this report can be ignored. If the parameters are different, then both links in the group should be booted. If the link is being booted online after being offline and no parameters have been changed, then ignore this message.

1.4.6.3 Diagnostics

The diagnostic path trace will always show the path across the low-numbered link in a group even if that link is physically down while the high-numbered link is up.

NP loopback is changed whether it is invoked from the switches on the front of the card or through the CTP. If only one link is put in loopback, "CMMP ERROR 000" messages will be sent to the CTP. Either put both links in loopback or boot one of the links offline before putting the remaining link in loopback.

The VCTP command should be invoked from the low-numbered link in a CMMP Group. If the VCTP command is invoked on the high-numbered link, a CMMP Group no error report will be shown, and the command will return to the level it was before the VCTP attempt.

1.5 6740 Synchronous Protocol Message Formats

The message format information in this section was revised for 6740 Release 7.10. Use it to determine if a customer's application can be supported on the 6740.

All 24 subtypes are listed:

- Message Formats
- Control Character List
- Data Codes Used
- Sync Fill Protection

Be sure to check for notes at the end of each subtype; important configuration and special-case information may be given.

IBM BISYNC - SUBTYPE 1

1) SYNCS SOH/ STX ..... ETB/ETX BCC1 BCC2
2) SYNCS SOH/ STX ..... SYN ..... ITB BCC1 BCC2 ..... ETB/ETX BCC1 BCC2
3) SYNCS DLE STX ..... DLE ETB/ ETX BCC1 BCC2
4) SYNCS DLE STX ..... DLE ITB BCC1 BCC2 DLE STX ..... DLE ETB/ ETX BCC1 BCC2
5) SYNCS SOH ..... DLE STX ..... (ending format of 3 and 4)
6) SYNCS ..... (up to max block size) EOT/ ENQ
7) SYNCS NAK
8) SYNCS DLE CHAR (non STX)
9) SYNCS SOH/ STX ..... ENQ
10) SYNCS SOH/ STX .....SYN ..... ITB BCC1 BCC2 ..... ENQ
11) SYNCS DLE STX ..... DLE ENQ
12) SYNCS DLE STX ..... DLE ITB BCC1 BCC2 DLE STX ..... DLE ENQ
13) SYNCS EOT PAD SYN SYN AD1 AD2 ..... ENQ (See note 1.)
14) SYNCS EOT PAD X'55' X'AA' SYN SYN AD1 AD2 ..... ENQ (See note 2.)
15) SYNCS EOT PAD (any extra PADs or mark idle optional X'55'/X 'AA' for EBCDIC only) SYN SYN AD1 AD2 .... ENQ (See notes 3 and 4.)

Standard BSC Control Character List

EBCDIC	TRANSCODE	ASCII	MEANING
X'FF'	X'3F'	X'7F'	DATA LENGTH 7-BIT+PARITY (ASCII) 8-BIT NO PARITY(EBCDIC/ASCII) 6-BIT NO PARITY (TRANSCODE)
X'01'	X'00'	X'01'	SOH
X'02'	X'0A'	X'02'	STX
X'03'	X'2E'	X'03'	ETX
X'37'	X'1E'	X'04'	EOT
X'2D'	X'2D'	X'05'	ENQ
X'10'	X'1F'	X'10'	DLE
X'3D'	X'3D'	X'15'	NAK
X'32'	X'3A'	X'16'	SYN
X'26'	X'0F'	X'17'	ETB
X'1F'	X'1D'	X'1F'	ITB

DATA CODES USED

EBCDIC (8 BIT, NO PARITY, 16-bit CRC)
ASCII with no transparency (7 BITS, ODD/EVEN PARITY, 8-bit LRC)
ASCII with transparency:
(7 bits, ODD/EVEN PARITY for Control Char and Text, 16-bit CRC)
or
(7 Bits, SPACE parity for CONTROL CHARS. and 8 bits, NO parity for text, 16-bit CRC, configure for 8 bits and NO parity)
TRANSCODE (6 BITS NO PARITY)

SYNC FILL PROTECTION

1) Last Character in message and PAD
2) ITB/ETB/ETX BCC1 BCC2
3) DLE ITB/ETB/ETX BCC1 BCC2
4) DLE CHAR

NOTES

1) This is a valid sequence for multipoint operations.

2) This is a valid sequence for EBCDIC Multipoint operations.

3) Op mode bit 5 must be set for this message to pass.

4) Message 15 can also be expanded in the following manner:

   SYNCS EOT PAD (any extra PADs or mark idle)
   [(optional X'55'/X 'AA') SYN SYN EOT PAD (extra PADs or mark idle)]
   (optional X'55'/X'AA') SYN SYN AD1 AD2 .... ENQ

   One or more sequences as shown enclosed in square brackets may occur within the message. There is a limitation that once random idle is seen, further message element must be separated by less than three character times of idle (including the pad), or the message will be terminated.

CDC USER 200 - SUBTYPE 2

1) SYNCS (4) SOH ADR1 ADR2 ACK/NAK ETX BCC
2) SYNCS (4) SOH ADR1 ADR2 CC ..... ETX BCC
3) SYNCS (4) SOH ADR1 ADR2 CC ..... ESC CHAR ETX BCC
4) SYNCS (4) SOH ADR1 ADR2 CC SYNCS (7) ..... ESC CHAR ETX BCC
5) SYNCS (4) DLE EOT

CDC USER 200 Control Character List

STATE DIAGRAM ACTED UPON?	ASCII	MEANING
	X'7F'	DATA LENGTH= 7-BIT+PARITY
NO	X'01'	SOH
YES	X'3E'	ESC
YES	X'03'	ETX
YES	X'16'	SYN
NO	X'04'	EOT
YES	X'10'	DLE

DATA CODES USED

ASCII (7 BITS, ODD PARITY)

SYNC FILL PROTECTION

1) Last character in message and PAD
2) ESC CHAR (This sequence may also appear within text)
3) ETX BCC
4) SOH CHAR (3) : protected by character delay
5) DLE EOT : protected by character delay

UNISCOPE 100/200/400 - SUBTYPE 3

1) SYNCS SOH RID SID DID ..... ETX BCC
2) SYNCS DLE EOT
3) SYNCS EOT EOT
4) SYNCS DLE EOT ETX BCC
5) SYNCS EOT EOT ETX BCC
6) SYNCS SOH RID SID DID ..... DLE
   [SOH RID SID DID ..... ETX BCC DLE] ..... ETX BCC
7) SYNCS SOH RID SID DID ..... DLE CHAR (non [or]) ..... ETX BCC
8) SYNCS SOH RID SID DID NULLS STX NULLS HT NULLS ..... STX ... ETX BCC
9) SYNCS SOH RID SID DID ..... US CHAR (4) ..... ETX BCC
10) SYNCS SOH RID SID DID ..... ESC CHAR (non VT) ..... ETX BCC
11) SYNCS SOH RID SID DID ..... ESC VT CHAR (2 OR 3) SI ..... ETX BCC

Multiple Message:

12) SYNCS SOH RID SID DID ..... ETX BCC SYNCS SOH RID SID DID .. ETX BCC

Uniscope 100/200 Control Character List

STATE DIAGRAM ACTED UPON?	ASCII	MEANING
	X'7F'	DATA LENGTH= 7-BIT+PARITY
NO	X'02'	STX
YES	X'01'	SOH
YES	X'10'	DLE
YES	X'04'	EOT
YES	X'03'	ETX
NO	X'5D'	]
NO	X'5B'	[
YES	X'16'	SYN
YES	X'1F'	US
YES	X'1B'	ESC
YES	X'0B'	VT
YES	X'0F'	SI

DATA CODES USED

(ASCII 7 BIT, ODD PARITY)

SYNC FILL PROTECTION

1) Last character in message and PAD
2) DLE CHAR
3) ETX BCC
4) SOH CHAR (3)
5) ESC VT CHAR (2 or 3) SI
6) US CHAR (4)
7) ESC CHAR (non-VT)

UNIVAC 1004 - SUBTYPE 4

1) SYNCS SOM1 ..... EOM BCC
2) SYNCS SOM2 ..... EOM BCC

Multiple Message:
3) SYNCS SOM ..... EOM BCC SYNCS (2+) SOM ..... EOM BCC

UNIVAC 1004 Control Character List

STATE DIAGRAM ACTED UPON?	BCD	MEANING
	X'7F'	DATA LENGTH = 7-BIT NO PARITY
YES	X'40'	SOM down line (SOM1)
YES	X'00'	SOM up line (SOM2)
YES	X'55'	EOM
YES	X'35'	SYN

DATA CODE USED

BCD (6 BIT), EVEN/ODD PARITY (Configure port as 7 bits no parity)

SYNC FILL PROTECTION

1) Last Character in Message and PAD
2) EOM BCC

NOTE

SYNC fills are in pairs.

UNIVAC DCT 2000 - SUBTYPE 5

1) SYNCS SOH SEL STX ..... ETX BCC
2) SYNCS STX ..... ETX BCC
3) SYNCS ACK ACK
4) SYNCS NAK NAK
5) SYNCS BEL BEL
6) SYNCS DC1 DC1
7) SYNCS EOT EOT

UNIVAC DCT 2000 Control Character List

STATE DIAGRAM ACTED UPON?	ASCII	MEANING
	X'7F'	DATA LENGTH= 7-BIT+PARITY
YES	X'02'	STX
YES	X'03'	ETX
YES	X'16'	SYN
YES	X'01'	SOH
NO	X'06'	ACK
NO	X'15'	NAK
NO	X'07'	BEL
NO	X'04'	EOT
NO	X'11'	DC1

DATA CODE USED

ASCII 7 BITS, ODD/EVEN PARITY

SYNC FILL PROTECTION

1) Last character in message and PAD
2) ETX BCC
3) The following are protected by character delay:
   a) ACK ACK
   b) NAK NAK
   c) BEL BEL
   d) DC1 DC1
   e) EOT EOT

ISO R1745 - SUBTYPE 6

1) SYNCS SOH AG AS AD STX ..... ETX BCC
2) SYNCS EOT AG AS AD STX ..... ETX BCC
3) SYNCS EOT AG AS AD ENQ
4) SYNCS EOT
5) SYNCS NAK
6) SYNCS ENQ
7) SYNCS DLE CHAR

ISO R1745 Control Character List

STATE DIAGRAM ACTED UPON?	ASCII	MEANING
	X'7F'	DATA LENGTH= 7-BIT+PARITY
YES	X'01'	SOH
YES	X'10'	DLE
YES	X'05'	ENQ
YES	X'04'	EOT
YES	X'03'	ETX
YES	X'16'	SYN
NO	X'02'	STX
NO	X'15'	NAK

DATA CODES USED

ASCII 7 BITS, ODD/EVEN PARITY

SYNC FILL PROTECTION

1) Last character in message and PAD
2) ETX BCC
3) EOT AG
4) SOH AG
5) DLE CHAR (in message #7 only, protected by character delay)

DEC DDCMP - SUBTYPE 7

1) SYNCS SOH/DLE N(LSB) N(MSB) RESP# TR# ADDR BCC1 BCC2
   DATA (N CHARS) BCC3 BCC4
2) SYNCS ENQ TYPE SUBTYPE RX# TX# ADDR BCC1 BCC2

Multiple Messages:

3) SYNCS MESSAGE1 SYNCS (See note 1.) MESSAGE1
4) SYNCS MESSAGE1 SYNCS (See note 1.) MESSAGE2
5) SYNCS MESSAGE2 SYNCS (See note 1.) MESSAGE1
6) SYNCS MESSAGE2 SYNCS (See note 1.) MESSAGE2

DEC DDCMP Control Character List

STATE DIAGRAM ACTED UPON?	ASCII	MEANING
	X'FF'	DATA LENGTH = 8 BIT
YES	X'96'	SYN
YES	X'81'	SOH
YES	X'05'	ENQ
YES	X'90'	DLE

DATA CODES USED

ASCII 8 BITS, NO PARITY

SYNC FILL PROTECTION

THIS PROTOCOL ALLOWS NO SYNC FILL

NOTES

1) The number of SYNCS between messages may be zero, four, or eight.
2) Message 1 uses 'N' to describe the number of data characters; the variable 'N' is interpreted as follows:

N(LSB) (HEX)	N(MSB) (HEX)	NO. OF DATA CHARS. (HEX)
10	00	0010
03	20	2003
FF	3F	3FFF (THIS IS MAX. NO. CHARS.)
FF	FF	3FFF (SEE EXPLANATION BELOW.)

N(MSB) byte is ANDed with X'3F";therefore, maximum DATA length may be X'3FFF' characters. Variable 'N' may range anywhere from X'0000' to X'3FFF'.

NTR 2R2 PROTOCOL - SUBTYPE 8
(UNIVAC SPEC. SRD 119)

1) SYNCS B9 B3 B0 B0 ID ID EOM BCC	SIGN-ON
2) SYNCS B9 B3 0D 89 ID ID EOM BCC	SIGN-ON
3) SYNCS SOH MSG# ACK# MT DN DET EOM BCC	CONTROL
4) SYNCS SOH MSG# ACK# 83 DN DET STX ..... EOM BCC	DATA
5) SYNCS SOH 80 ACK# 80 80 DET EOM BCC	ACK
6) SYNCS SOH 80 ACK# 01 80 SEQ# EOM BCC	NAK1
7) SYNCS SOH 80 ACK# 02 80 SEQ# EOM BCC	NAK2

Multiple Message:
8) SYNCS SOH ..... EOM BCC SYNCS SOH ..... EOM BCC

NTR Control Character List

STATE DIAGRAM ACTED UPON?	CODE	MEANING	
	X'FF'	DATA LENGTH=8 BIT NO PARITY	
NO	X'B9'	STX	FOR SIGN ON MESSAGE
NO	X'01'	SOH	ODD PARITY
YES	X'03'	EOM	EVEN PARITY
YES	X'96'	SYN	EVEN PARITY
NO	X'02'	STX	FOR DATA MESSAGE

DATA CODES USED

This protocol is unique in that the SYNC characters are even parity (X'96'). The message itself is odd parity (including the SOH character), the EOM is even parity (X'03'), and the BCC is odd parity.

The port should be configured 8-BIT NO PARITY.

SYNC FILL PROTECTION

1) Last character in message and PAD
2) EOM BCC

SITA (1024A) - SUBTYPE 9

1) SYNCS DLE ..... ETB BCC
2) SYNCS DLE TSI MBI LCI HEX HEN AC1 ..... ETB BCC
3) SYNCS DLE LSI TSI ETB BCC

Multiple Messages:
4) SYNCS DLE ..... ETB BCC SYNCS DLE ..... ETB BCC

SITA 1024 Control Character List

STATE DIAGRAM ACTED UPON?	ASCII	MEANING
	X'7F'	DATA LENGTH = 7 BIT + PARITY
YES	X'17'	ETB
NO	X'10'	DLE
YES	X'16'	SYN

DATA CODES USED

ASCII 7 BITS, ODD/EVEN PARITY

SYNC FILL PROTECTION

1) Last character in message and PAD
2) ETB BCC

ICL C02/C03- SUBTYPE 10

MESSAGES USED BY C02 PROTOCOL:

1) SYNCS EOT ADDR ENQ (POLL)
2) SYNCS SOH ADDR STX ..... TEXT ..... ETB/ETX BCC (SELECT OR TEXT)
3) SYNCS LS DS ACK/NAK (STATUS ACKNOWLEDGEMENT)
   MESSAGES USED BY C03 PROTOCOL:

4) SYNCS EOT ADDR QUAL ENQ (POLL)
5) SYNCS SOH ADDR PX ETX BCC (SELECT)
6) SYNCS LS FC DS ACK/NAK (STATUS ACKNOWLEDGEMENT)
7) SYNCS SOH ADDR FC PX ..... TEXT ..... ETX BCC (TEXT)

NOTES

1) TEXT FIELD MAXIMUM 255 CHARACTERS
2) LS = LINK STATUS
3) DS = DEVICE STATUS
4) PX = PREFIX
5) FC = FLOW CONTROL
6) ADDR = ADDRESS
7) QUAL = QUALIFIER (MAY BE X'7F')

ICL C02/C03 Control Character List

STATE DIAGRAM ACTED UPON?	ASCII	MEANING
	X'7F'	DATA LENGTH = 7 BIT + PARITY
YES	X'01'	SOH
NO	X'02'	STX
YES	X'03'	ETX
NO	X'04'	EOT
YES	X'05'	ENQ
YES	X'06'	ACK
YES	X'15'	NAK
YES	X'16'	SYN
YES	X'17'	ETB

DATA CODES USED

ASCII 7 BIT ODD PARITY

SYNC FILL PROTECTION

1) Last character in message and PAD
2) ETX BCC
3) ETB BCC

BURROUGHS 771 - SUBTYPE 11

1) SYNCS SOH ARM XH STX ..... ETX BCC
2) SYNCS SOH ARM XH STX DA1 DA2 CCL ..... RS CCL ..... ETX BCC
3) SYNCS EOT
4) SYNCS ARM ACK
5) SYNCS NAK/ENQ

BURROUGHS 771 Control Character List

STATE DIAGRAM ACTED UPON?	ASCII	MEANING
	X'7F'	DATA LENGTH = 7 BIT + PARITY
YES	X'01'	SOH
NO	X'15'	NAK
NO	X'04'	EOT
YES	X'06'	ACK
YES	X'03'	ETX
YES	X'16'	SYN
YES	X'1E'	RS
NO	X'02'	STX
NO	X'05'	ENQ

DATA CODES USED

ASCII 7 BITS, ODD/EVEN PARITY

SYNC FILL PROTECTION

1) Last Character in message and PAD
2) ETX BCC
3) RS CHAR
4) ARM ACK: protected by character delay

ARM : Non-control character

BURROUGHS POLL SELECT (RTB) - SUBTYPE 12

1) SYNCS ENQ/ACK/NAK
2) SYNCS EOT (See note 2.)
3) SYNCS EOT AD1 AD2 POL/SEL ENQ
4) SYNCS EOT NUL NUL BEL
5) SYNCS AD1 AD2 POL/SEL ENQ
6) SYNCS CHAR (1 to 3) ACK (See note 1.)
7) SYNCS SOH AD1 AD2 TR# STX ..... ETX BCC
8) SYNCS EOT AD1 AD2 FSL SOH AD1 AD2 TR# STX ..... ETX BCC
9) SYNCS DLE CHAR

Multiple Message:
10) SYNCS SOH ..... STX ..... ETX BCC SYN SYN SOH ..... STX ..... ETX BCC

BURROUGHS POLL SELECT (RTB) Control Character List

STATE DIAGRAM ACTED UPON?	ASCII	MEANING
	X'7F'	DATA LENGTH = 7 BIT +PARITY
YES	X'01'	SOH
YES	X'05'	ENQ
YES	X'15'	NAK
YES	X'07'	BEL
YES	X'06'	ACK
YES	X'03'	ETX
NO	X'04'	EOT
YES	X'16'	SYN
YES	X'10'	DLE
NO	X'02'	STX

DATA CODES USED

ASCII 7 BITS ODD PARITY

SYNC FILL PROTECTION

1) Last character in message and PAD
2) ETX BCC
3) DLE CHAR

NOTES

1) CHAR (1 to 3) are not control characters.
2) PAD can be either '7E', '7F', 'FE', or 'FF'.

HONEYWELL 701 - SUBTYPE 13

1) SYNCS SOH ..... STX ..... ETX/ETB BCC
2) SYNCS SOH EOT
3) SYNCS EOT

HONEYWELL 701 Control Character List

STATE DIAGRAM ACTED UPON?	ASCII	MEANING
	X'7F'	DATA LENGTH = 7 BIT + PARITY
NO	X'01'	SOH
YES	X'04'	EOT
YES	X'03'	ETX
YES	X'17'	ETB
YES	X'16'	SYN
NO	X'02'	STX

DATA CODES USED

7 BITS, ODD/EVEN PARITY

SYNC FILL PROTECTION

1) Last character in message and PAD
2) ETX BCC
3) ETB BCC

ICL C01 - SUBTYPE 14

1) SYNCS SOH ..... STX ..... ETX/ETB BCC
2) SYNCS EOT ..... ETX/ETB BCC
3) SYNCS STATUS ACK/NAK/ENQ
4) SYNCS ACK/NAK/ENQ/EOT
5) SYNCS EOT ..... ENQ

ICL C01 Control Character List

STATE DIAGRAM ACTED UPON?	ASCII	MEANING
	X'7F'	DATA LENGTH = 7 BIT +PARITY
YES	X'04'	EOT
NO	X'01'	SOH
YES	X'05'	ENQ
YES	X'15'	NAK
YES	X'06'	ACK
YES	X'03'	ETX
YES	X'16'	SYN
YES	X'17'	ETB
NO	X'02'	STX

DATA CODES USED

ASCII 7 BITS ODD PARITY

SYNC FILL PROTECTION

1) Last character in message and PAD
2) ETX BCC
3) ETB BCC

VIP 7700 - SUBTYPE 15

1) SYNCS SOH EOT
2) SYNCS EOT
3) SYNCS SOH ADR ACK/NAK FC1 FC2 STX ETX BCC1 BCC2
4) SYNCS SOH ADR NUL STX ETX BCC1 BCC2
5) SYNCS SOH ADR NUL/PRT/ACK/NAK/BUSY FC1 FC2 STX .....ETB/ETX BCC1 BCC2
6) SYNCS [MESSAGE 3/4/5] SYNCS (0 or 4) EOT

Multiple Message:

7) SYNCS [MESSAGE 4] SYN SYN [MESSAGE 5] SYN SYN [MESSAGE 4]
8) SYNCS [MESSAGE 4] SYN SYN [MESSAGE 3] SYN SYN [MESSAGE 4]

MESSAGE FORMATS WITH RLP (remote line printer) OPTION:

9) SYNCS SOH FC SC AC OC IC STX ..... TEXT ..... ETX BCC1 BCC2
10) SYNCS SOH ..... HEADING ..... STX ETX BCC1 BCC2
11) SYNCS SOH X'49' SC AC OC IC STX ..... TEXT ..... CHAR US CNT TEXT ETX BCC1 BCC2
12) SYNCS SOH ..... HEADING ..... STX ..... TEXT ..... RS BCC1 BCC2 TEXT .... RS BCC1 BCC2 ETX BCC1 BCC2

VIP 7700 Control Character List

STATE DIAGRAM ACTED UPON?	ASCII	MEANING
	X'7F'	DATA LENGTH = 7 BIT + PARITY
YES	X'16'	SYN
YES	X'01'	SOH
NO	X'02'	STX
YES	X'17'	ETB
YES	X'03'	ETX
NO	X'06'	ACK
NO	X'15'	NAK
YES	X'04'	EOT
YES	X'1F'	US
YES	X'1E'	RS
YES	X'49'	(ONE OF FORMAT CODES) THE REST OF THE FORMAT CODES ARE NOT ACTED UPON BY STATE DIAGRAMS.

DATA CODES USED

ASCII 7 BITS ODD PARITY

SYNC FILL PROTECTION

1) Last Character in message and PAD
2) ETX BCC1 BCC2
3) ETB BCC1 BCC2
4) RS BCC1 BCC2
5) CHAR US CNT

FTS - SUBTYPE 16

1) SYNCS SOH/STX ..... ETB/ETX BCC1 BCC2
2) SYNCS SOH/STX ..... SYN ..... ITB BCC1 BCC2 ..... ETB/ETX BCC1 BCC2
3) SYNCS DLE STX ..... DLE ETB/ETX BCC1 BCC2
4) SYNCS DLE STX ..... DLE ITB BCC1 BCC2 DLE STX ..... DLE ETB/ETX BCC1 BCC2
5) SYNCS SOH ..... DLE STX ..... (ending format of 3 and 4)
6) SYNCS ..... (up to max block size) EOT/ENQ
7) SYNCS NAK
8) SYNCS DLE CHAR (non STX)
9) SYNCS SOH/STX ..... ENQ
10) SYNCS SOH/STX ..... SYN ..... ITB BCC1 BCC2 ..... ENQ
11) SYNCS DLE STX ..... DLE ENQ
12) SYNCS DLE STX ..... DLE ITB BCC1 BCC2 DLE STX ..... DLE ENQ
13) SYNCS EOT PAD SYN SYN AD1 AD2 ..... ENQ (See note 1.)
14) SYNCS EOT PAD (any extra PADs or mark idle) SYN SYN AD1 AD2....ENQ (See note 2.)
15) SYNCS EOT EOT

FTS Control Character List

STATE DIAG ACTED UPON?	ASCII	MEANING
	X'7F'	DATA LENGTH = 7 BIT + PARITY
YES	X'01'	SOH
YES	X'02'	STX
YES	X'03'	ETX
YES	X'04'	EOT
YES	X'05'	ENQ
YES	X'10'	DLE
YES	X'15'	NAK
YES	X'16'	SYN
YES	X'17'	ETB
YES	X'1F'	ITB

DATA CODES USED

ASCII with no transparency: (7 BIT, ODD/EVEN PARITY, 8 BIT LRC)
ASCII with transparency: (7 BIT, ODD/EVEN PARITY for Control Chars and TEXT, 16 bit CRC)

or

(7 BIT, space parity for Control Chars. and 8 BIT, NO PARITY for TEXT, 16 bit CRC, configured for 8 BIT, NO PARITY)

SYNC FILL PROTECTION

1) Last character in Message and PAD
2) ITB/ETB/ETX BCC1 BCC2
3) DLE ITB/ETB/ETX BCC1 BCC2
4) DLE CHAR

NOTES

1) This is a valid sequence for Multipoint Operation.

2) Op mode bit 5 must be set for this message to pass. Op mode bit 7 must be set if the amount of idle is not a whole number of characters times and there might be three or more consecutive characters times of idle in the data stream between the 10th and 24th characters after the random idle time. After the 24th character, three character times of idle will terminate the message.

3) Message 14 can also be expanded in the following manner:
   - SYNCS EOT PAD (any extra PADs or mark idle)
   - [SYN SYN EOT PAD (extra PADs or mark idle)]
   - SYN SYN AD1 AD2 ..... ENQ

One or more sequences as shown enclosed in square brackets may occur within the message. There is a limitation that once random idle is seen, further message elements must be separated by less than three character times of idle (including the PAD), or the message will be terminated.

MULTIPLE MESSAGE IBM BISYNC - SUBTYPE 17

MESSAGE FORMATS 1 THROUGH 4 ARE VALID FOR MULTIPLE MESSAGES:

1) SYNCS SOH/STX ..... ETB/ETX BCC1 BCC2
2) SYNCS SOH/STX ..... SYN ..... ITB BCC1 BCC2 ..... ETB/ETX BCC1 BCC2
3) SYNCS DLE STX ..... DLE ETB/ETX BCC1 BCC2
4) SYNCS DLE STX ..... DLE ITB BCC1 BCC2 DLE STX ..... DLE ETB/ETX BCC1 BCC2

MESSAGE FORMATS 5 THROUGH 15 ARE NOT VALID FOR MULTIPLE MESSAGES:

5) SYNC SOH ..... DLE STX ..... (ending format of 3 and 4)
6) SYNCS ..... (up to maximum block size) EOT/ENQ
7) SYNCS NAK
8) SYNCS DLE CHAR (non-STX)
9) SYNCS SOH/STX ..... ENQ
10) SYNCS SOH/STX ..... SYN ..... ITB BCC1 BCC2 ..... ENQ
11) SYNCS DLE STX ..... DLE ENQ
12) SYNCS DLE STX ..... DLE ITB BCC1 BCC2 DLE STX ..... DLE ENQ
13) SYNCS EOT PAD SYN SYN AD1 AD2 ..... ENQ (See note 1.)
14) SYNCS EOT PAD X'55'/X'AA' SYN SYN AD1 AD2 .....ENQ (See note 2.)
15) SYNCS EOT PAD (any extra PADs or mark idle) (optional X'55'/X'AA') SYN SYN AD1 AD2 ..... ENQ (See notes 3 and 4.)

Multiple Messages:

16) SYNCS [MESSAGE 1, 2, 3, or 4] SYNCS [MESSAGE 1, 2, 3, or 4] ..... (See note 5.)

Multiple Message BSC Control Character List

STATE DIAG ACTED UPON?	EBCDIC	MEANING
	X'FF'	DATA LENGTH = 8 BIT NO PARITY
YES	X'01'	SOH
YES	X'02'	STX
YES	X'03'	ETX
YES	X'37'	EOT
YES	X'2D'	ENQ
YES	X'10'	DLE
YES	X'3D'	NAK
YES	X'32'	SYN
YES	X'26'	ETB
YES	X'1F'	ITB

DATA CODES USED

EBCDIC 8 BIT NO PARITY 16-BIT CRC

SYNC FILL PROTECTION

1) Last Character in message and PAD
2) ITB/ETB/ETX BCC1 BCC2
3) DLE ITB/ETB/ETX BCC1 BCC2
4) DLE CHAR

NOTES

1) This is a valid sequence for Multipoint Operation.

2) This is a valid sequence for EBCDIC Multipoint Operation.

3) Op mode bit 5 must be set for this message to pass. Op mode bit 7 must be set if the amount of idle is not a whole number of characters times and there might be three or more consecutive character times of idle in the data stream between the 10th and 24th characters after the random idle time. After the 24th character, three character times of idle will terminate the message.

4) Message 15 can also be expanded in the following manner:
SYNCS EOT PAD (any extra PADs or mark idle)] [(optional X'55'/X'AA') SYN SYN EOT PAD (extra PADs or mark idle)]
[(optional X'55'/X'AA') SYN SYN AD1 AD2 ..... ENQ)

One or more sequences as shown enclosed in square brackets may occur within the message. There is a limitation that once random idle is seen, further message elements must be separated by less than three character times of idle (including the PAD), or the message will be terminated.

5) Op mode bit 1 must be set to 0 to enable multiple messages.

NEC LEVEL 2B - SUBTYPE 18

1) SYNCS SOH HEADER STX ..... CHAR US CNT ..... ETX/ETB BBC
2) SYNCS SOH/STX ..... CHAR US CNT ..... ETX/ETB BBC 3) SYNCS SA UA ENQ
4) SYNCS EOT/ENQ/NAK
5) SYNCS DLE CHAR (EQUIVALENT TO ACK 0 OR ACK 1)

NEC LEVEL 2B Control Character List

STATE DIAG ACTED UPON?	ASCII	MEANING
	X'7F'	DATA LENGTH=7 BIT+PARITY
YES	X'02'	STX
YES	X'01'	SOH
YES	X'10'	DLE
YES	X'05'	ENQ
YES	X'15'	NAK
YES	X'04'	EOT
YES	X'03'	ETX
YES	X'17'	ETB
YES	X'1F'	US
YES	X'16'	SYN

DATA CODES USED

ASCII (TEXT = 7 BIT, ODD PARITY, BCC's =8 BIT NO PARITY)
Configure port for 8 bit no parity.

SYNC FILL PROTECTION

1) Last Character in message and PAD
2) ETX/ETB BCC
3) CHAR US CNT

MODIFIED BURROUGHS POLL SELECT - SUBTYPE 19

1) SYNCS ENQ/ACK/NAK
2) SYNCS EOT (See note 2.)
3) SYNCS EOT AD1 AD2 POL/SEL ENQ
4) SYNCS EOT NUL NUL BEL
5) SYNCS AD1 AD2 POL/SEL ENQ
6) SYNCS CHAR (1 to 3) ACK (See note 1.)
7) SYNCS SOH AD1 AD2 TR# STX ..... ETX BCC
8) SYNCS EOT AD1 AD2 FSL SOH AD1 AD2 TR# STX ..... ETX BCC
9) SYNCS DLE CHAR

Multiple Message:
10) SYNCS SOH ..... STX ..... ETX BCC SYN SYN SOH .... STX ... ETX BCC

BURROUGHS POLL SELECT Control Character List

STATE DIAG ACTED UPON?	ASCII	MEANING
	X'7F'	DATA LENGTH=7 BIT+PARITY
YES	X'01'	SOH
YES	X'05'	ENQ
YES	X'15'	NAK
YES	X'07'	BEL
YES	X'06'	ACK
YES	X'03'	ETX
YES	X'04'	EOT
YES	X'16'	SYN
YES	X'10'	DLE
NO	X'02'	STX

DATA CODES USED

ASCII 7 BIT ODD PARITY

SYNC FILL PROTECTION

1) Last Character in message and PAD
2) ETX BCC
3) DLE CHAR

NOTES

1) CHAR (1 to 3) are not control characters
2) PAD CHAR can be '01' - '1F' or '7F' - 'FF'

MITSUBISHI M-345 - SUBTYPE 20

1) SYNCS SOH ..... DLE # # ETX BCC
2) SYNCS EOT EOT ETX BCC
3) SYNCS SOH ..... ENQ ETX BCC

MITSUBISHI M-345 Control Character List

STATE DIAGRAM ACTED UPON?	ASCII	MEANING
	X'7F'	DATA LENGTH=7 BIT+PARITY
YES	X'01'	SOH
NO	X'10'	DLE
YES	X'04'	EOT
YES	X'03'	ETX
YES	X'16'	SYN

DATA CODES USED

ASCII 7 BIT ODD PARITY

SYNC FILL PROTECTION

1) Last Character in message and PAD
2) ETX BCC

NOTES

In message 1, # = non-ETX

TOSHIBA RT-100 - SUBTYPE 21

1) SYNCS SOH EOT
2) SYNCS SOH (6 CHARS) STX ETX BCC1 BCC2
3) SYNCS SOH (6 CHARS) STX ..... ETX BCC1 BCC2
4) SYNCS SOH (6 CHARS) STX SYN SYN SYN ..... ETX BCC1 BCC2

TOSHIBA RT-100 Control Character List

STATE DIAG ACTED UPON?	ASCII	MEANING
	X'7F'	DATA LENGTH=7 BIT+PARITY
NO	X'02'	STX
YES	X'01'	SOH
YES	X'04'	EOT
YES	X'03'	ETX
YES	X'16'	SYN

DATA CODES USED

ASCII 7 BIT ANY PARITY

SYNC FILL PROTECTION

1) Last Character in message and PAD
2) ETX BCC1 BCC2

NOTE

The 6-character header does not contain control characters.

TOSHIBA RT-120 - SUBTYPE 22

1) SYNCS STX OP/STA SEQ ETX BCC
2) SYNCS STX OP/STA SEQ ..... ETX BCC

TOSHIBA RT-120 Control Character List

STATE DIAG ACTED UPON?	ASCII	MEANING
	X'7F'	DATA LENGTH=7 BIT+PARITY
YES	X'02'	STX
YES	X'03'	ETX
YES	X'16'	SYN

DATA CODES USED

ASCII 7 BIT ANY PARITY

SYNC FILL PROTECTION

1) Last character in message and PAD
2) ETX BCC

NOTES

OP, STA and SEQ = non-ETX

DDP/80 - SUBTYPE 23

1) SYNCS SOH/STX ..... ETB/ETX BCC1 BCC2
2) SYNCS SOH/STX ..... SYN ..... ITB BCC1 BCC2 ... ETB/ETX BCC1 BCC2
3) SYNCS DLE STX ..... DLE ETB/ETX BCC1 BCC2
4) SYNCS DLE STX ..... DLE ITB BCC1 BCC2 DLE STX ..... DLE ETB/ETX BCC1 BCC2
5) SYNCS SOH ..... DLE STX ..... (ending format of 3) and 4))
6) SYNCS ..... (up to maximum block size) EOT/ENQ
7) SYNCS NAK
8) SYNCS DLE CHAR (non-STX)
9) SYNCS SOH/STX ..... ENQ
10) SYNCS SOH/STX ..... SYN ..... ITB BCC1 BCC2 ..... ENQ
11) SYNCS DLE STX ..... DLE ENQ
12) SYNCS DLE STX ..... DLE ITB BCC1 BCC2 DLE STX ..... DLE ENQ
13) SYNCS EOT PAD SYN SYN AD1 AD2 ..... ENQ (See note 1.)
14) SYNCS EOT PAD (any extra PADs or mark idle) SYN SYN AD1 AD2.....ENQ
15) SYNCS ACK

DDP/80 Control Character List

STATE DIAGRAM ACTED UPON?	ASCII	MEANING
	X'7F'	DATA LENGTH=7 BIT+PARITY
YES	X'01'	SOH
YES	X'02'	STX
YES	X'03'	ETX
YES	X'04'	EOT
YES	X'05'	ENQ
YES	X'10'	DLE
YES	X'15'	NAK
YES	X'16'	SYN
YES	X'17'	ETB
YES	X'1F'	ITB
YES	X'06'	ACK

DATA CODES USED

ASCII with no transparency (7 BIT, ODD/EVEN PARITY, 8 BIT LRC)
ASCII with transparency:
(7 bit, ODD/EVEN parity for CONTROL CHARS and TEXT, 16 bit CRC)
or
(7 BIT, SPACE parity for CONTROL CHARS, and 8 bit, no parity for TEXT, 16 bit CRC, configure for 8 bit and NO parity)

SYNC FILL PROTECTION

1) Last character in message and PAD
2) ITB/ETB/ETX BCC1 BCC2
3) DLE ITB/ETB/ETX BCC1 BCC2
4) DLE CHAR

NOTES

1) This is a valid sequence for Multipoint Operations.

2) Op mode bit 5 must be set for this message to pass. Op mode bit 7 must be set if the amount of idle is not a whole number of characters times and there might be three or more consecutive character times of idle in the data stream between the 10th and 24th characters after the random idle time. After the 24th character, three character times of idle will terminate the message.

3) Message 14 can also be expanded in the following manner:

   - SYNCS EOT PAD (any extra PADs or mark idle)
   - [SYN SYN EOT PAD (extra PADs or mark idle)]
   - SYN SYN AD1 AD2 ..... ENQ

One or more sequences as shown enclosed in square brackets may occur within the message. There is a limitation that once random idle is seen, further message elements must be separated by less than three character times of idle (including the PAD), or the message will be terminated.

GENERIC SYNCHRONOUS PROTOCOL - SUBTYPE 24

1) SYNCS ..... [ANY CHARACTER] ..... PAD

Generic Synchronous Control Character List

STATE DIAGRAM ACTED UPON?	ASCII	MEANING
	X'FF'	DATA LENGTH = 8 BIT NO PARITY
	X'7F'	DATA LENGTH=7 BIT+PARITY
YES	X'FF'	PAD (8 BIT NO PARITY/ 7 BIT EVEN PARITY)
	X'7F'	PAD (7 BIT ODD PARITY)
YES	X'16'	SYN

DATA CODES USED

ASCII 8 BIT NO PARITY or 7 BIT ODD/EVEN PARITY

SYNC FILL PROTECTION

NONE

Section 5.0
Configuration Specification

Contents

5.1 Introduction

This section describes how to configure the 6740 DCP product during installation and maintenance. Hardware strapping information consists of strap descriptions and recommended strapping selections for given applications.

This section identifies those quirks or performance-related problems that you can rectify with proper parameter or strap selection. In addition, descriptions of all components contained in the 6740 DCP Hardware Strapping Guide are identified, e.g., power supplies, port cards, and mainframe components.

5.2 Network and Application Topology Considerations

Refer to Section 1, Paragraph 1.3, 6740 Interconnectivity, of this Technical Reference for Network and Application Topology Considerations.

5.3 Rack, Nest, and Card Placement Rules

Refer to Sections 3.0 and 7.0 of this Technical Reference for site preparation specifications.

5.4 Programming Rules

Paragraph 5.4 is intended to assist AE's and CSE's in fine tuning a 6740 network. Since it is not intended to be an operations manual, it does not repeat parameter definitions.

5.4.1 Link Timeout Configurations

Prior to Software Release 6.1, a network link could be restarted 20 seconds after power-up. Now, the T2 TIMEOUT default parameter allows you to set the timeout from 6 to 63 seconds. You can also use the T2 TIMEOUT for MXP link applications. Note: The proper value of the T2 TIMEOUT default parameter varies according to the application. You need to know specific information about link utilization and reliability before you can accurately bring up the network. Configure the T2 TIMEOUT default parameter to 20 seconds if you lack sufficient network data.

5.4.2 Adaptive Routing and Load Balancing

Load balancing is a feature that is available when two separate NP links can route a thread. If rerouting a thread from one NP link to another can improve a thread's one-way delay by 20 ms, then that thread will be automatically rerouted.

5.5 Hardware Strapping Guide

There are no hard straps in the 6740 that affect system performance. CTP terminal speed and parity are switched; and node number, remote reset, and Configuration Memory (CMEM) battery backup are all strapped. Refer to Chapter 3, *6740 DCP Operator's Guide*, for proper setting of these straps and switches.

5.6 Informational Updates (To Be Supplied)

5.6 Release 7.10 Network Application Configuration Information

CMMP adds more configuration rules to the 6740. The notes below can be used as a quick applications reference for networks using CMMP. CMMP is discussed in greater detail in Paragraph 1.4.1 of Section 1. **Note:** These configuration guidelines are repeated for your convenience.

1) The NP card is still a single point of failure; if the card fails, both links go down.

2) The maximum number of muxport threads through a NP card stays the same: 85 for 6740s.

3) For CMMP Groups of muxport protocol links, there is only one backup link rather than the three backup links of a parallel topology using CMMP network links.

4) One 6740 EIA-232 NP card supports a maximum of two CMMP Groups. The two groups are fixed and defined as Link 1 and Link 2 assigned to one group, and link 3 and link 4 assigned to the other group. One V.35 NP card supports one CMMP Group, with both links assigned to one group.

5) Maximum parallel topology Gnet link bandwidth capacity (not data throughput) is 256 kbps (four links at 64 kbps) for group band speed links, or 76.8 kbps (four links at 19.2 kbps) for standard EIA 232-C links.

6) Maximum linear topology Gnet link bandwidth capacity (not actual user data throughput) is 128 kbps (two links at 64 kbps) for group band speed links, or 38.4 kbps (two links at 19.2 kbps) for standard EIA 232-C links.

7) Maximum delta topology Gnet link bandwidth capacity (not actual user data throughput) is 128 kbps (two links at 64 kbps) for group band speed links, or 38.4 kbps (two links at 19.2 kbps) for standard EIA 232-C links.

8) For group band speed muxport protocol links, with two links per NP card times four NP cards per node, link bandwidth capacity (not actual user data throughput) is 512 kbps. Note that this is significantly higher than the throughput of the 6740 switch processor. For standard EIA 232-C muxport protocol links, with 16 muxport protocol links per node, link capacity is 307.2 kbps.

9) Equal static link delays are assumed on all physical links in a CMMP Group because the static link delay parameters are forced equal at configuration time. If the actual static link delays are significantly different on physical links in a CMMP Group, data may suffer long delays and bursts.

10) If unequal link speeds are used or if excessive restransmission or line errors exist on one line in a CMMP Group, delays will result and burst data may be seen on TP threads routed over both lines in the group.

11) The maximum number of outstanding frames allowed on a CMMP Group is 127. The 127-frame limit was designed into CMMP to allow future use. However, since the 6740 NP allows only up to 30 frames per physical link to be outstanding, the CMMP Group limit for a 6740 is 60 frames outstanding.

12) You *cannot* configure CMMP Group net links and non-CMMP single net links on the same NP.

13) Be sure to use separate modems and lines to ensure no single points of failure. The link redundancy feature is of no use if both links use the same modem and the modem fails.

14) For best results, use the *same* physical link characteristics. Suppose Link 1 is a satellite link and Link 2 is a terrestrial link. The actual static link delays for each link are significantly different, and Link 2's performance will degrade to that of the satellite link. This is an example of limitation #9. If different links must be used in the application, a dual network link configuration is a better choice.

15) A single 19.2 kbps link provides slightly better throughput and delay than two 9600 bps links. A CMMP Group of net links provides *better* load balancing (and therefore better overall performance) than two single net links in most point-to-point applications.

16) If Link 1 is configured as a group type link, then Links 1 and 2 will automatically be treated as a CMMP Group. Link 1's configuration overrides Link 2's configuration. If Link 2 is configured as a type other

than the same type as Link 1 (GN or GM) or empty, an error report will be generated by the NP for Link 2, but Link 2 will still default to Link 1's parameters. The same rules hold for Links 3/4.

17) If Link 1 is configured as a single link and Link 2 is configured as a group link, Link 1 will come up properly as a single link. Link 2 will come up as an empty default link and an error report will be sent to the CTP. The same rule holds for Links 3/4.

18) When a link is configured as a CMMP muxport link (GM), thread records must be configured for only Link 1. If muxport thread records are configured for Link 2, no error reports will be sent to the CTP. Similarly, if a terminal port attempts to establish a call to a thread on Link 2, the call will not be accepted and no error report will be generated. The same rules hold for Links 3/4.

19) The T2 Timer parameter also takes on added importance when CMMP links are used. The T2 Timer specifies the timeout period, in seconds, before a link is declared down due to not receiving an acknowledgment for a previously transmitted frame. It is recommended that the T2 timer for CMMP Group links be set to 3 seconds to avoid excessive delays due to a single link failure. The T2 Timer may now be configured from 3 to 63 seconds instead of the previous 6 to 63 seconds.

20) The T2 timer default is 20 for Net, Gnet, and Gmux links and NO for MUX links. If the default value is used and one of the links in the CMMP Group goes down, data will probably be lost. Since the link is not declared down until the 20 seconds have passed, data is not routed over the other link quickly enough; data loss at the TP will occur if the user continues to enter data during the 20-second timeout. Change the T2 Timer default for group links.

22) The T2 Timer cannot be set to NO for GMUX links; for this case, the link is never declared down and data is never routed over the other link.

5.6.1 Clocking Enhancements

Asynchronous templates have the addition of 100 and 200 bps with internal or external clocking, and 12000 bps with external clocking only.

Synchronous/BOP templates have the addition of 12000, 14.4 and 16.8 kbps internal or external clocking, but not internal clock stopping.

Synchronous/BOP templates will not be able to have 100 or 200 bps under any circumstances.

Tables 5-1, 5-2, and 5-3 list the speeds supported by Release 7.10.

Table 5-1.
Asynchronous Clocking

Port Type	*Tx Clock*	*Rx Clock*	*External*
Async	50	50	Y/N
Async	75	75	Y/N
Async	100	100	Y/N
Async	110	110	Y/N
Async	134	134	Y/N
Async	150	150	Y/N
Async	200	200	Y/N
Async	300	300	Y/N
Async	600	600	Y/N
Async	1200	1200	Y/N
Async	1800	1800	Y/N
Async	2000	2000	Y/N
Async	2400	2400	Y/N
Async	3600	3600	Y/N
Async	4800	4800	Y/N
Async	7200	7200	Y/N
Async	9600	9600	Y/N
Async	12000	12000	Y
Async	14400	14400	Y
Async	16800	16800	Y
Async	19200	19200	Y/N

Table 5-2.
Synchronous Clocking

Port Type	*Tx Speed*	*Rx Speed*	*Tx Clock*	*Rx Clock*
Sync	50	50	I/E	I/IS/E
Sync	75	75	I/E	I/IS/E
Sync	110	110	I/E	I/IS/E
Sync	134	134	I/E	I/IS/E
Sync	150	150	I/E	I/IS/E
Sync	300	300	I/E	I/IS/E
Sync	600	600	I/E	I/IS/E
Sync	1200	1200	I/E	I/IS/E
Sync	1800	1800	I/E	I/IS/E
Sync	2000	2000	I/E	I/IS/E
Sync	2400	2400	I/E	I/IS/E
Sync	3600	3600	I/E	I/IS/E
Sync	4800	4800	I/E	I/IS/E
Sync	7200	7200	I/E	I/IS/E
Sync	9600	9600	I/E	I/IS/E
Sync	12000	12000	I/E	I/E
Sync	14400	14400	I/E	I/E
Sync	16800	16800	I/E	I/E
Sync	19200	19200	I/E	I/IS/E

Table 5-3.
BOP Clocking

Port Type	*Tx Speed*	*Rx Speed*	*Tx Clock*	*Rx Clock*
BOP	50	50	I/E	I/IS/E
BOP	75	75	I/E	I/IS/E
BOP	110	110	I/E	I/IS/E
BOP	134	134	I/E	I/IS/E
BOP	150	150	I/E	I/IS/E
BOP	300	300	I/E	I/IS/E
BOP	600	600	I/E	I/IS/E
BOP	1200	1200	I/E	I/IS/E
BOP	1800	1800	I/E	I/IS/E
BOP	2000	2000	I/E	I/IS/E
BOP	2400	2400	I/E	I/IS/E
BOP	3600	3600	I/E	I/IS/E
BOP	4800	4800	I/E	I/IS/E
BOP	7200	7200	I/E	I/IS/E
BOP	9600	9600	I/E	I/IS/E
BOP	12000	12000	I/E	I/E
BOP	14400	14400	I/E	I/E
BOP	16800	16800	I/E	I/E
BOP	19200	19200	I/E	I/IS/E

5.7 Configuration of CMMP on the 6740

The following sections, taken from the 6740 CMMP Functional Specification, describe configuration parameters which are different for Network Port CMMP links and non-CMMP links. No changes are necessary at the Network Port Processor configuration level to support CMMP. No new parameters are required at the Network Port link configuration level either, but several have a slightly different meaning or have been extended to accept new values for CMMP links. For complete details on configuration of Network Ports, Network Port links, and Network Port muxport protocol threads, refer to Chapter 5 of the *6740 Operator's Manual.*

5.7.1 Configuring the 6740 Network Port Link Records

Configuration of 6740 Network Port links is basically the same for CMMP links and non-CMMP links except that the Link Type parameter has been extended to accept new values for CMMP links, and several parameters have added significance or a slightly different meaning when CMMP links are used.

The Link Type parameter currently accepts the values "N" for networking links, "M" for muxport links, and "E" for empty links. Two new values will be accepted for CMMP. These values are "GN" for CMMP Group networking links and "GM" for CMMP Group muxport links. If Link 1 (or Link 3) is configured as a group type link, then Links 1 and 2 (or Links 3 and 4) will be treated as a CMMP Group. Link 1's configuration parameters will then be used by both links in the group, regardless of what Link 2's configuration is. If Link 2 is configured as a type other than either empty or the same type as Link 1, then an error report will be generated by the NP for Link 2, and both links will use Link 1's configuration parameters.

If Link 2 is configured as a CMMP link and Link 1 is configured as a single link, then Link 1 will come up properly as a single link, but Link 2 will come up with default values (Link Type Empty, Address A, only CTP information allowed on the link), and an error report will be sent to the CTP. Note that misconfiguring one end of a link as a CMMP Group type link and the other end of the link as a single link will also result in the link being established with default values. Note also that Links 3 and 4 may be substituted for Links 1 and 2, respectively in the above paragraphs. Links 1/2 and 3/4 are the only possible CMMP link groups on a 6740 NP.

The Address parameter is configured to identify each end of any muxport protocol or network protocol Network Port link. The Address parameter is used in conjunction with the Link Type parameter when configuring CMMP Groups or non-CMMP links. The Address parameter for both CMMP and non-CMMP links is configured as "A" or "B." For non-CMMP links, the Address parameter configured is used in the Address Field of CMP frames. For CMMP links, the Address parameter configured is converted by the NP to the HDLC Address "C" or "D," and "C" or "D" is used in the Address Field of CMMP frames. Table 5-4 shows all possible combinations of Address parameter configurations for two ends of a link.

Table 5-4.
Address Parameter Configurations

Configured Address Node X, Link Y	Node X, Link Y NP/MXP HDLC Addr	Configured Address Node M, Link N	Node M, Link N NP/MXP HDLC Addr	Result
A	A	A	A	Invalid Config
A	A	B	B	MXP, Normal Mode
A	A	A (CMMP)*	C	Invalid Config
A	A	B (CMMP)*	D	Invalid Config
B	B	A	A	MXP, Normal Mode
B	B	B	B	Invalid Config
B	B	A (CMMP)*	C	Invalid Config
B	B	B (CMMP)*	D	Invalid Config
A (CMMP)*	C	A	A	Invalid Config
A (CMMP)*	C	B	B	Invalid Config
A (CMMP)*	C	A (CMMP)*	C	Invalid Config
A (CMMP)*	C	B (CMMP)*	D	CMMP, Normal Mode
B (CMMP)*	D	A	A	Invalid Config
B (CMMP)*	D	B	B	Invalid Config
B (CMMP)*	D	A (CMMP)*	C	CMMP, Normal Mode
B (CMMP)*	D	B (CMMP)*	D	Invalid Config

*This indicates that the link was configured as part of a CMMP Group by setting the Network Port Link Type parameter to a CMMP Group value, either "GN" or "GM."

NOTE: Links will not operate properly for INVALID CONFIGURATIONs. Links in INVALID CONFIGURATIONs will only allow CTP information to be passed across the link.

Misconfiguration of the Network Port link type parameter (e.g., one end is configured as network protocol and one end as muxport protocol) when non-CMMP or CMMP links are used results in only CTP information being passed on the Network Port link(s).

Incorrect cabling where one link in the local CMMP Group goes to one remote CMMP Group, while the other link in the local CMMP Group goes to a different remote CMMP Group may have various results. Since CMMP links are established sequentially, the result of miscabling depends on which link in the CMMP Group establishes first. A CMMP link will be established with the node on the link which completes the CMMP initialization process first. If the first link to attempt initialization is misconfigured in any way (e.g., one end network protocol and one end muxport protocol, both ends using the same address, etc.) both links in the CMMP Group default to only allow CTP information to be passed, and an error report is sent to the CTP. If the first link to establish is configured correctly and the second link is not configured correctly, this indicates that something has been cabled incorrectly since both links in a CMMP Group use the same link parameters. In this case, the first link will continue to operate properly, but the second link is not allowed to come up and an error report is sent to the CTP.

The T2 Timer parameter also takes on added importance when CMMP links are used. The T2 Timer specifies the timeout period in seconds before a link is declared down due to not receiving an acknowledgment for a previously transmitted frame. It is recommended that the T2 Timer for CMMP network protocol links and CMMP muxport protocol links be set to 3 seconds to avoid excessive delays due to a single link failure in the CMMP Group. The CTP has been modified to allow the T2 timer to be configured as low as 3 seconds.

5.7.2 Configuring the Muxport Thread Record

When a link is configured as a CMMP muxport protocol link, (i.e., Link Type GM) thread records must be configured for only Link 1. If muxport thread records are configured for Link 2, an error report will be sent to the CTP for each incorrectly configured thread. Similarly, if a terminal port attempts to establish a call to a thread on Link 2, the call will not be accepted and an error report will be sent to the CTP. The Link 3/4 group will be handled in the same manner.

5.8 Special Op Mode Bit Settings for Synchronous Protocol

The following paragraphs give a quick summary of synchronous messages that require special op mode bit settings in the thread template. If you use the subtypes listed below, refer to the Synchronous Protocol Message Formats (Paragraph 1.4.2) in Section 1 of this Technical Reference.

SUBTYPE 1 - IBM BISYNC

For multipoint operations, see message #15.

- Op mode bit 5 must be cleared at the controller end.
- Op mode bit 5 must be set at the host end.

- Op mode bit 7 must be cleared at the controller end.
- Op mode bit 7 must be set at the host end.

SYBTYPE 16 - FTS

For multipoint operations, see message #15.

- Op mode bit 5 must be cleared at the controller end.
- Op mode bit 5 must be set at the host end.

- Op mode bit 7 must be cleared at the controller end.
- Op mode bit 7 must be set at the host end.

SUBTYPE 17 - MULTIPLE MESSAGE IBM BISYNC

For multipoint operations, see message #15.

- Op mode bit 5 must be cleared at the controller end.
- Op mode bit 5 must be set at the host end.

- Op mode bit 7 must be cleared at the controller end.
- Op mode bit 7 must be set at the host end.

Op mode bit 1 must be set to 0 to enable multiple message #16.

SUBTYPE 23 - DDP/80

For multipoint operations, see message #15.

- Op mode bit 5 must be cleared at the controller end.
- Op mode bit 5 must be set at the host end.

- Op mode bit 7 must be cleared at the controller end.
- Op mode bit 7 must be set at the host end.

Section 6.0
Order Processing Specification

Contents

6.1 Introduction

This section tells you what forms to use when placing an order with the Order Entry Department. This explanation should reduce problems with customer orders. Paragraph 6.2, Product Information and Overview, describes individual components and gives their part numbers. This information helps service personnel who order spare components for maintenance purposes.

6.2 Product Code Information and Overview

Refer to Table 6-1 for the applicable product codes when ordering components for the 6740 DCP.

Table 6-1.
6740 DCP Product Codes and Ordering Information

Item	*Ordering Information*	*Product Code*
Basic 6740 DCP (115 VAC)	Order initial building block when building a new 6740 node requiring 115 VAC operation. This unit includes the following components: 1 Chassis with Port Nest 1 Power Supply 1 Master Processor 1 CTP Card 1 NP Processor Set (No I/O Adapter) 1 TP Processor Set 2 Hex TP Expander Cards	67400
Basic 6740 DCP (230 VAC)	Order initial building block when building a new 6740 node requiring 230 VAC operation. This unit includes the same components as mentioned above, excluding the power supply.	65740
6740 Redundancy (115 VAC)	Order if the customer requires 115 VAC 6740 base unit redundancy. Parts List: 1 Power Supply (115 VAC) 1 Master Processor	67420
6740 Redundancy	Order if the customer requires 230 VAC 6740 base unit redundancy. Parts List: 1 Power Supply (230 VAC) 1 Master Processor	67421

Table 6-1 (continued).
6740 DCP Product Codes and Ordering Information

Item	*Ordering Information*	*Product Code*
Anadex Printer	Order this printer for the 6740 CTP logging printer port.	23850
Earthtone Rack (56-in.)	Order this rack to mount the 6740.	81363
Cable; 15-ft, EIA, M-F, Straight-through	Order this cable to connect EIA 232 NP links to modems. Parts List: 56-in. Earthtone Rack Front and rear doors and side panels Top mounted fan assembly 115 VAC, 15 Amp, 6-outlet AC power strip	66175
Cable; 15-ft, M-F, Straight-through	Order this cable to connect V.35 NP links to V.35 through transmission media.	66173

6.3 Order Requirements

All orders must be accompanied by the following CoEDS worksheets:

- 6740 Node Layout
- 6740 Product Code Summary

The worksheets can be found in Paragraph 12.5.1 of this Technical Reference.

6.4 Informational Updates

Refer to Table 6-2 for the applicable "M" number (Customer Service Special Products) for the 6740 DCP.

Table 6-2.
6740 DCP "M" Numbers

"M" No.	*Function*	*Release Date*
5820	FTS Protocol	5/16/86
5828	Alarm Feature to CTP	2/03/86
5834	Breakhandling of 6002, 6005	5/22/86
5835	Time of Day Stamp	5/23/86
5840	Special Speed	5/22/86
5841	Special Speed	5/22/86
5849	Change Link-Down Timer	5/16/86
5865	Change Break Signal Handling	5/22/86
5871	Combination of M5840 and M5841	5/28/86
5872	Implement X.3 PAD Editing	7/07/86
5874	Disconnect UDR	6/30/86
5879	DTM to Support RCI Honeywell	6/17/86
5891	Change MXP Protocol for Reuters	12/10/86

Table 6-2 (continued).
6740 DCP "M" Numbers

"M" No.	*Function*	*Release Date*
5900	Special Speeds	10/22/86
5904	Add Flow Control Back in M5891	10/22/86
5914	Gateway Table and 30 Nodes to 1	11/06/96
5925	Burroughs Async Poll/Select Speed	2/05/87
5927	Isochronous Support	2/23/87
5934	High-Performance HDLC	3/19/87
5836	Interface for Remote Autodialing	3/24/87
5935	IPARS Protocol	4/03/87
5940	Separate Broadcast Channel Attached to IXP	4/07/87
5938	TP Dial Billing	4/07/87
5941	HP and DS3000 Protocol	4/07/87
5942	CRYPTO-KICK	4/21/87
5951	Increase Threads from 85 to 127	5/01/87

6.5 Release 7.10 Product Code Information

Release 7.10 software may be ordered with the following product codes:

- Release 7.10 Initial EPROM card (P/C 67402): Order 1 for each 6740 network.
- Release 7.10 Additional EPROM card (P/C 67403): Order for redundant software or reducing software load time.
- NP IPL chip set (P/C 67408): Order 1 for each NP card.

Note: Release 6.1 software is no longer the manufacturing revision. Also, its product code has changed to P/C 67492.

Section 8.0
Equipment Installation Specification

Contents

8.1 Installation of Release 7.10

At a mimimum, Release 7.10 consists of an EPROM card with Release 7.10 chips installed on it and NP IPL ROM chip sets for each NP card in the network. There may also be EPROM cards for other nodes in the network and more than one NP card in each node of the network. **Note:** If you don't have a set of NP IPL ROMs for *all* the NP cards in the network, the upgrade will not be successful.

The entire network must be brought down in order to upgrade to Release 7.10 software. The amount of time the network is down depends on factors, such as the number of nodes, whether the nodes load software from a local EPROM card or over the link, etc.

The steps below give the installation procedure for one node. If a node does not have an EPROM card in it, skip Step 1.

Follow these steps to ensure a successful software installation:

1) Remove the old EPROM board and install a 7.10 EPROM board into the node. Make sure the node chip (U34) from the old board is transferred to the 7.10 board to ensure that the customer receives all the purchased options.

2) Check the amount of NP RAM on each NP card. The NP card should have 256K of RAM. Some prototype units had only 128K of RAM. There should be four rows of RAM chips. If any of the NP cards do not have 128K of RAM, swap them for NP cards with 256K of RAM before proceeding.

3) Install Release 7.10 NP IPL ROMs into each NP card in the node. These chips are marked to go in locations U16 and U17 on the NP card.

4) Hit the reset button on the master processor card. It is possible to perform a "turbo load" by hitting the reset button again, immediately after the master processor status LED is lit. Another way to load the software is to issue a Boot Node command from the CTP. **Note:** Make sure you do a NORMAL boot. A WARM boot will *not* load the new software.

5) The "ENTER PASSWORD" prompt will be displayed after the node has loaded the new software. If it is not displayed within 3 minutes, disconnect all the NP link cables and hit the reset button again. Sometimes the units try to load software over a link instead of from the EPROM board.

6) Log onto the CTP, take node statistics, and verify that the following information is displayed:

   Software release number: 7
   Software revision number: 10
   "M" number: 0
   "M" number revision: 0

   If these messages are not displayed, the software has not loaded properly. Reseat the EPROM card and repeat Steps 4 and 5.

7) Run the diagnostic checksum utility, and compare the checksums to those in Table 8-1.

Table 8-1. PROM/Checksum Cross-Reference

PROM	*Checksum*	*PROM*	*Checksum*
0	09EE	15	191C
1	C60C	16	5ED5
2	5990	17	FB5C
3	0FF0	18	F706
4	7028	19	AC75
5	494F	20	B58E
6	90F7	21	776C
7	72B5	22	2766
8	CE51	23	C71F
9	DF9E	24	8569
10	B64B	25	CBC1
11	EC4F	26	A08C
12	E2F7	27	05E9
13	9388	28	EB6E
14	B4FD	29	D54C

If one or more of the checksums do not match, use Table 8-2 to cross-reference the bad chip location. Check the chip to see if it is inserted correctly and that no pins are bent. Reinsert the chip, if needed, and repeat Steps 4 through 7. If the software still does not load correctly or the checksums still don't match, then use another EPROM board and return the faulty one for repair.

Table 8-2. PROM/Socket Locations

PROM	*Socket*	*PROM*	*Socket*
0	U19	1	U43
2	U20	3	U44
4	U21	5	U45
6	U22	7	U46
8	U23	9	U47
10	U24	11	U48
12	U25	13	U49
14	U26	15	U50
16	U27	17	U35
18	U28	19	U36
20	U29	21	U37
22	U30	23	U38
24	U31	25	U39
26	U32	27	U40
28	U33	29	U41
Node Chip	U34		

8) The node should come back up in the same configuration as before. Verify that the network behaves as it did with previous software releases before reconfiguring the network or adding CMMP links. Read the CMMP White Paper Report in Section 1 of this Technical Reference for additional information on CMMP installation.

Section 9.0
Fault Isolation Specification

Contents

9.1 On-Site Fault Isolation Techniques

This section contains a series of flowcharts that provide a suggested flow for fault isolation at the customer site. There are several charts; the first chart requires some basic answers that will give direction to the more detailed charts that should ultimately produce the cause for the failure. These charts also reference flowcharts from the *6740 Operator's Guide*. For your convenience, the flowcharts from the *Operator's Guide* are reproduced here as Figures 9-3 through 9-7.

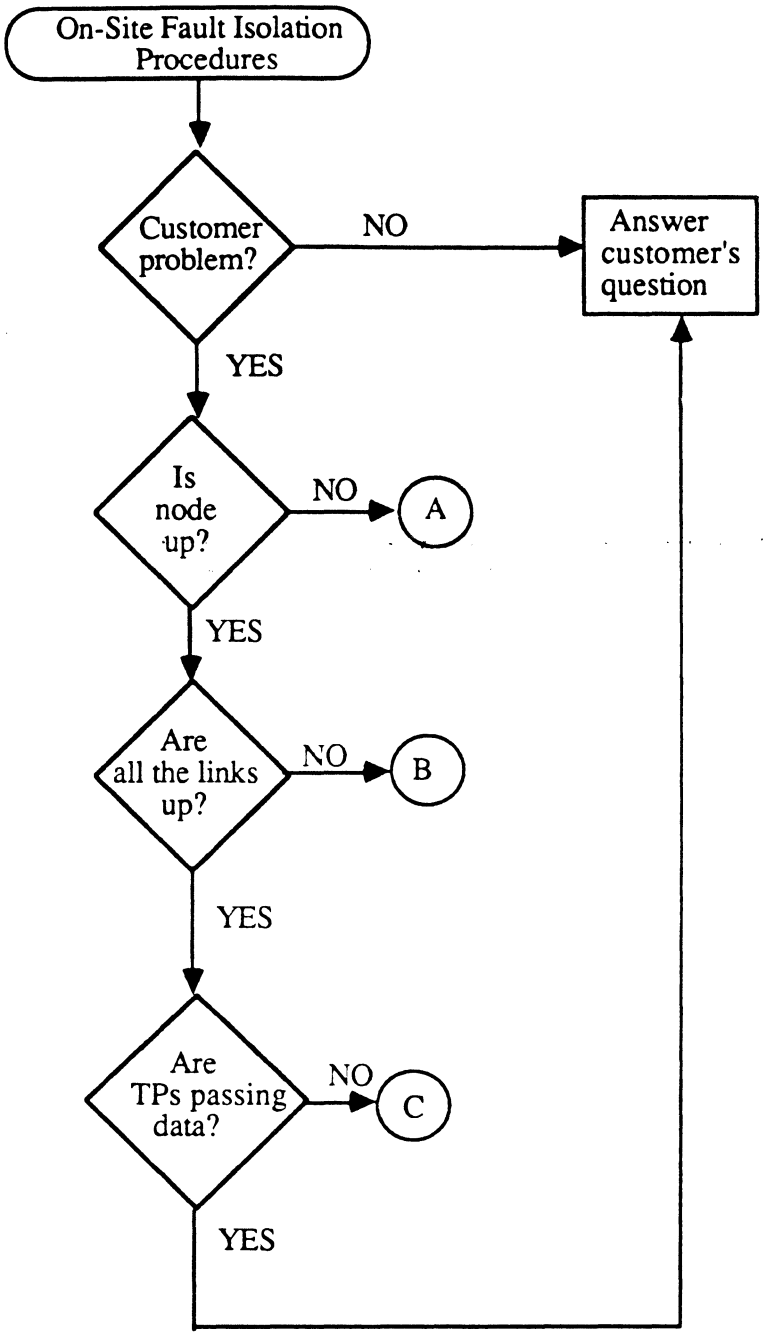


Figure 9-1. On-Site Fault Isolation Flowcharts

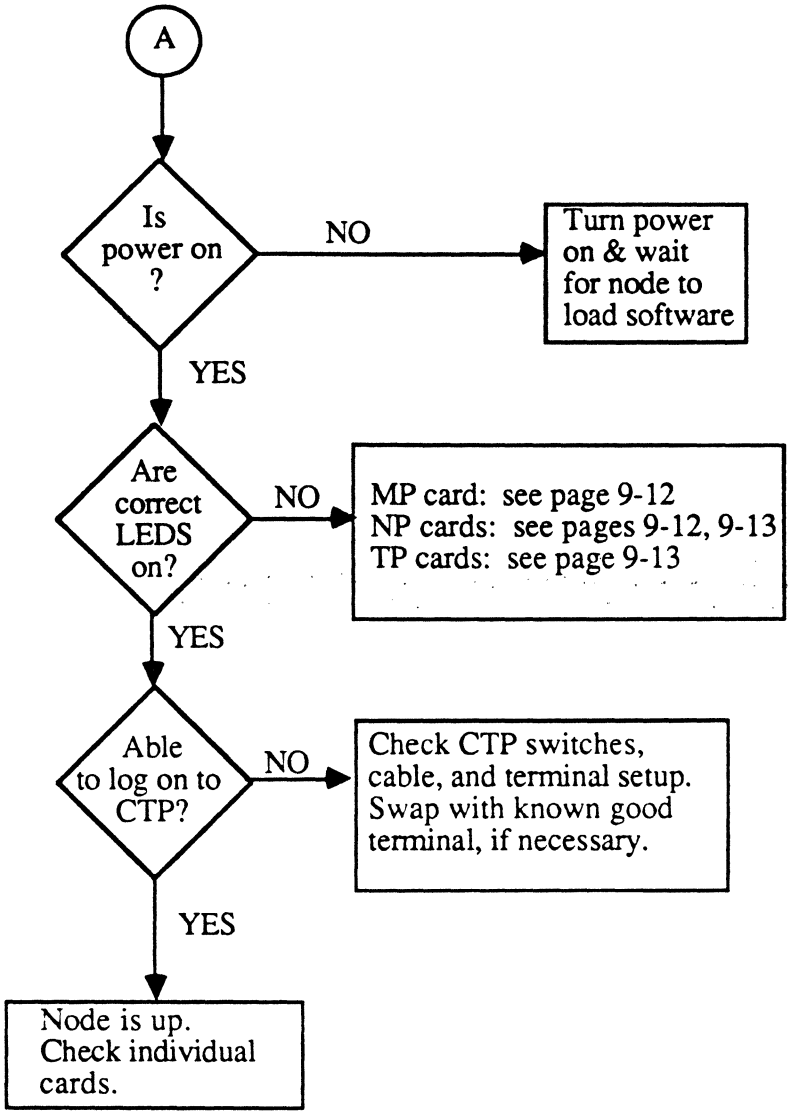


Figure 9-1 (continued). On-Site Fault Isolation Flowcharts

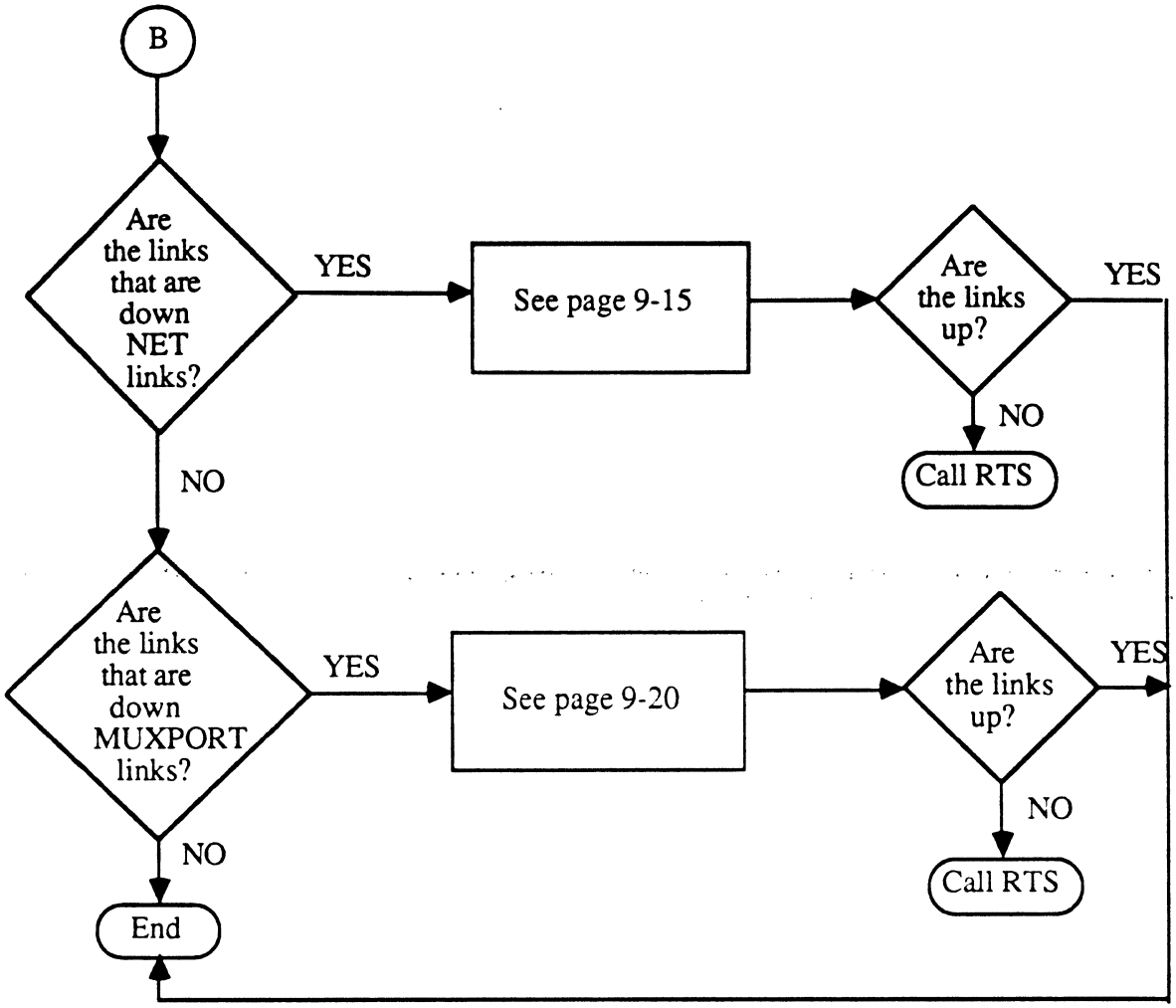


Figure 9-1 (continued). On-Site Fault Isolation Flowcharts

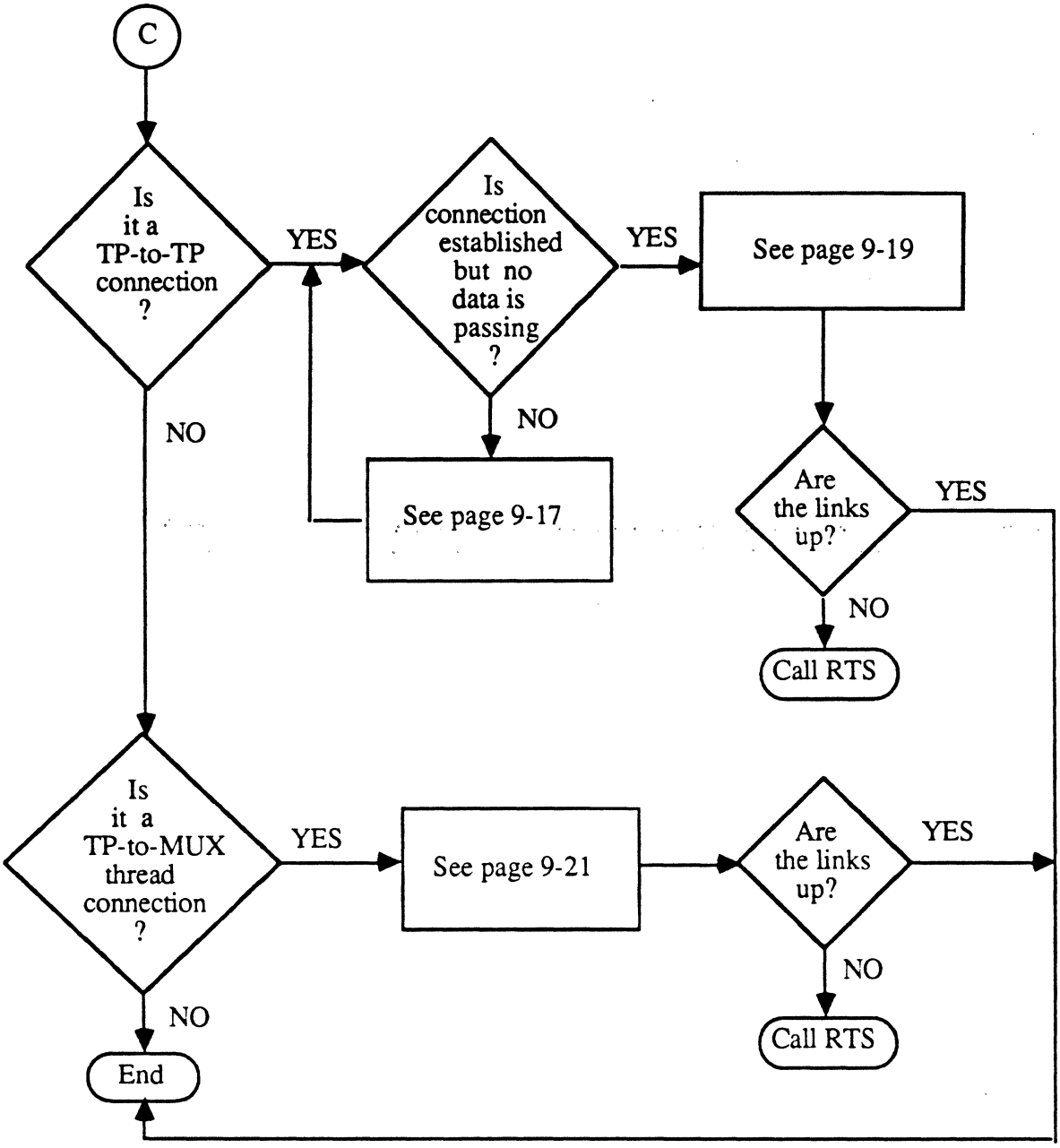


Figure 9-1 (continued). On-Site Fault Isolation Flowcharts

9.2 Remote Fault Isolation Techniques

This section contains a series of flowcharts that provide a suggested flow for fault isolation over the phone. There are several charts; the first chart requires some basic answers that will give direction to the more detailed charts that should ultimately produce the cause for the failure. These charts also reference flowcharts from the *6740 Operator's Guide*. For your convenience, the flowcharts from the *Operator's Guide* are reproduced in Figures 9-3 through 9-7.

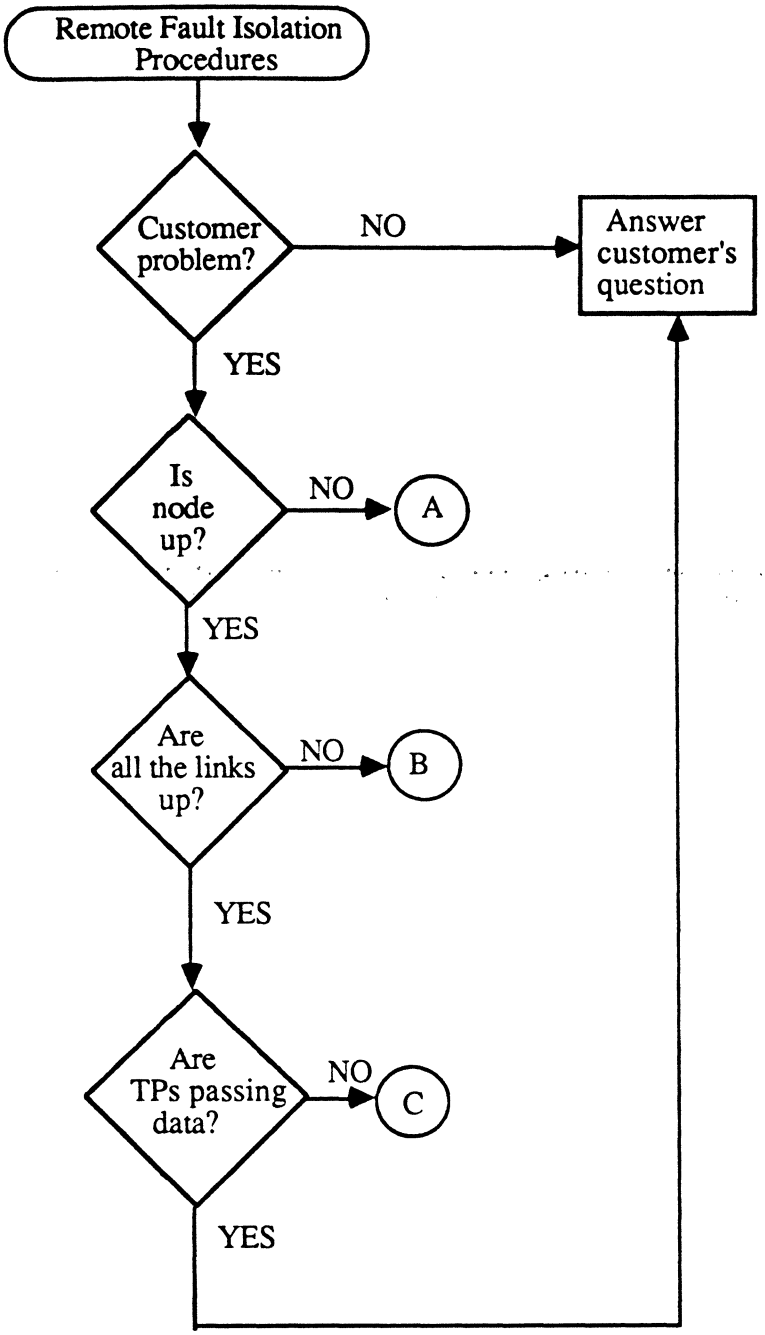


Figure 9-2. Remote Fault Isolation Flowcharts

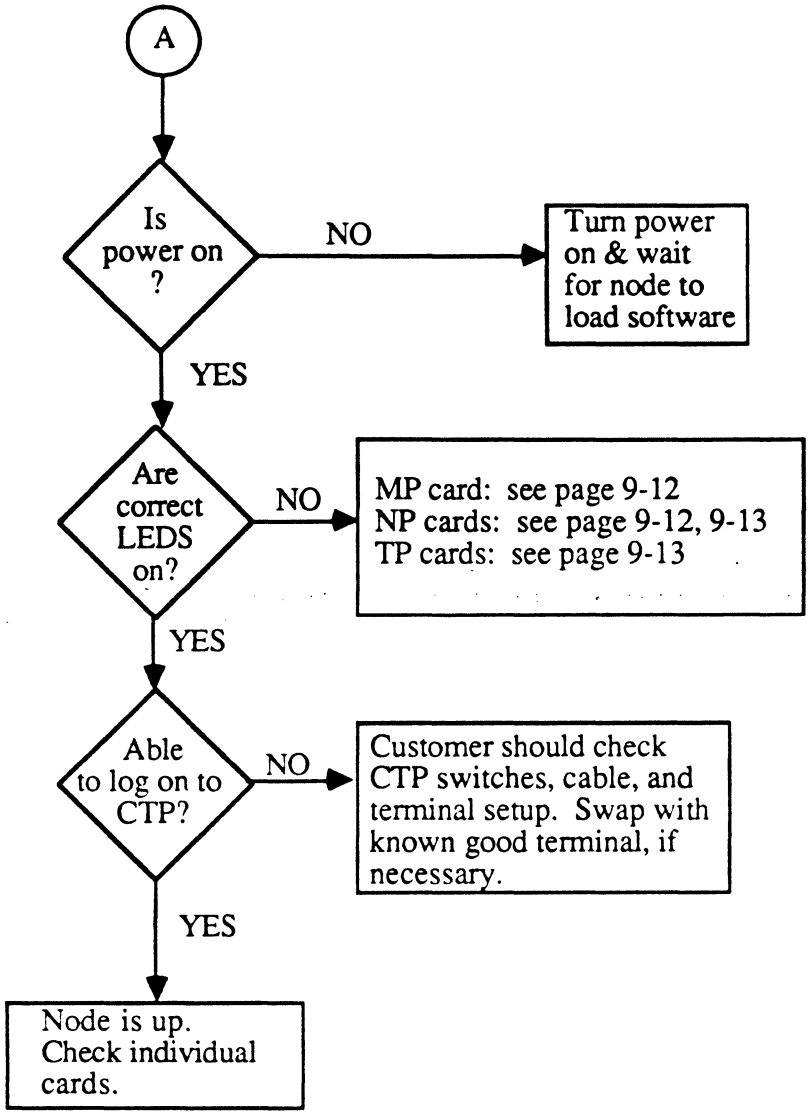


Figure 9-2 (continued). Remote Fault Isolation Flowcharts

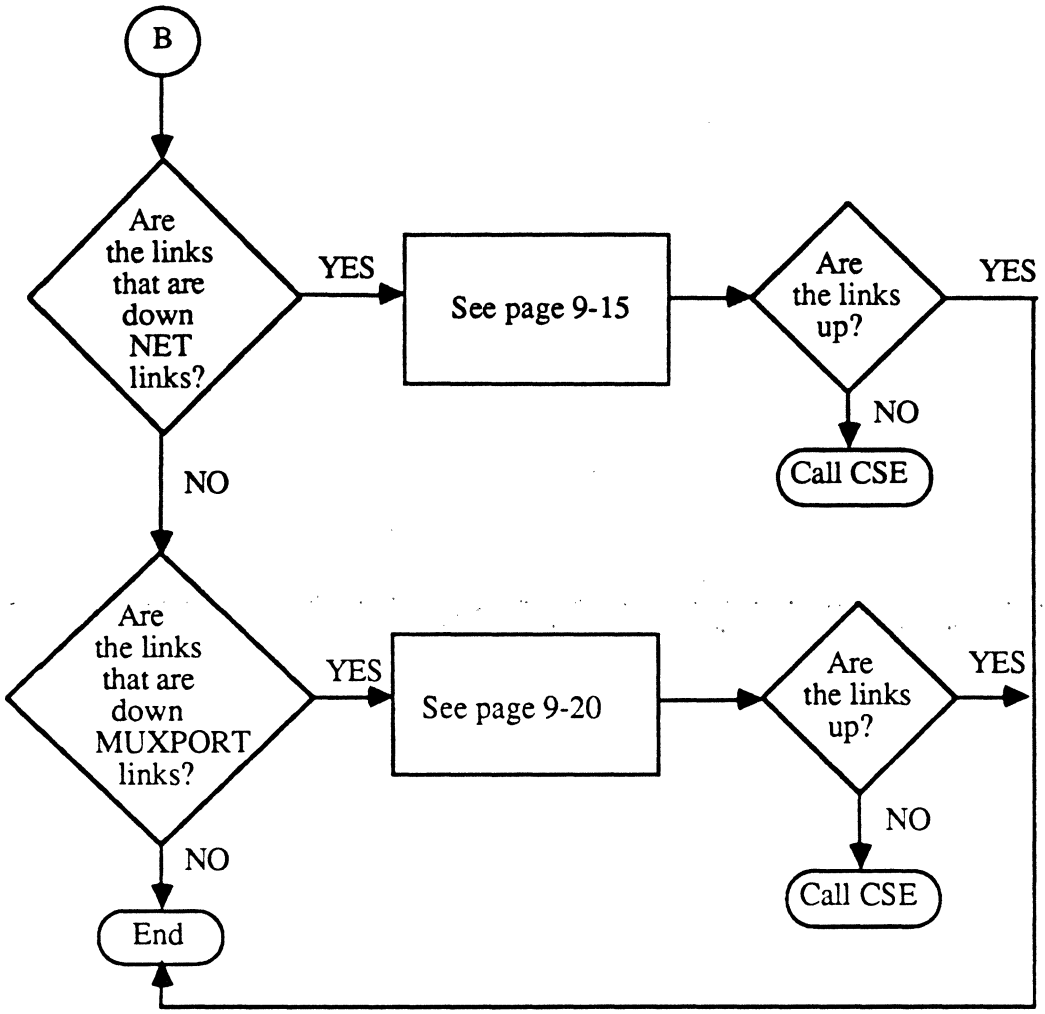


Figure 9-2 (continued). Remote Fault Isolation Flowcharts

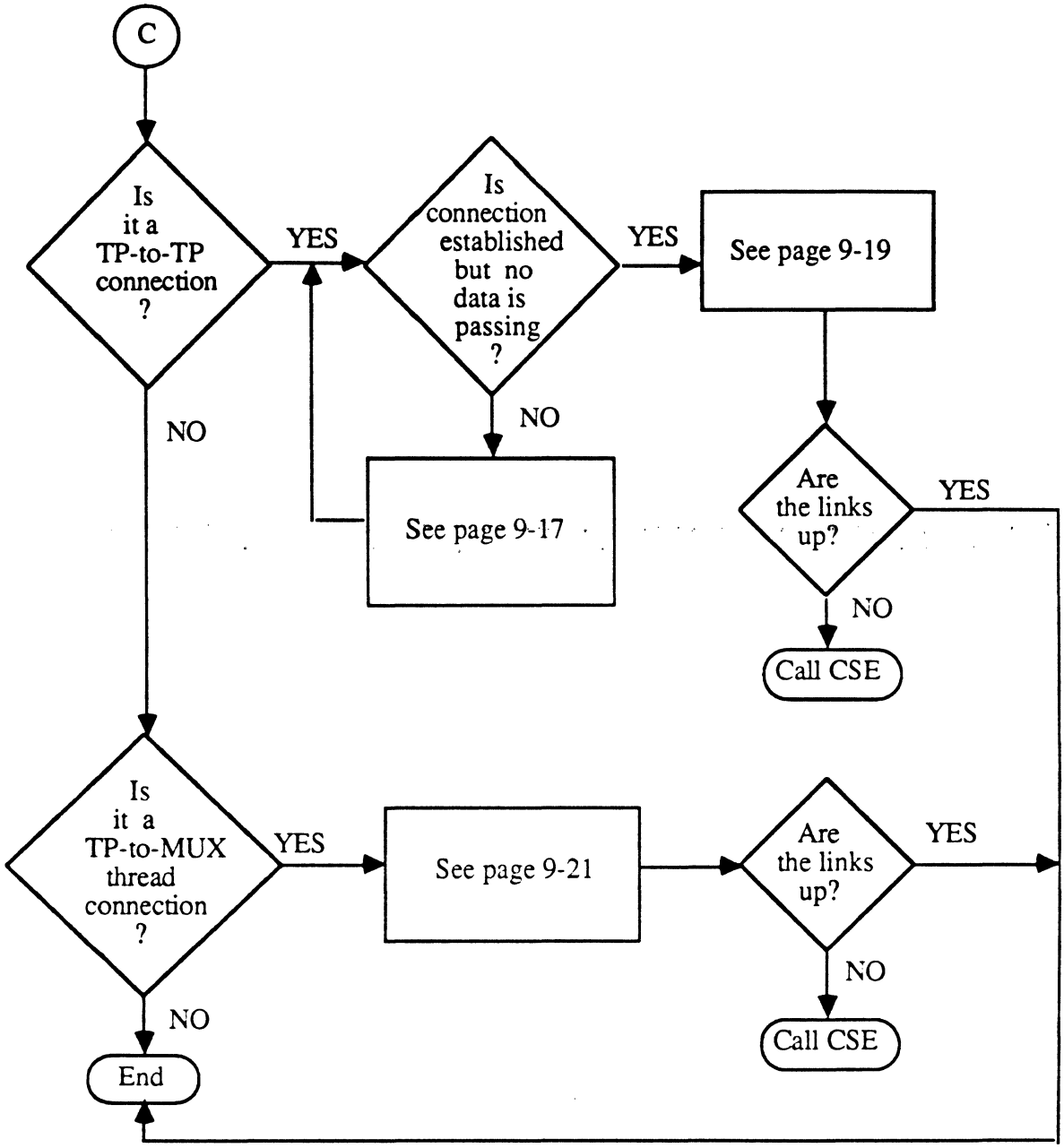


Figure 9-2 (continued). Remote Fault Isolation Flowcharts

9.3 LEDs

The following charts describe the LED states for the master processor, network port processor, quad NP, and TP processor cards.

Master Processor Card LEDs

ST (Status)	AL (Alarm)	**Note**: Read the ST and AL LEDs together.
On	Off	Normal operations.
On	Flashing	Diagnostic failure.
Off	Flashing	Looking for software.
Flashing	Flashing	Loading software.

OL (Online Switch)	
On	Master Processor card operational.
Off	Master Processor card not online. (If it's a redundant MP, this is normal.)

WT (Watchdog Timer)	
On	Master Processor card failure.
Off	Normal operations.
Flashing	Master Processor card ROM/RAM failure.

Network Port Processor Card LEDs

ST (Status)	AL (Alarm)	**Note**: Read the ST and AL LEDs together.
On	Off	Normal operations.
On	Flashing	Diagnostic failure.
Off	Flashing	Requesting software load from Master Processor module.
Flashing	Flashing	Loading software.

OL (Online Switch)	
On	Network Port Processor card operational.

WT (Watchdog Timer)	
On	Network Port Processor card failure.
Off	Normal operations.
Flashing	Network Port Processor card ROM/RAM failure.

Quad NP Card LEDs

LU (Link Up)	
On	Link is up.
Off	Link is down.
Flashing	Configuration problem. Ends of the link are not compatible or they are both configured empty.
CD (Carrier Detect)	
On	The Carrier Detect signal from the DCE connnected to the NP link is present.
Off	The Carrier Detect signal is absent.
LB (Loopback)	
Off	No loopback.
Flashing	Loopback activated.

TP Processor Card LEDs

ST (Status)	
On	TP Processor is operational and can communicate with switching processors.
Off	TP Processor failure of power supply voltage is not present on the card.
Flashing	TP Processor is operational but cannot establish communication with the Master Processor.
BU (Buffer Use)	
On	Data lost due to excessive buffer use.
Off	Normal operations.
Flashing	TP Processor is restraining data from one or more terminals.
DL (Data Lost)	
On	Data was lost because of frame overrun or parity error in a thread controlled by this TP Processor.
Off	Normal operations.

WT (Watchdog Timer)	
On	Watchdog timer time-out occurred.
Off	Normal operations.
Flashing	TP Processor RAM/ROM failure.

9.4. Troubleshooting Flowcharts

For your convenience, troubleshooting flowcharts from the *6740 Operator's Guide* are reproduced here as Figures 9-3 through 9-7.

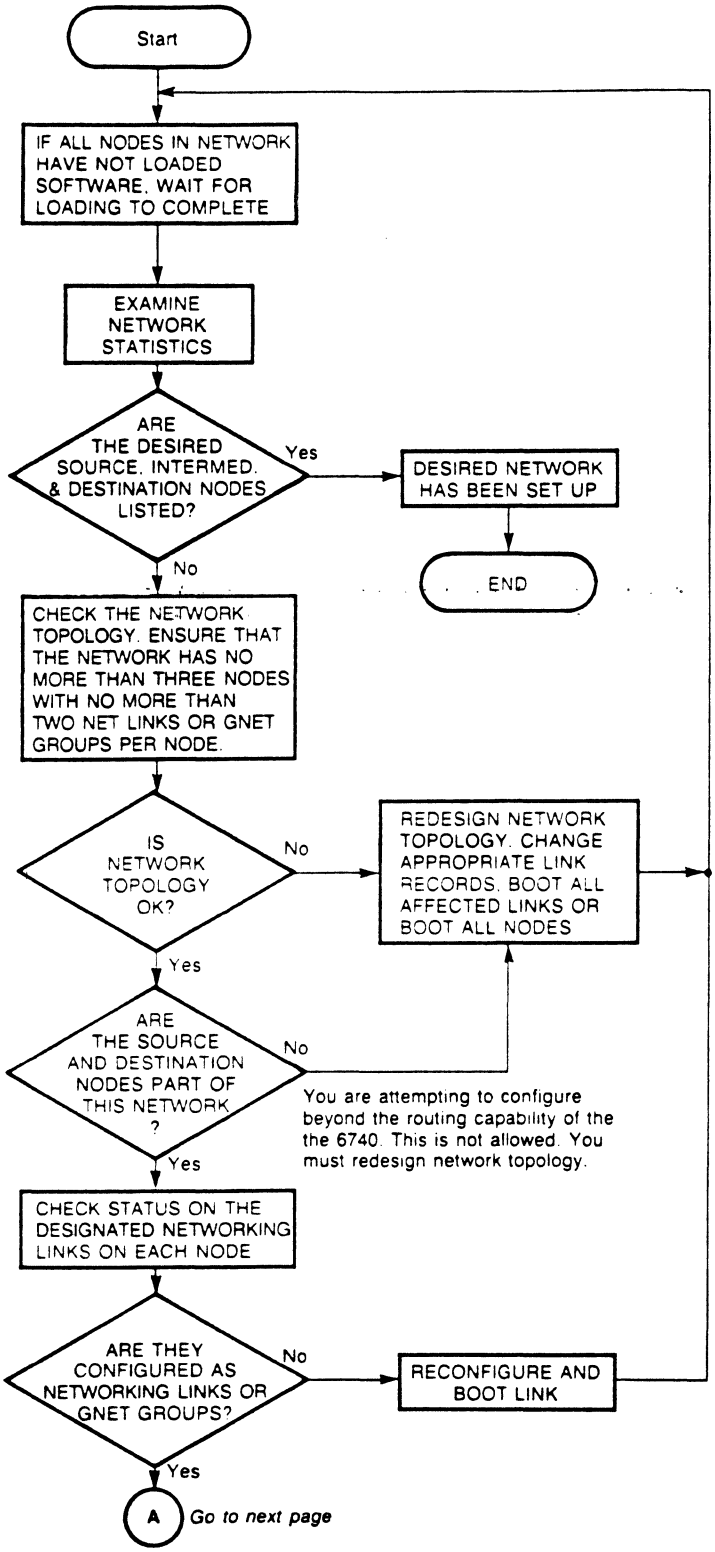


Figure 9-3. Setting Up the 6740 DCP Network - Troubleshooting Flowchart

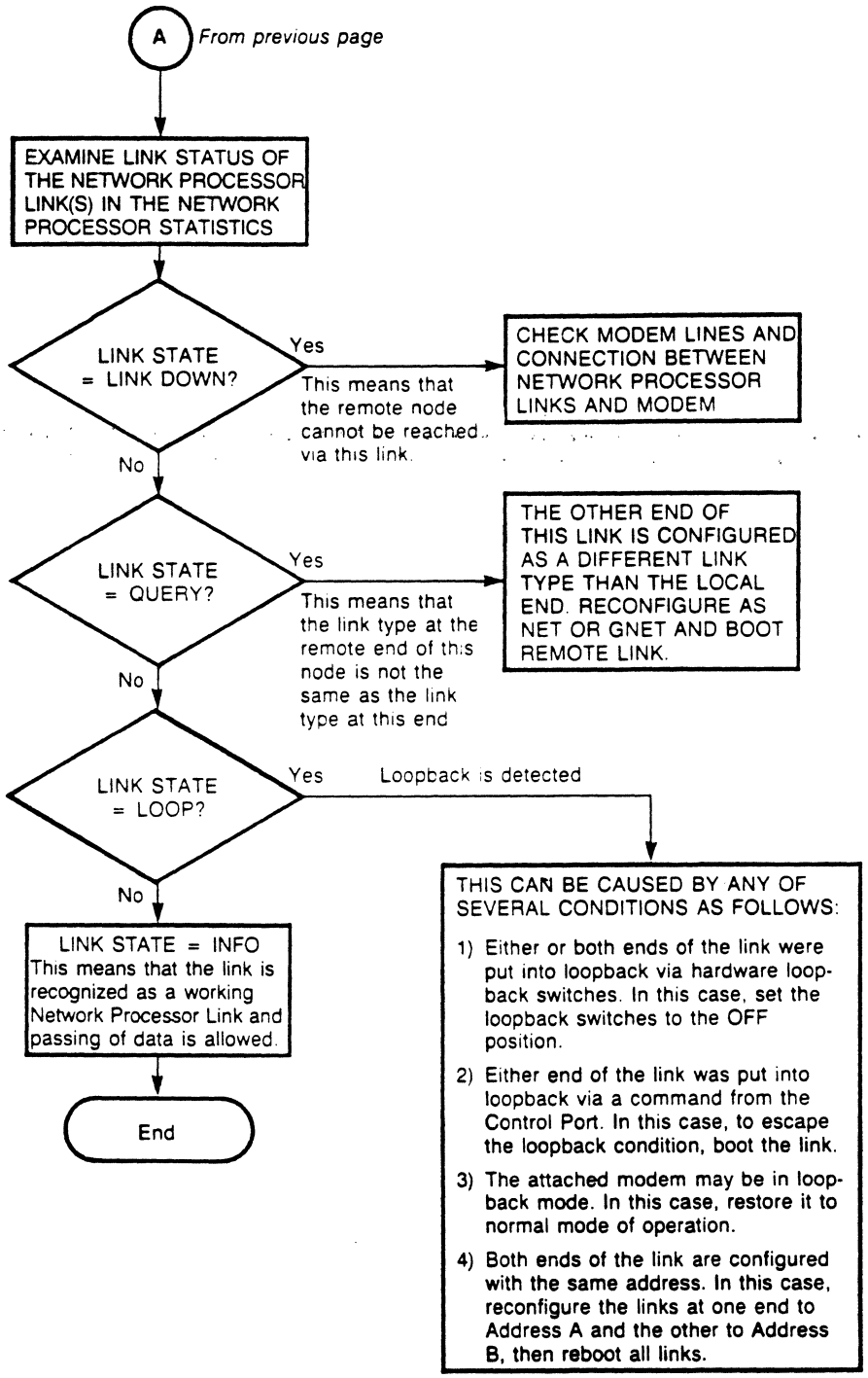


Figure 9-3 (continued). Setting Up the 6740 DCP Network - Troubleshooting Flowchart

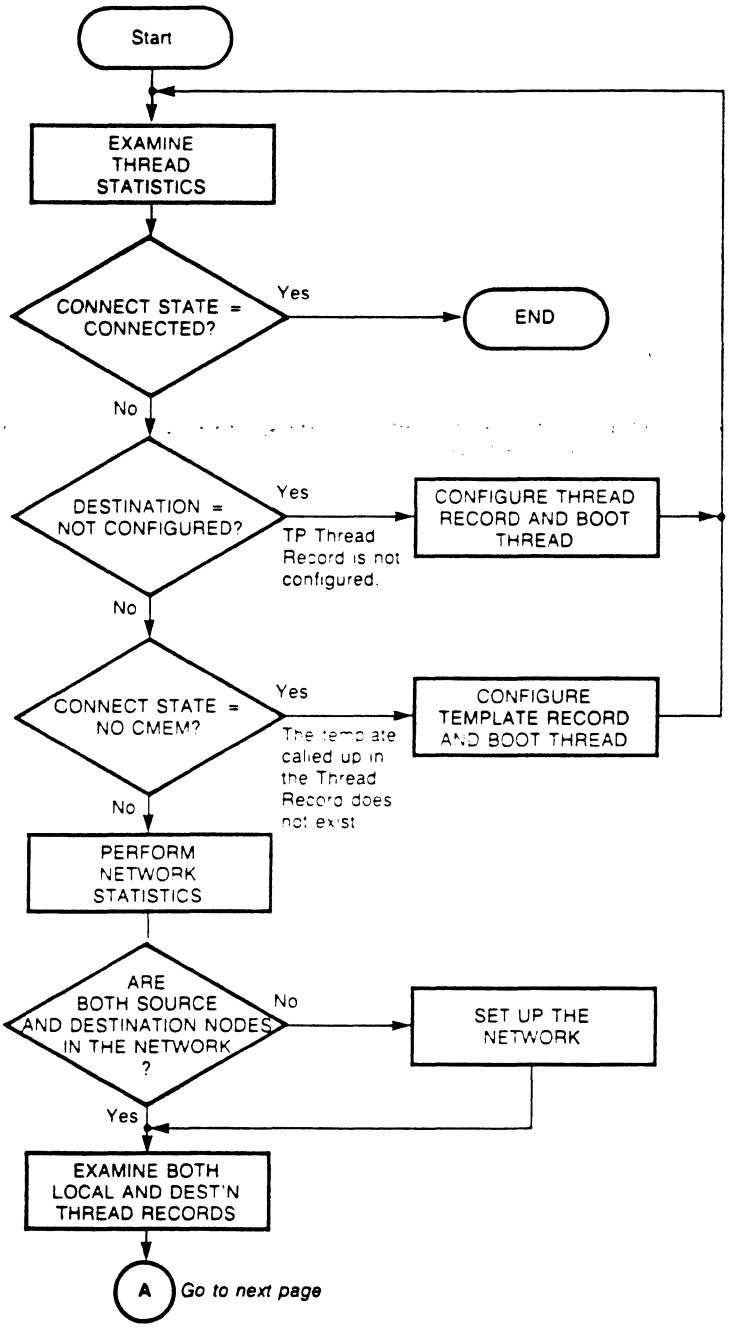


Figure 9-4. TP-to-TP Connection - Troubleshooting Flowchart

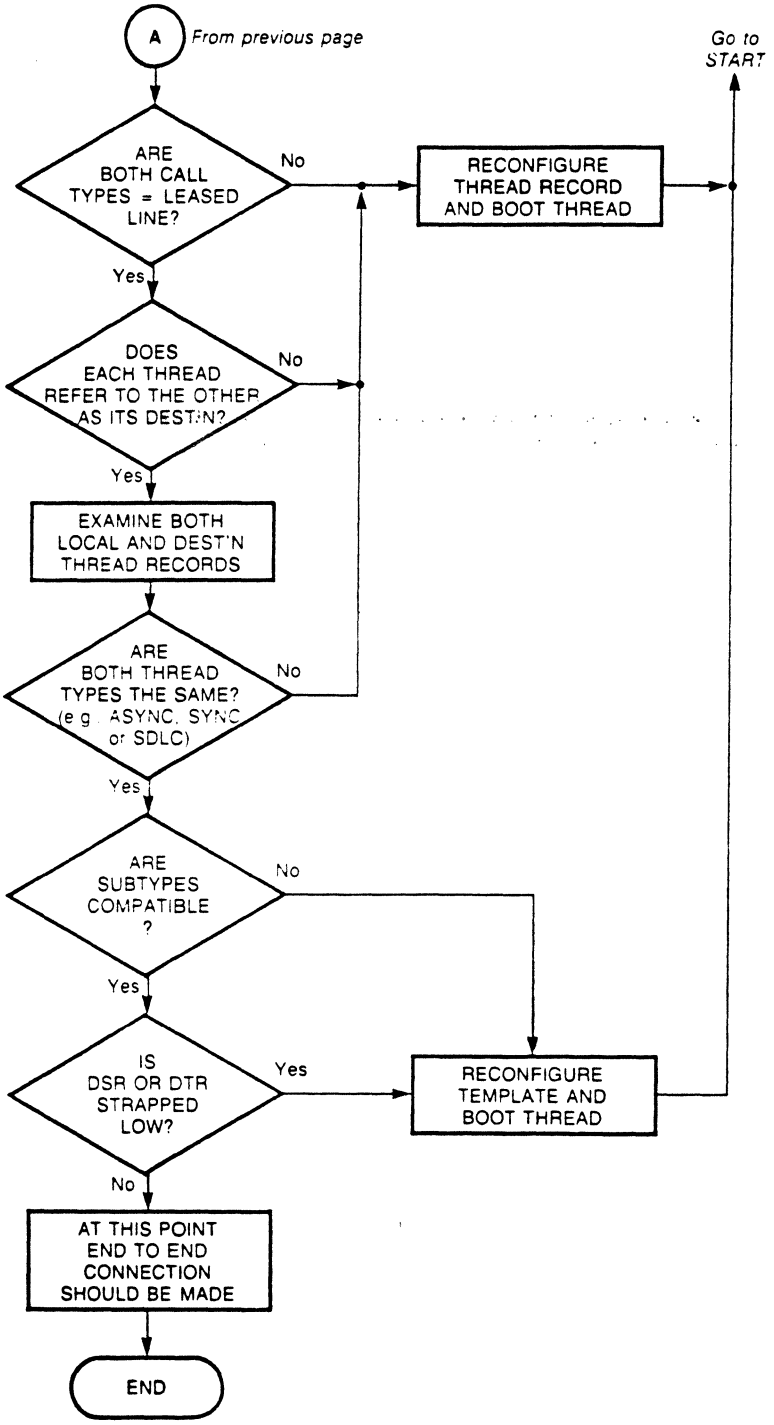


Figure 9-4 (continued). TP-to-TP Connection - Troubleshooting Flowchart

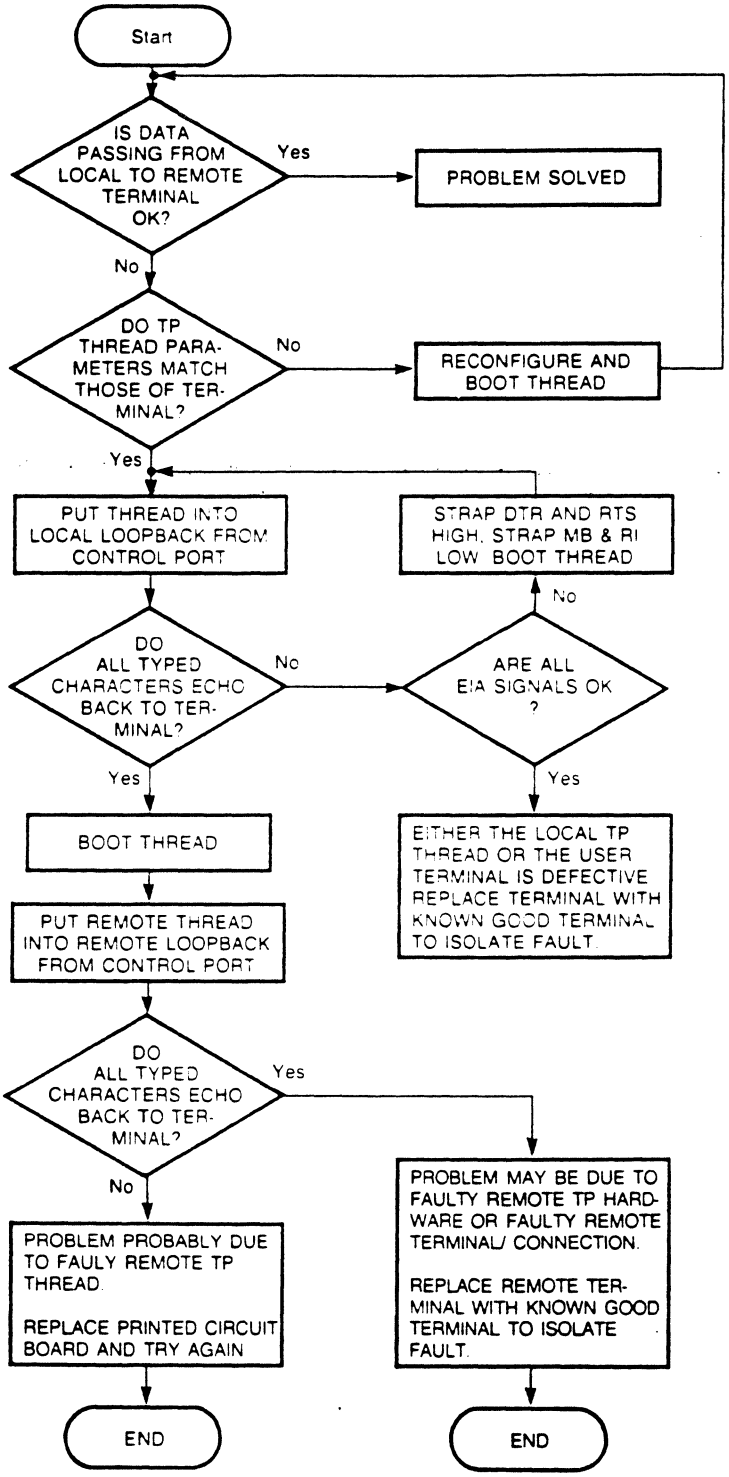


Figure 9-5. TP-to-TP Connection, But No Data Is Passing - Troubleshooting Flowchart

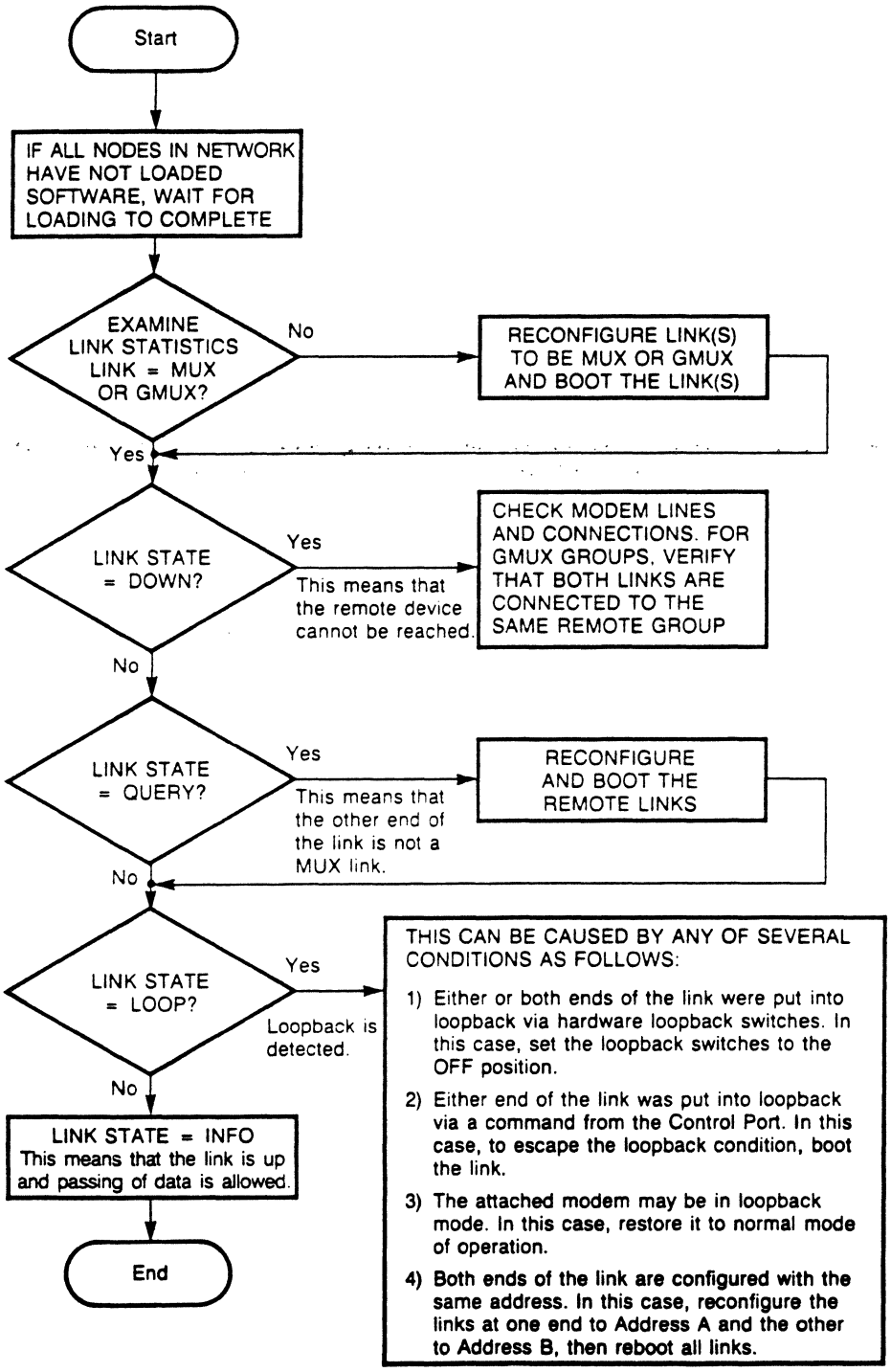


Figure 9-6. Setting Up Muxport Links - Troubleshooting Flowchart

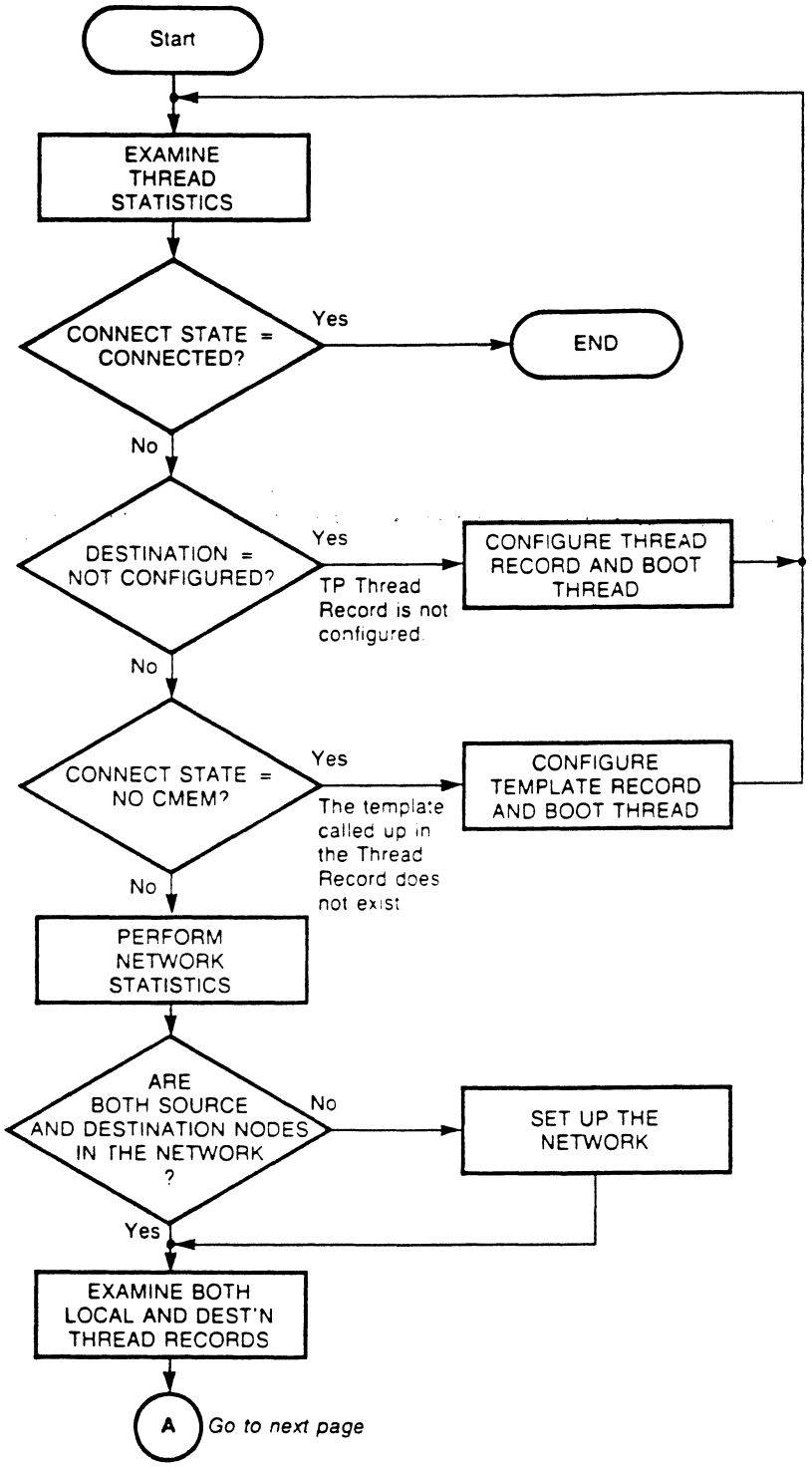


Figure 9-7. TP-to-Muxport Thread Connection - Troubleshooting Flowchart

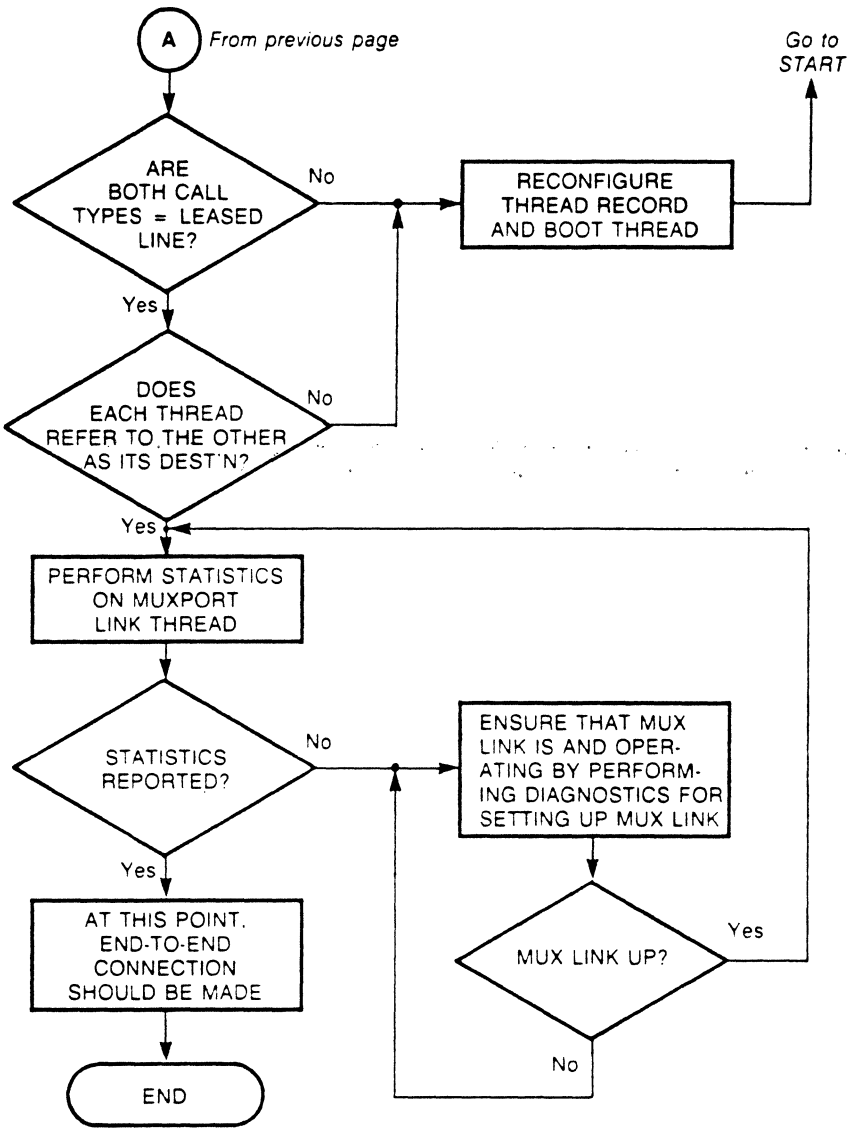


Figure 9-7 (continued). TP-to-Muxport Connection - Troubleshooting Flowchart

9.5 6740 Protocol State Diagrams

Use the following state diagrams as a tool when isolating protocol problems. These diagrams should be referenced along with the protocol message formats in Paragraph 1.4.2 of this Technical Reference.

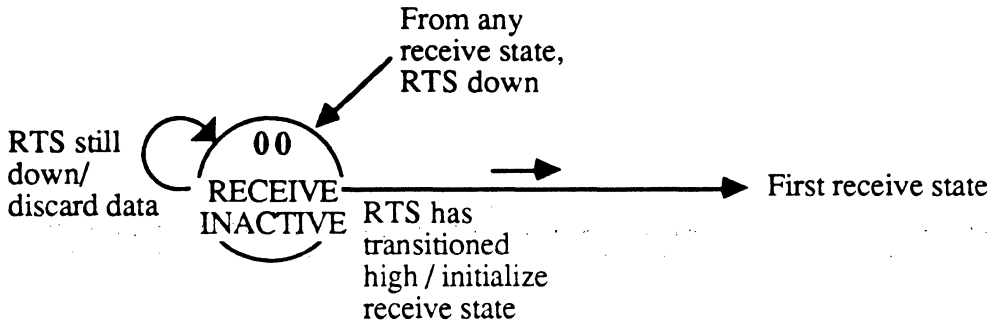
As an example, suppose the customer has recently installed a new application that doesn't run at all. If the thread and template configurations look correct and the reports don't indicate a configuration error, take thread statistics and note the transmit and receive states. Suppose the transmit and receive states are 00. By looking at the state diagram for inactive states, you can see that one or more of the control signals are down. This tells you to look at the EIA strapping in the template. Perhaps the customer's equipment does not provide the proper control signals so that the signals must be strapped high.

As another example, suppose the customer has recently started using a new synchronous subtype. Most of the application runs as expected, but certain messages won't pass. Put a datascope on the thread and monitor the data until you capture the crash. Then compare the messages on the datascope with the message formats listed in Paragraph 1.4.2. The thread is probably getting a message that it doesn't recognize for that subtype or perhaps an op mode bit needs to be set, as in the case of subtype 1, which is IBM Bisync.

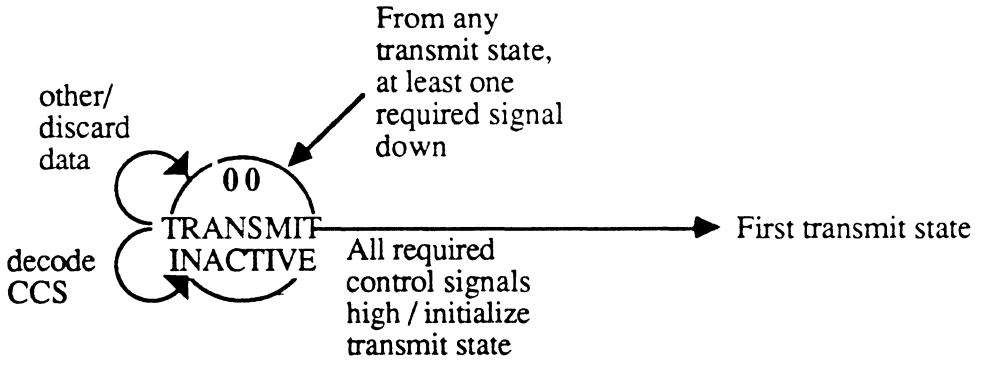
The following pages contain the Protocol State Diagrams. The first few pages give tips on how to read the diagrams. For the synchronous subtypes, the receive states always begin in the Hunt Mode (1234) and the transmit states always begin in Sync (01).

Inactive States - All Protocols

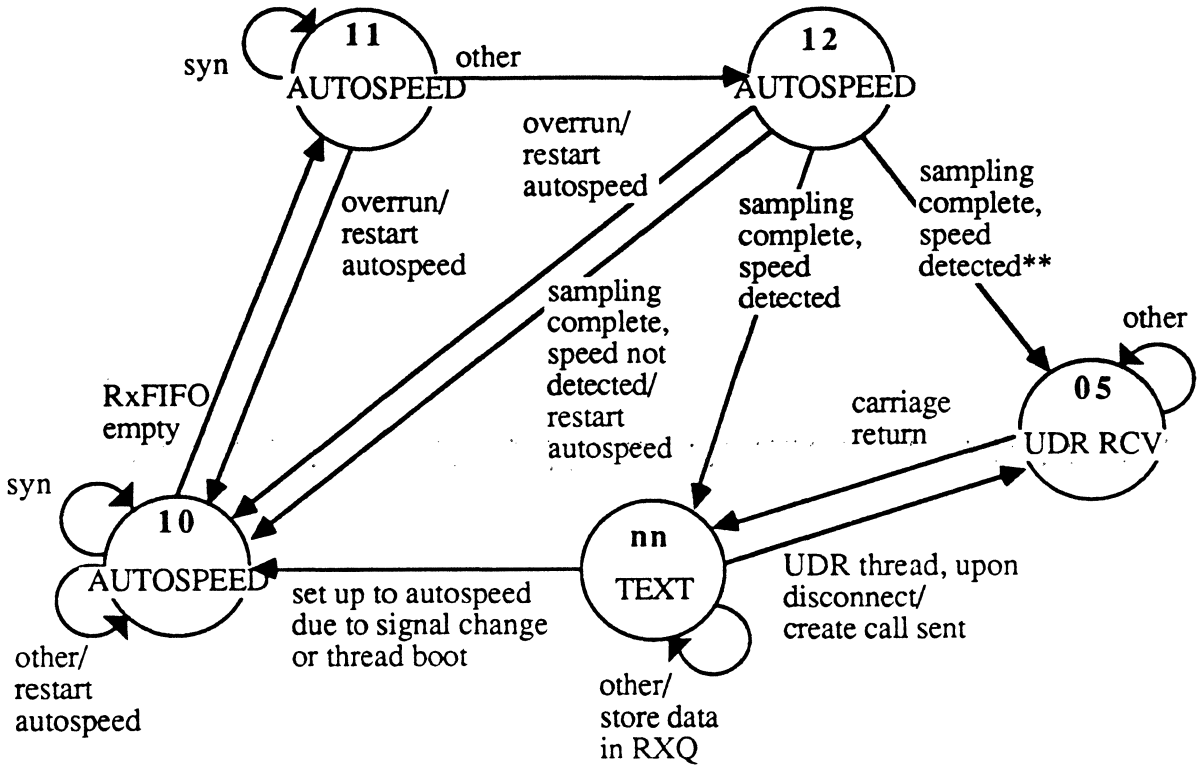
There are "inactive" states for the state machines on each side. These states are used when certain control signals are missing. These states are common to all protocols.

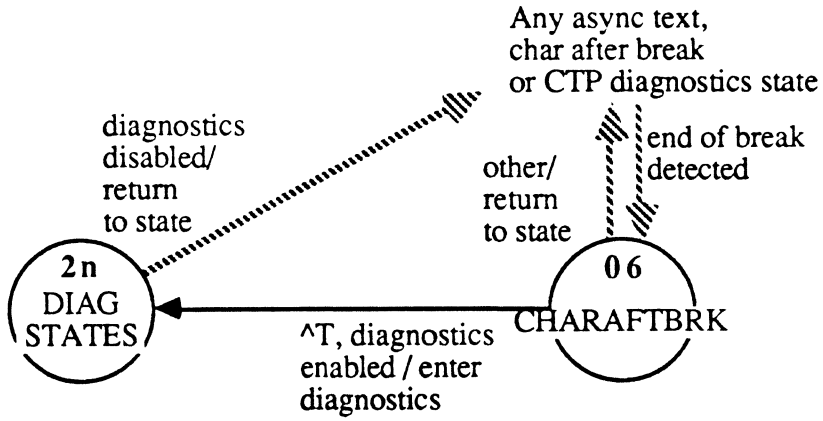


The RECEIVE INACTIVE state handles character interrupts while RTS is low and both DTR and DSR are up. The state checks the current status of RTS upon each interrupt. If the signal is still low, then the data is discarded. If RTS has gone high, then the signal change is acted on, the receive state is changed to an active state and jumped to to process the data byte.



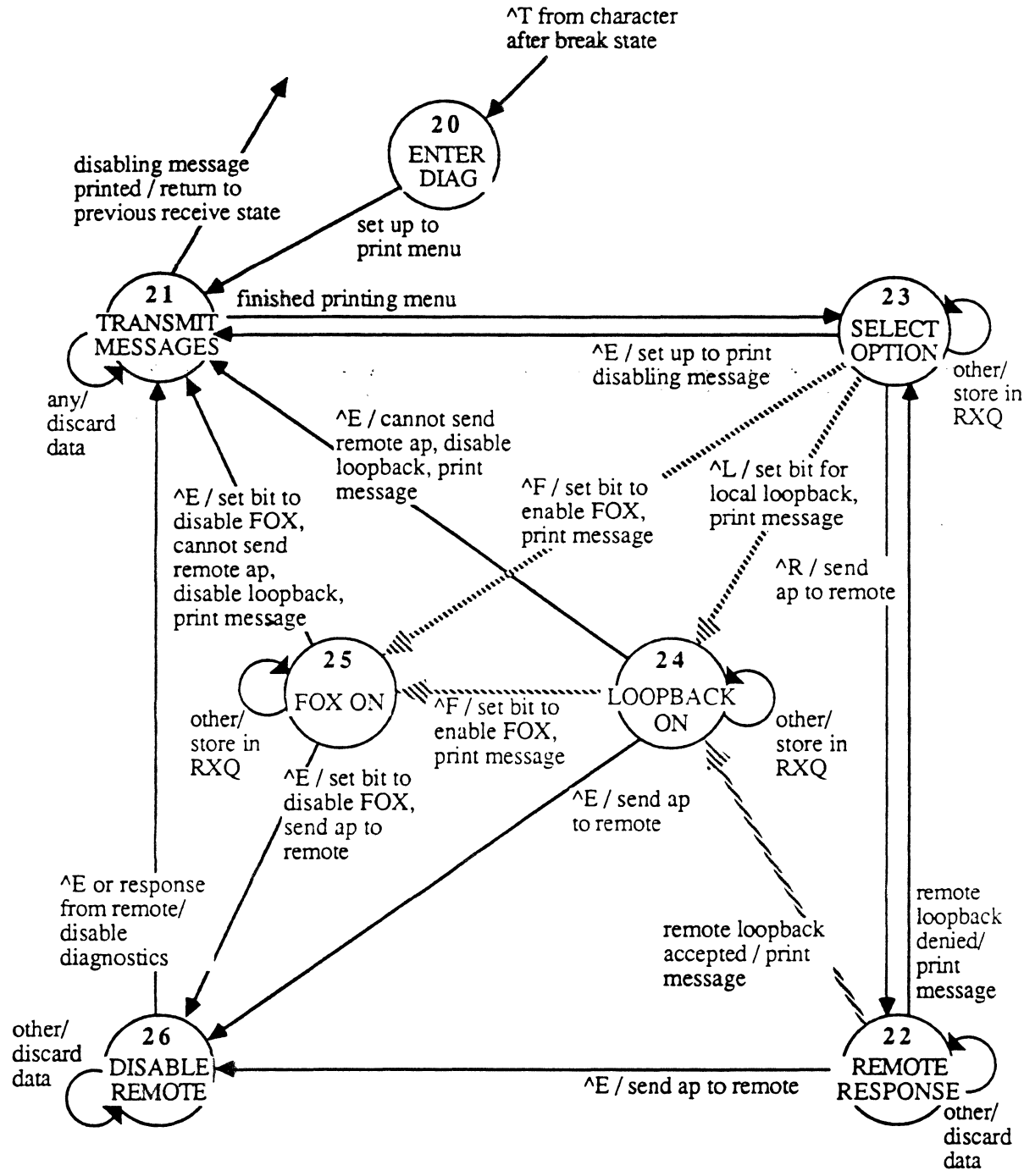
The TRANSMIT INACTIVE state discards all data while one or more of DTR, DSR and DCD are low. The state does process control signal updates and other CCS's coming from the remote end. The control signal handling routines change the transmit state to an active state when all three required signals are up.



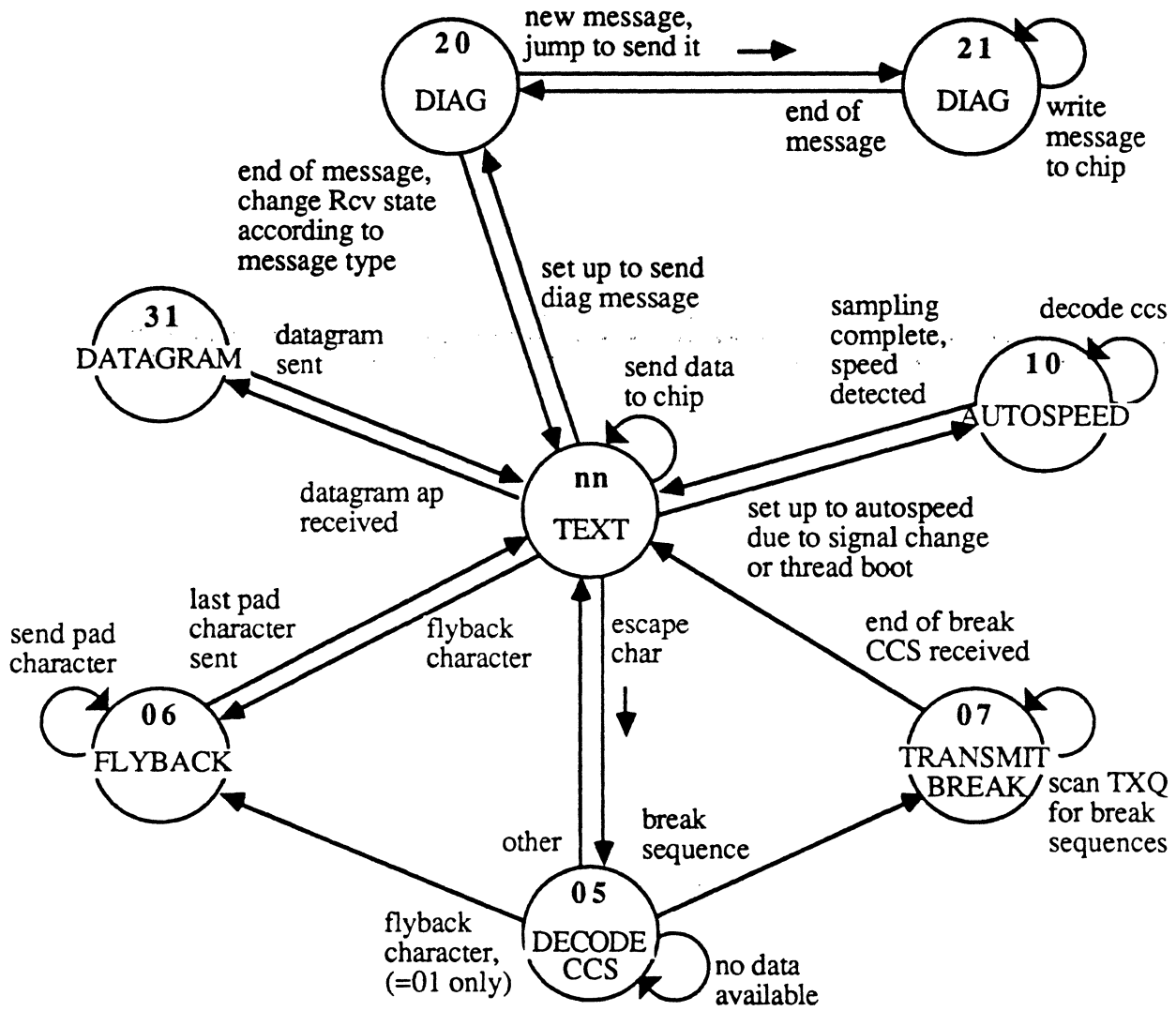


Async Receive States (nn):
01 - Character controlled DRO enabled.
02 - Auto echo enabled.
03 - Auto echo and character controlled DRO enabled.
04 - Plain async.
07 - Wang (terminal side).
08 - Wang (CPU side).
40 - HP Spoofing (CPU side).
41 - HP Spoofing (terminal side - subtype 3).
42 - HP Spoofing (terminal side - subtype 4).

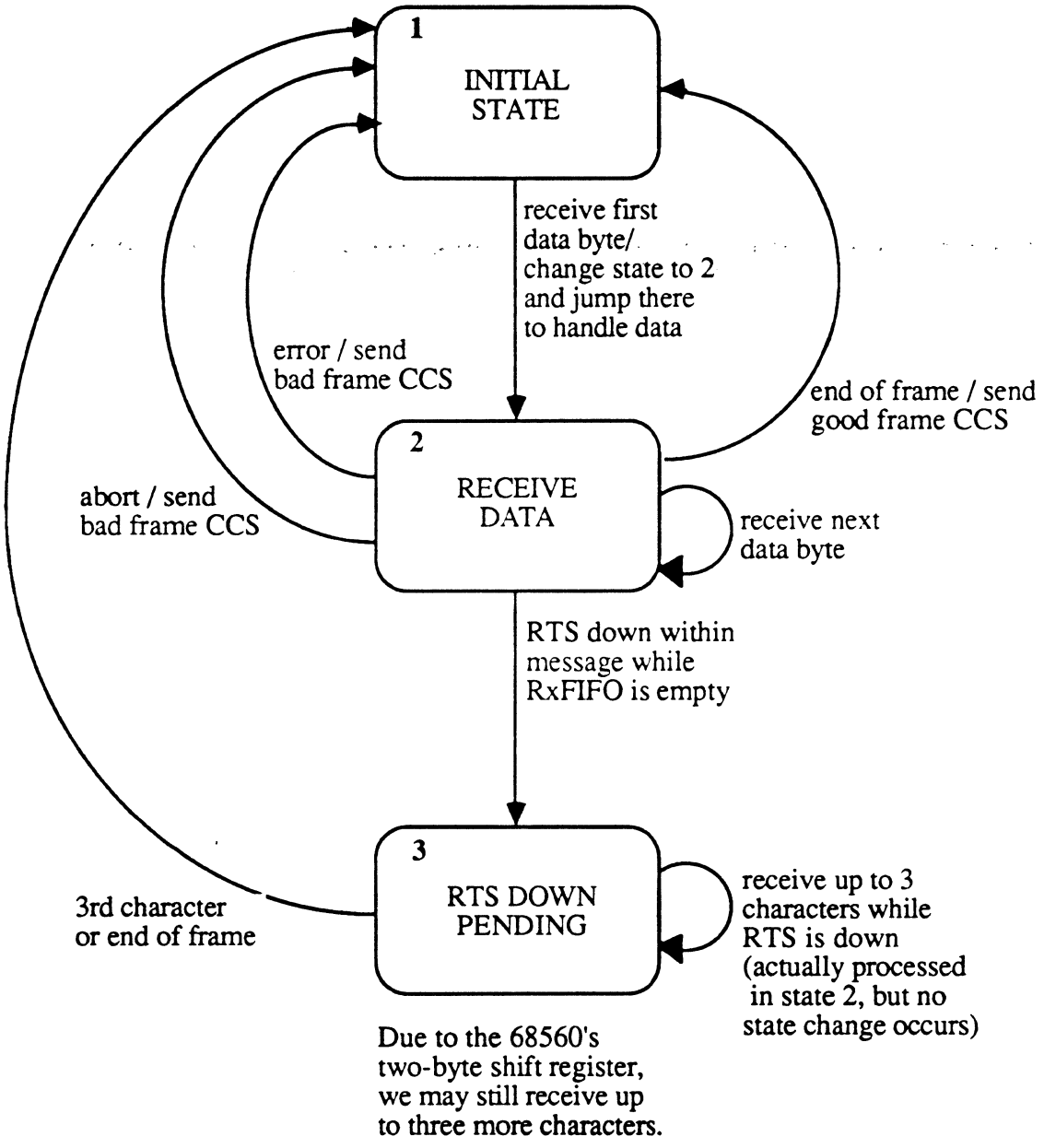
**This path is taken by UDR threads which are at the local end of an autospeed connection (i.e. the end which sends the recognition character).

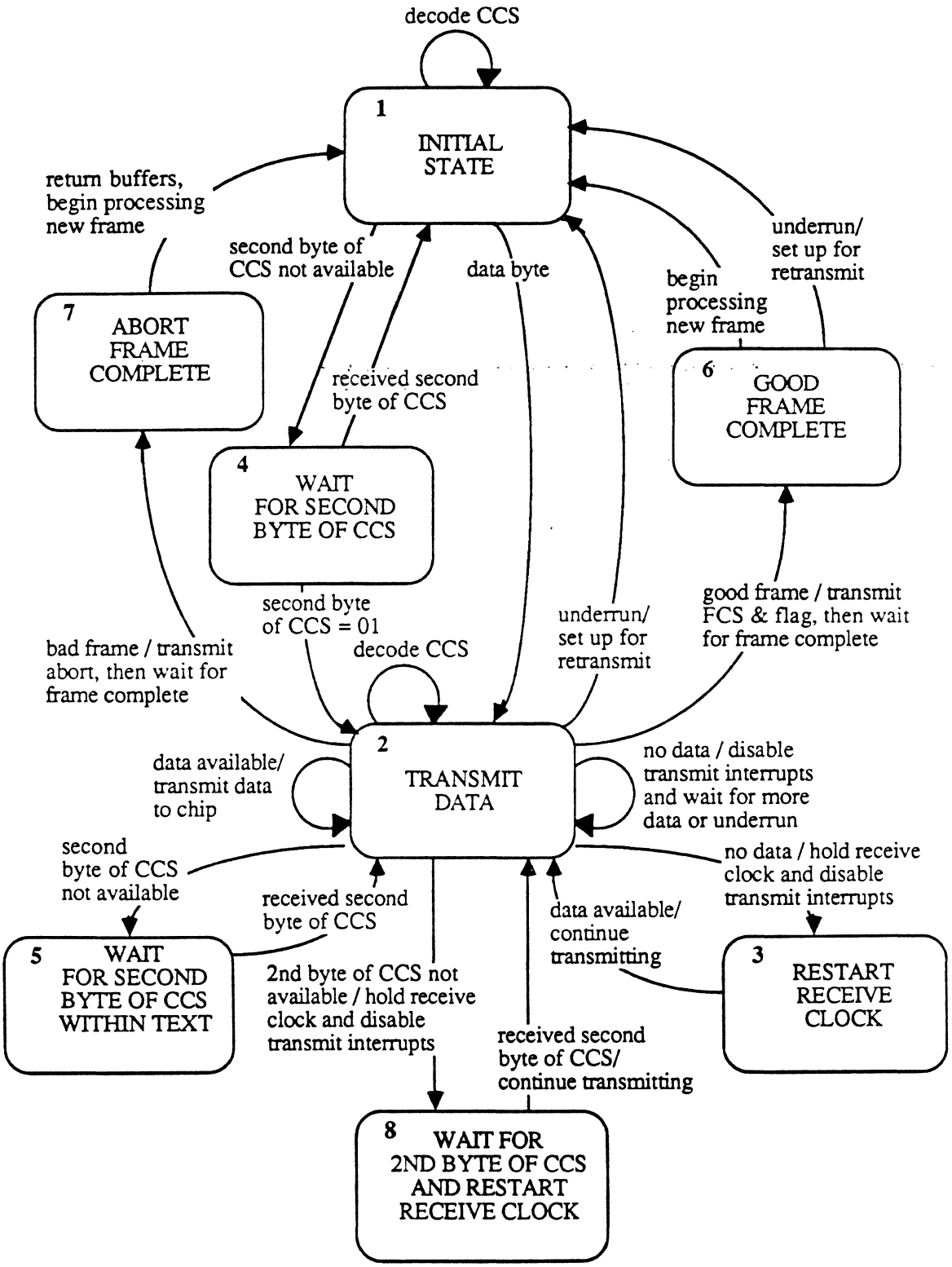


= Actually, the state is changed to state 21 until the diagnostics message is printed, then the transition is made to the next state.



Async Transmit States (nn):
01 - Flyback character delay enabled or Wang (terminal side).
02 - Character controlled DRI enabled.
03 - Flyback character delay and character controlled DRI enabled.
04 - Plain async.
08 - Wang (CPU side).
40 - HP Spoofing (CPU side).
41 - HP Spoofing (terminal side - subtypes 3 and 4).


1
INITIAL STATE
receive first data byte/ change state to 2 and jump there to handle data
error / send bad frame CCS
end of frame / send good frame CCS
2
RECEIVE DATA
abort / send bad frame CCS
receive next data byte
RTS down within message while RxFIFO is empty
3
RTS DOWN PENDING
3rd character or end of frame
receive up to 3 characters while RTS is down (actually processed in state 2, but no state change occurs)
Due to the 68560's two-byte shift register, we may still receive up to three more characters.


decode CCS
1
INITIAL STATE
return buffers, begin processing new frame
second byte of CCS not available
data byte
underrun/ set up for retransmit
begin processing new frame
7
ABORT FRAME COMPLETE
received second byte of CCS
6
GOOD FRAME COMPLETE
4
WAIT FOR SECOND BYTE OF CCS
second byte of CCS = 01
decode CCS
underrun/ set up for retransmit
good frame / transmit FCS & flag, then wait for frame complete
bad frame / transmit abort, then wait for frame complete
2
TRANSMIT DATA
data available/ transmit data to chip
no data / disable transmit interrupts and wait for more data or underrun
second byte of CCS not available
received second byte of CCS
no data / hold receive clock and disable transmit interrupts
data available/ continue transmitting
5
WAIT FOR SECOND BYTE OF CCS WITHIN TEXT
2nd byte of CCS not available / hold receive clock and disable transmit interrupts
3
RESTART RECEIVE CLOCK
received second byte of CCS/ continue transmitting
8
WAIT FOR 2ND BYTE OF CCS AND RESTART RECEIVE CLOCK

Guide to Synchronous FSM Diagrams

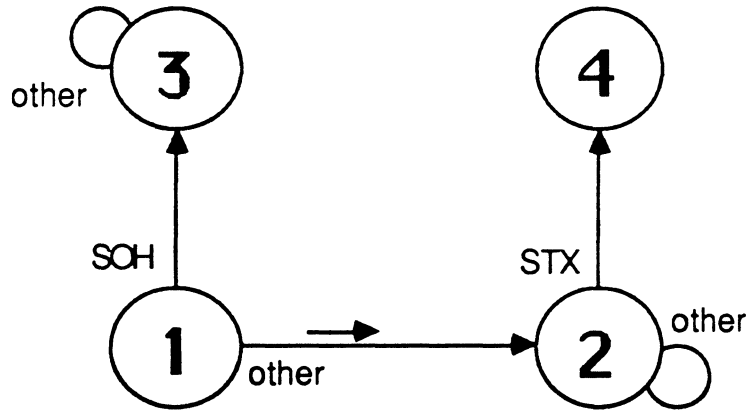
1.0 General Information

On the receive and transmit sides there are common states, independent of protocol, which are vectored to upon an interrupt, and from there the FSM states are called. On the receive side, the common state checks for parity, overrun, and loss of sync errors. The transmit side has several common states which manage between-message functions, prevent transmitter underruns within messages, handle CCS's (see TP Design Spec Supplement for pseudo code).

A single solid arc (without a -->) indicates that the character is stored in the RXQ (receive side) or sent to the chip (transmit side). The state pointed to by the arc will be entered when another data byte is available.

The extra arrow (-->) indicates a direct jump (JMP) to the next state, as opposed to waiting for the next character. This means that the present character is not stored until it leads along an arc without an extra arrowhead.

Example:



While in state 1, a SOH will be stored in the RXQ (receive side) or sent to the chip (transmit side), and the state will be changed to state 3. With a character other than a SOH we would jump directly from state 1 to state 2, where the character would be stored and the state changed as needed.

2.0 RECEIVE SIDE

The Hunt Mode state empties the RxFIFO and, if no syncs were found, sets the sync-stripping mode (OM4), resets the receiver, and changes the FSM

state to handle the interrupt after synching up. If syncs were found, the FSM state is changed to strip/not strip syncs (OM4) and search for the first non-sync.

The ending FSM state (RCV CHAR) will or will not store the character (pad) received immediately following the message based on the setting of opmode 6 (OM6). Also, a pad will be stored for messages ending with a single BCC character, and then an end of block CCS will be sent.

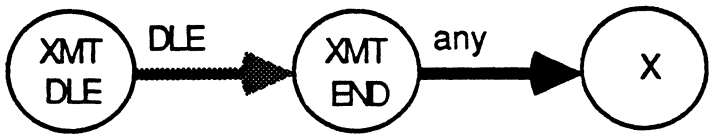
In the case of protocols which have only one BCC character, an extra pad is stored after the BCC. This is solely for the purpose of accomodating the 6040 which expects the extra character. When connecting a Jupiter to a 6040, OM6 must be set the same in both nodes.

3.0 TRANSMIT SIDE

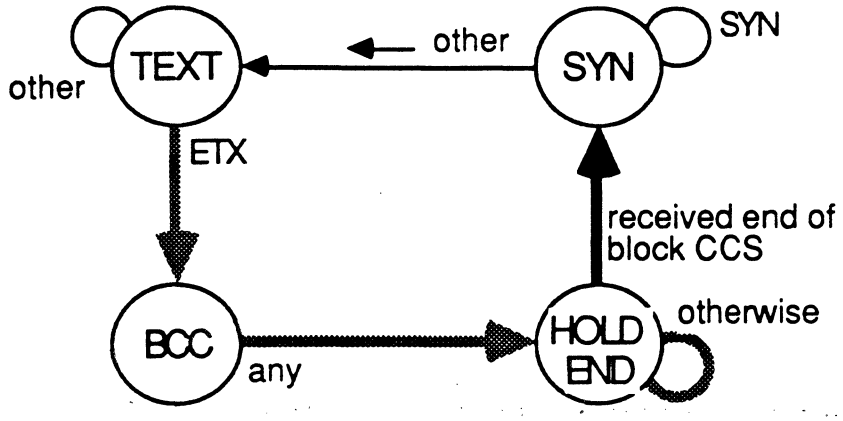
There is a set of common states which supercedes the finite state machine states. These common states take data from the TXQ (checking for CCS's) and send it to the FSM states, release protected characters and perform end of message tasks before looking for data in the TXQ, and perform sync fill or clock stopping when there is no data available in the TXQ.

FSM states with thick gray arcs or thick black arcs leaving them are called holding states. A data byte which leads along (or labels) one of these arcs is held in a temporary buffer in the thread page instead of being written to the chip. In addition, a thick black arc indicates that the common state is changed to release the data in the temporary buffer to the chip. In this case, no more data will be taken from the TXQ until the temporary buffer is emptied. This provides sync fill protection for the sequence of characters held.

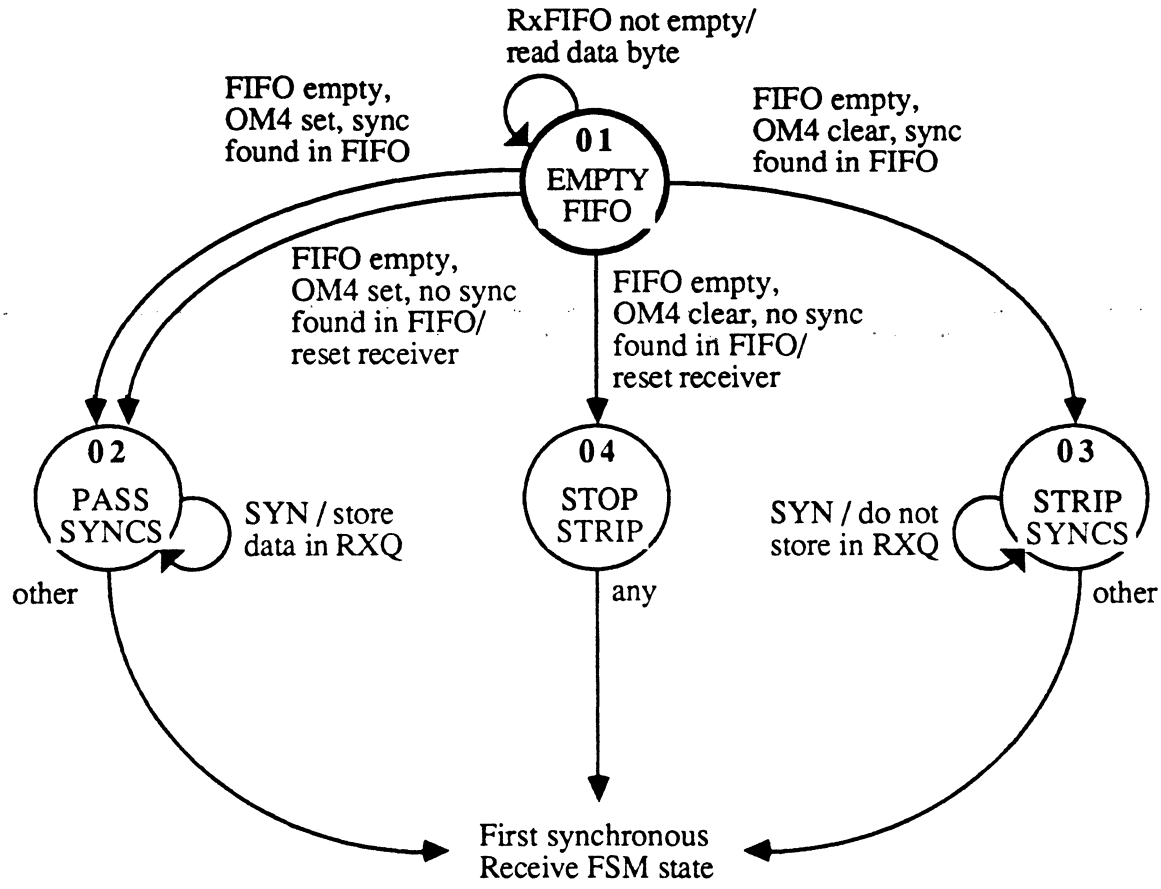
For example, to protect DLE CHAR, the diagram would look like this:



To protect ETX BCC PAD(S) until the end of block CCS is received, the diagram would look like:

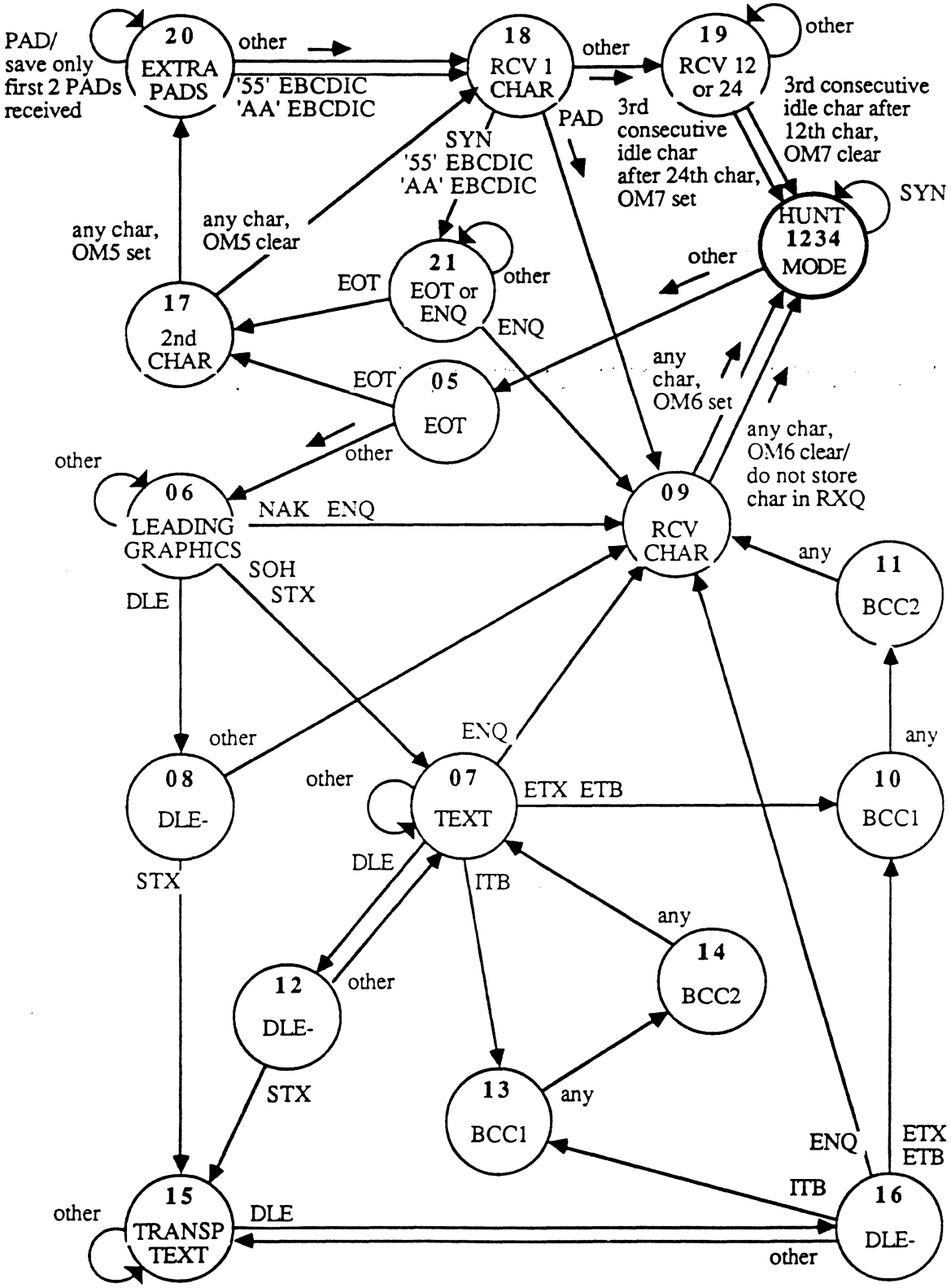


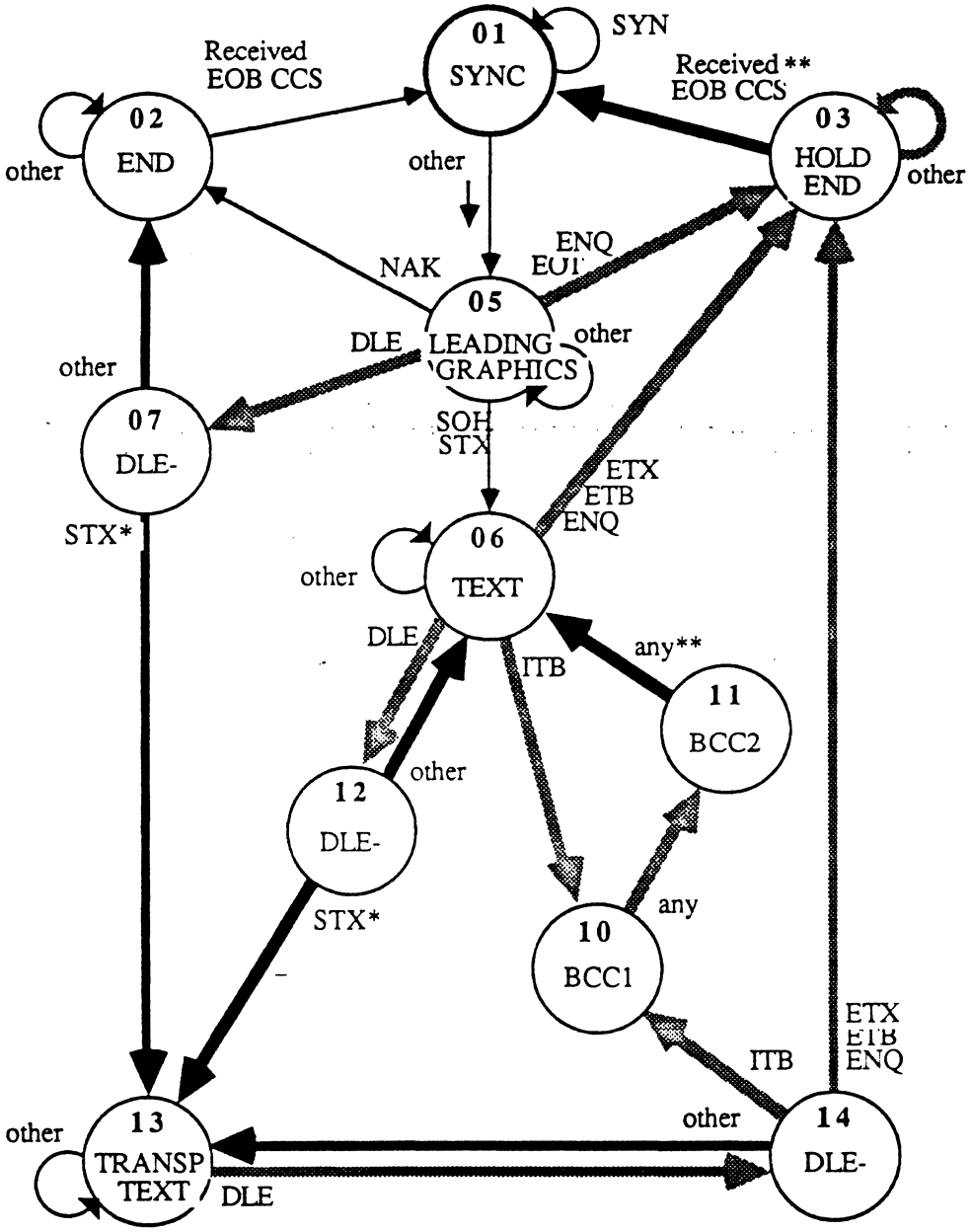
The transition from the last state to the SYN state is caused by the receipt of an end of block CCS. The routine which detects the CCS changes the common state to release the protected characters and perform end of message tasks (e.g. force a pad, drop carrier) and changes the FSM state to SYN.



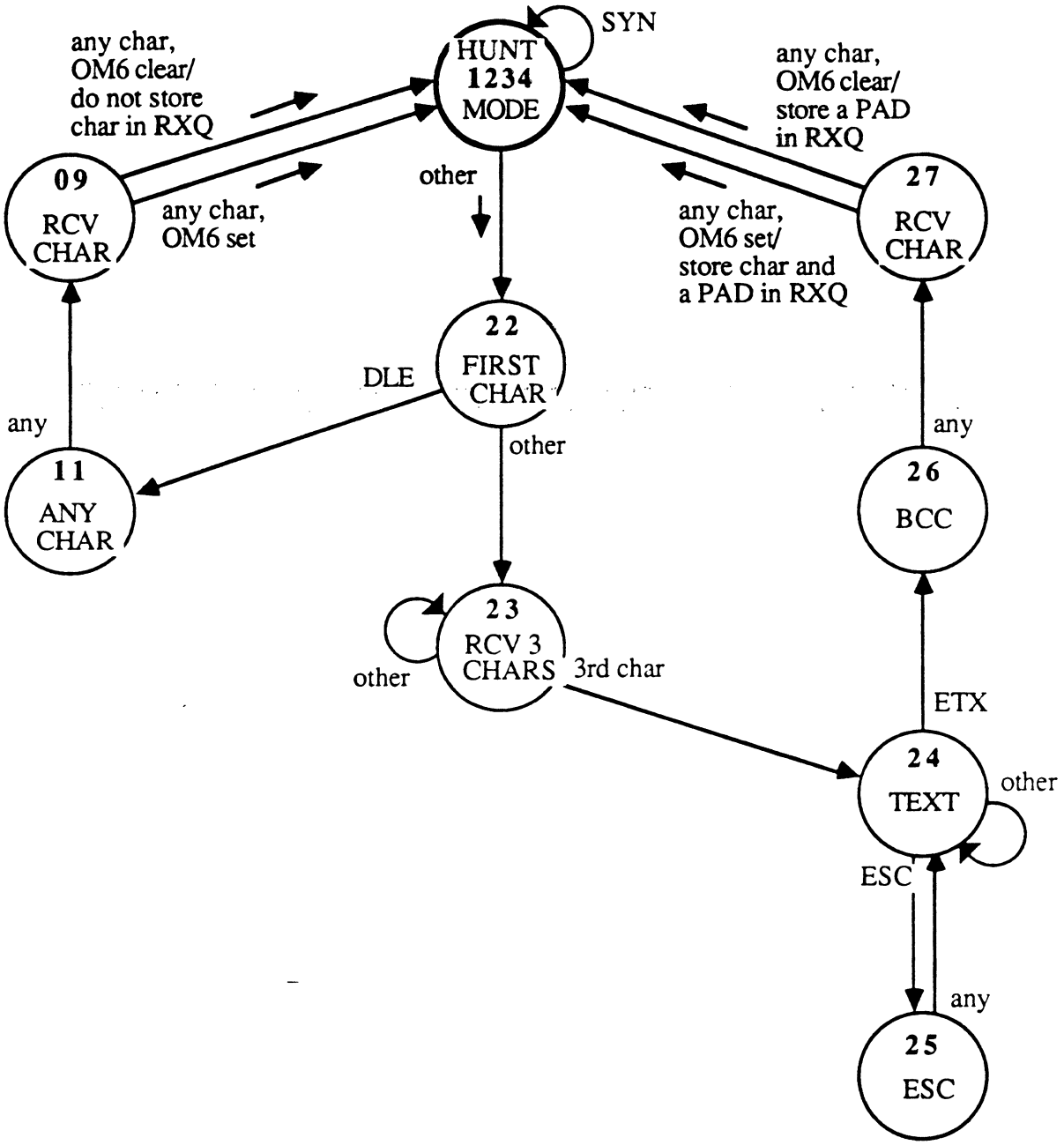
In the EMPTY FIFO state the receive FIFO is emptied, checking for sync characters. If two consecutive syncs are found, or the last character is a sync, then the chip is not reset in case there are no subsequent sync characters for the chip to sync up on. Also, the FSM state is changed to the state which will handle between-message syncs according to the setting of opmode bit 4.

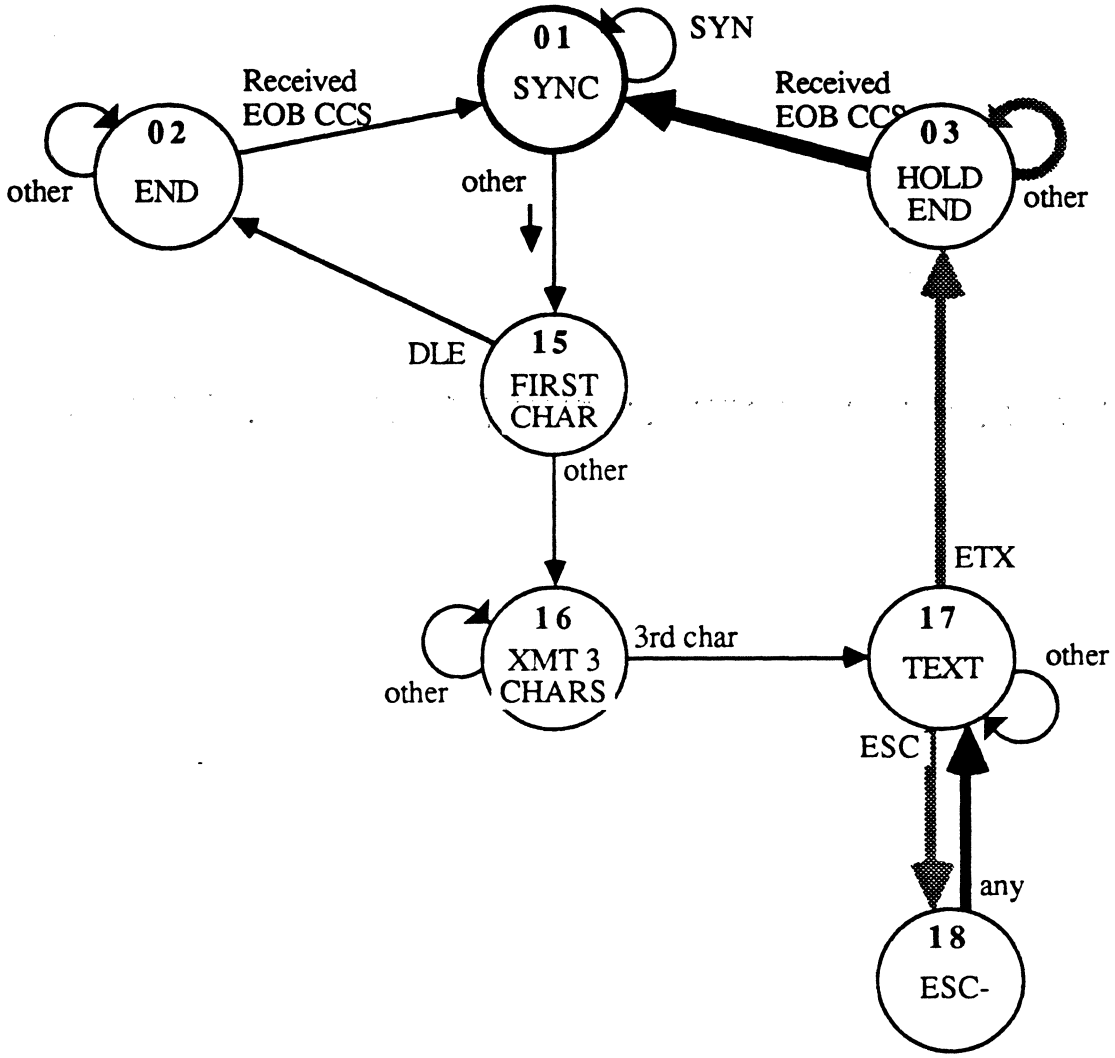
If the receive FIFO is emptied without finding a sync character, or there is a parity or overrun error, then the chip is reset to go into Hunt Mode. Also the FSM state is changed to the state which will handle the first interrupt upon synching up according to the setting of opmode bit 4.


20
EXTRA PADS
PAD/ save only first 2 PADs received
other
'55' EBCDIC
'AA' EBCDIC
18
RCV 1 CHAR
other
19
RCV 12 or 24
other
3rd consecutive idle char after 12th char, OM7 clear
PAD
3rd consecutive idle char after 24th char, OM7 set
SYN
'55' EBCDIC
'AA' EBCDIC
HUNT 1234 MODE
SYN
other
any char, OM5 set
any char, OM5 clear
21
EOT or ENQ
EOT
other
ENQ
17
2nd CHAR
EOT
05
EOT
other
other
any char, OM6 set
any char, OM6 clear/ do not store char in RXQ
06
LEADING GRAPHICS
NAK ENQ
09
RCV CHAR
any
11
BCC2
SOH
STX
DLE
other
ENQ
any
08
DLE-
other
07
TEXT
ETX ETB
10
BCC1
DLE
ITB
STX
any
14
BCC2
12
DLE-
other
13
BCC1
any
STX
ENQ
ETX
ETB
ITB
15
TRANSP TEXT
other
DLE
16
DLE-
other



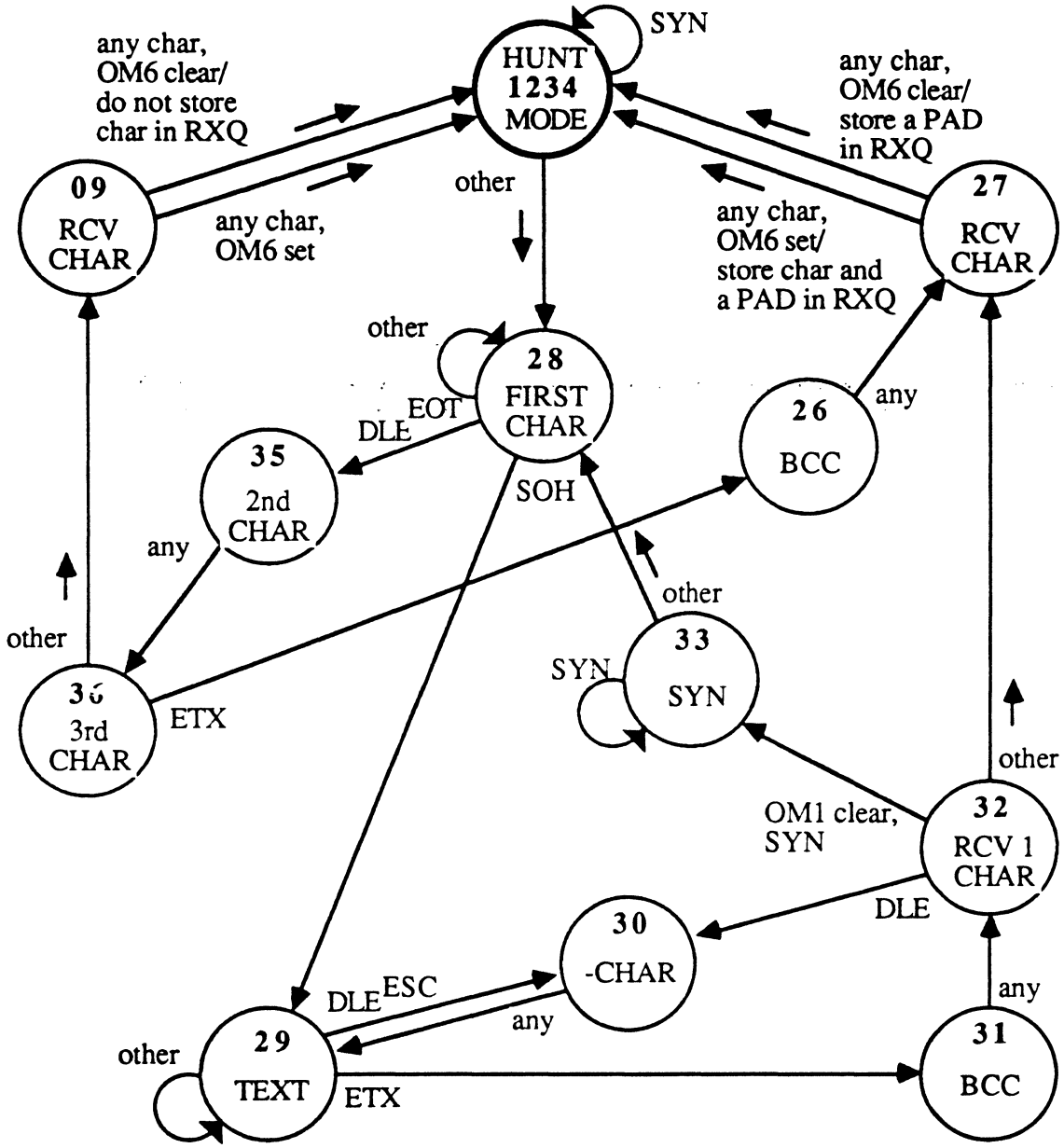
* = Set transparent mode flag.
** = Clear transparent mode flag.
▬▬ = Hold character in temporary buffer.
▬▬ = Hold character and set common state to send characters in temporary buffer to the chip.

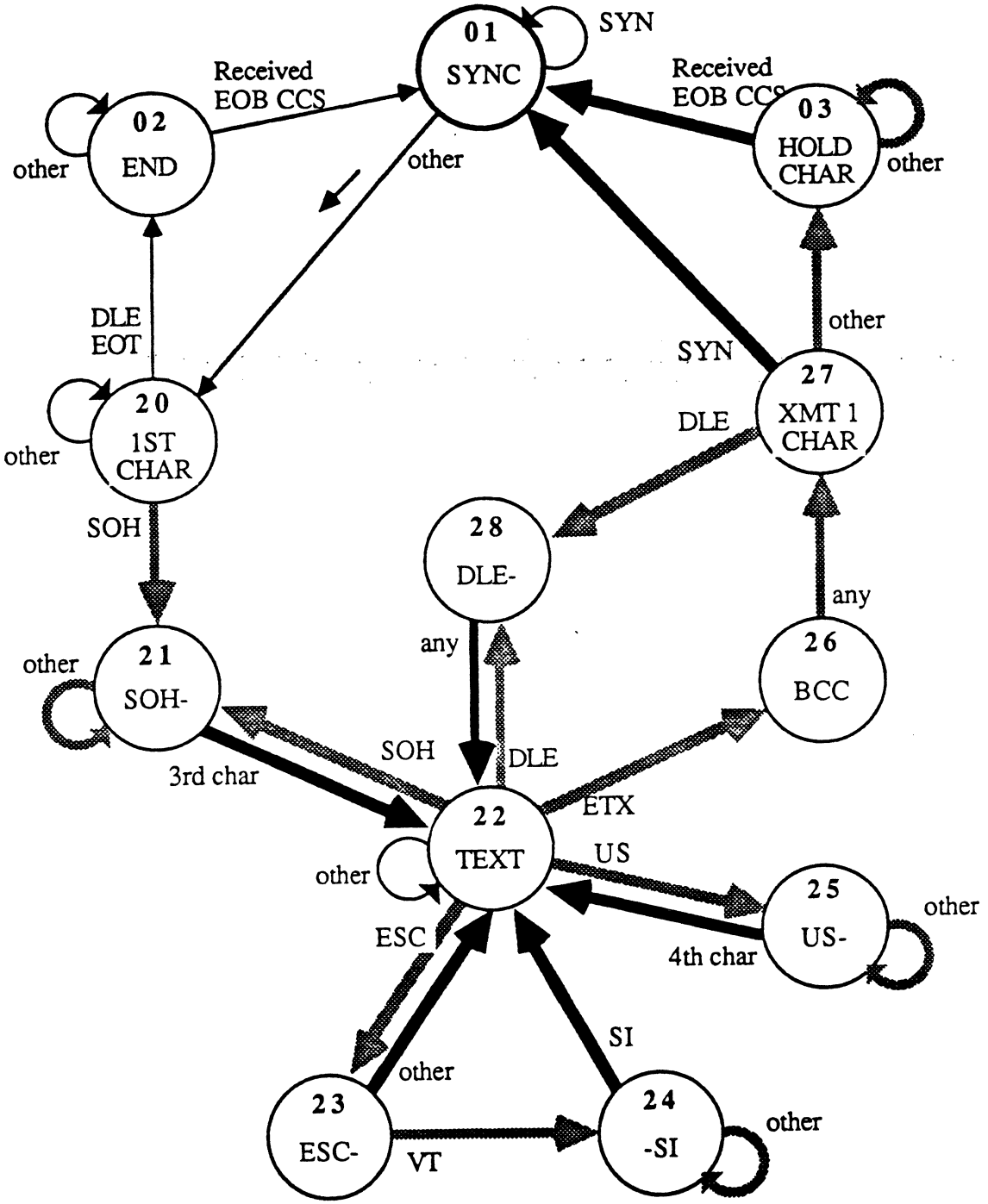

HUNT
1234
MODE
SYN
any char,
OM6 clear/
do not store
char in RXQ
any char,
OM6 clear/
store a PAD
in RXQ
09
RCV
CHAR
any char,
OM6 set
other
any char,
OM6 set/
store char and
a PAD in RXQ
27
RCV
CHAR
22
FIRST
CHAR
DLE
any
other
any
11
ANY
CHAR
26
BCC
23
RCV 3
CHARS
other
3rd char
ETX
24
TEXT
other
ESC
any
25
ESC



= Hold character in temporary buffer.

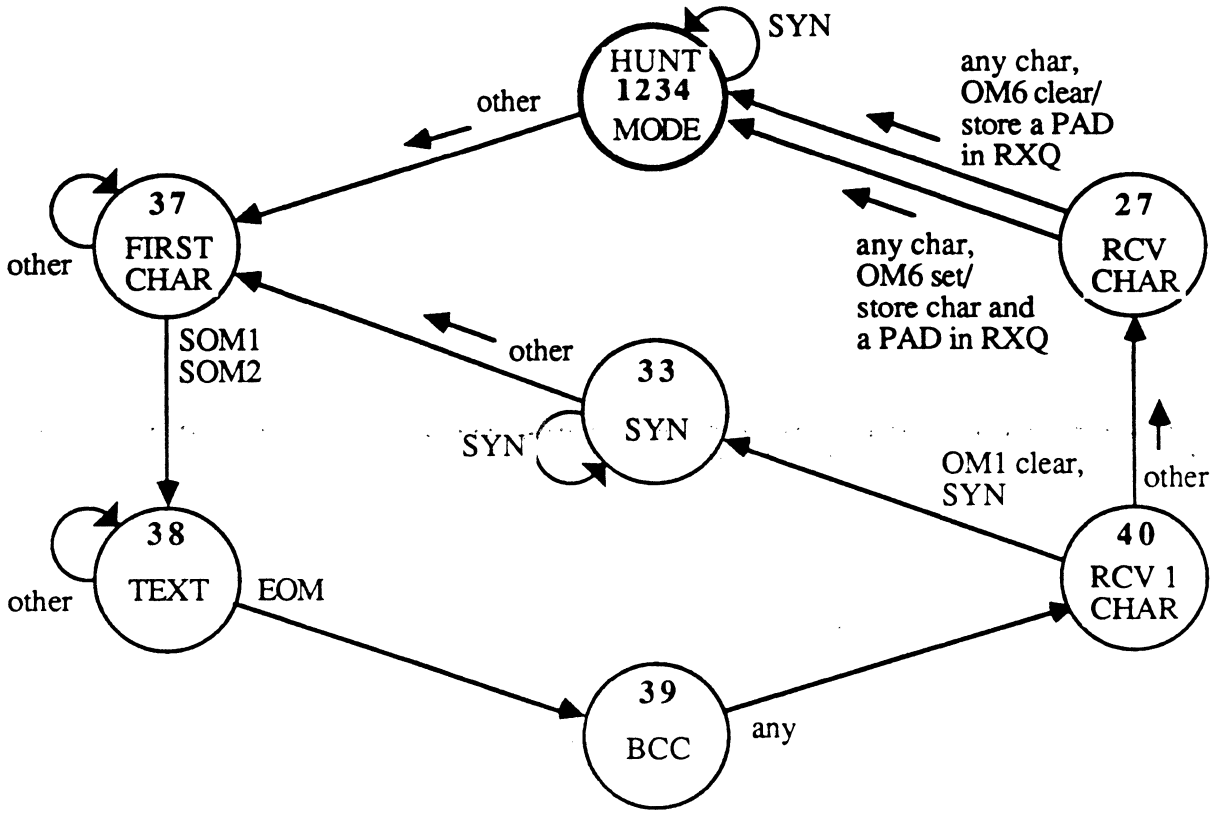
= Hold character and set common state to send characters in temporary buffer to the chip.

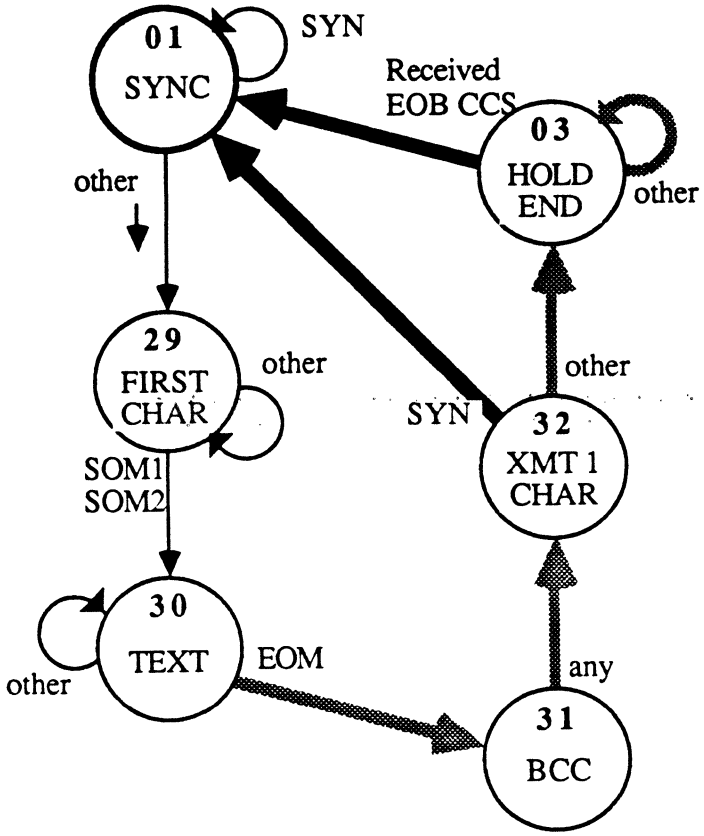

HUNT
1234
MODE
SYN
any char,
OM6 clear/
do not store
char in RXQ
any char,
OM6 clear/
store a PAD
in RXQ
09
RCV
CHAR
any char,
OM6 set
other
any char,
OM6 set/
store char and
a PAD in RXQ
27
RCV
CHAR
other
28
FIRST
CHAR
EOT
DLE
35
2nd
CHAR
26
BCC
any
SOH
any
other
other
33
SYN
SYN
36
3rd
CHAR
ETX
other
OM1 clear,
SYN
32
RCV 1
CHAR
DLE
30
-CHAR
DLE
ESC
any
any
other
29
TEXT
ETX
31
BCC



= Hold character in temporary buffer.

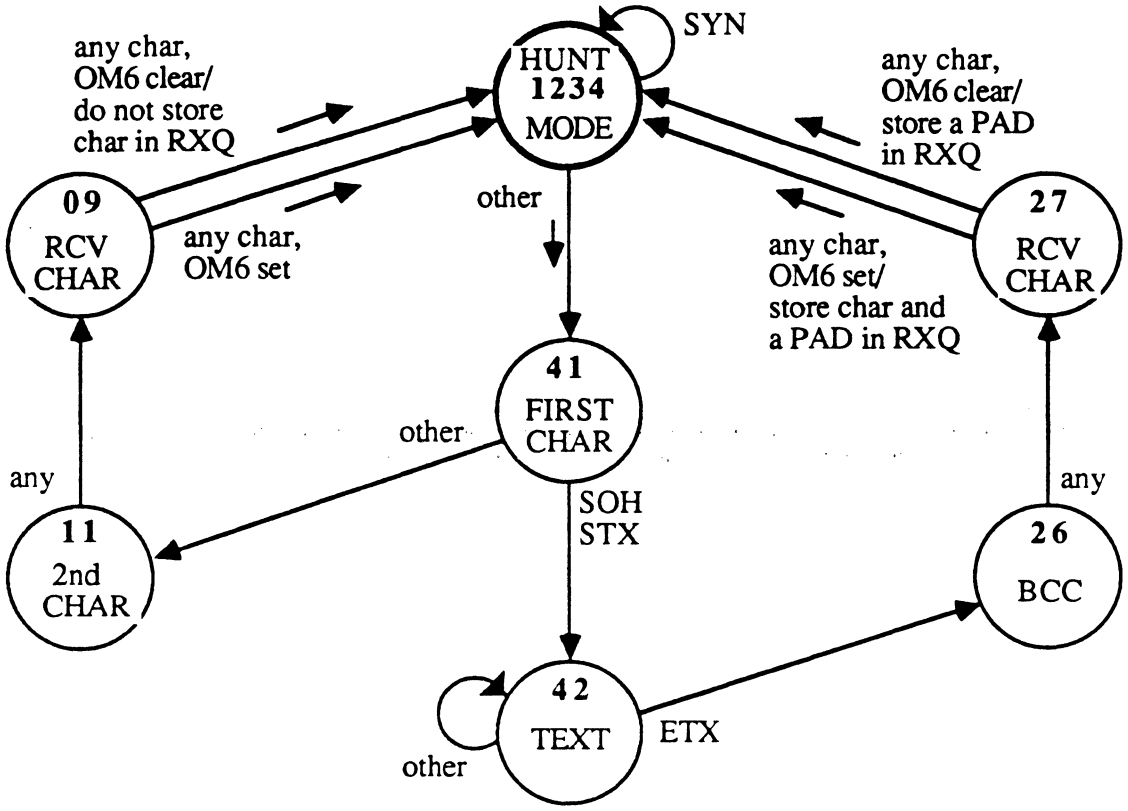
= Hold character and set common state to send characters in temporary buffer to the chip.

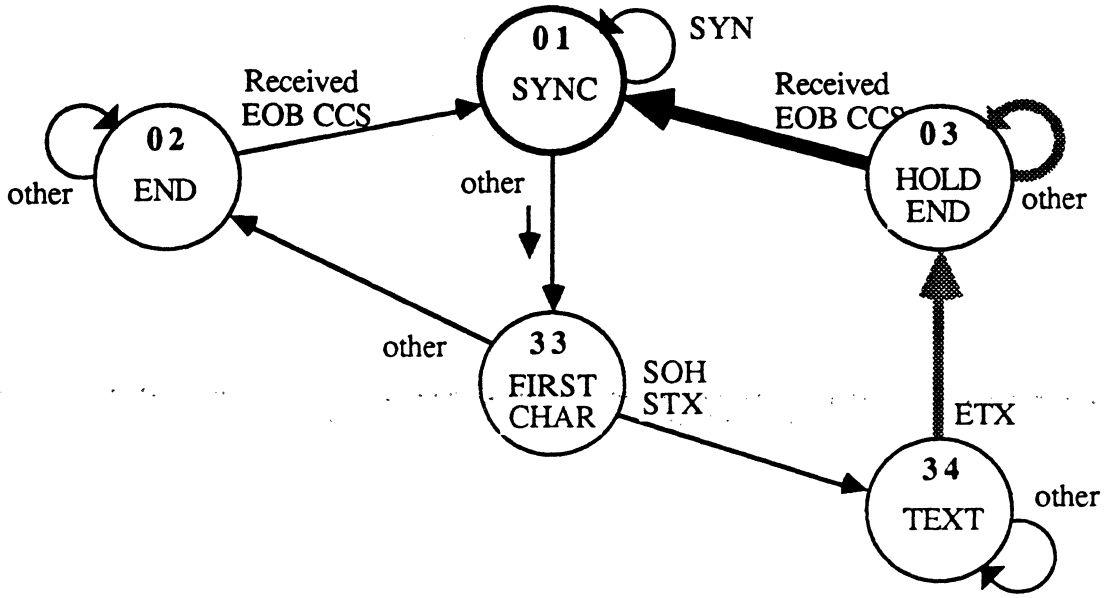

HUNT
1234
MODE
SYN
other
any char,
OM6 clear/
store a PAD
in RXQ
37
FIRST
CHAR
other
SOM1
SOM2
other
33
SYN
SYN
any char,
OM6 set/
store char and
a PAD in RXQ
27
RCV
CHAR
OM1 clear,
SYN
other
38
TEXT
other
EOM
40
RCV 1
CHAR
39
BCC
any



= Hold character in temporary buffer.

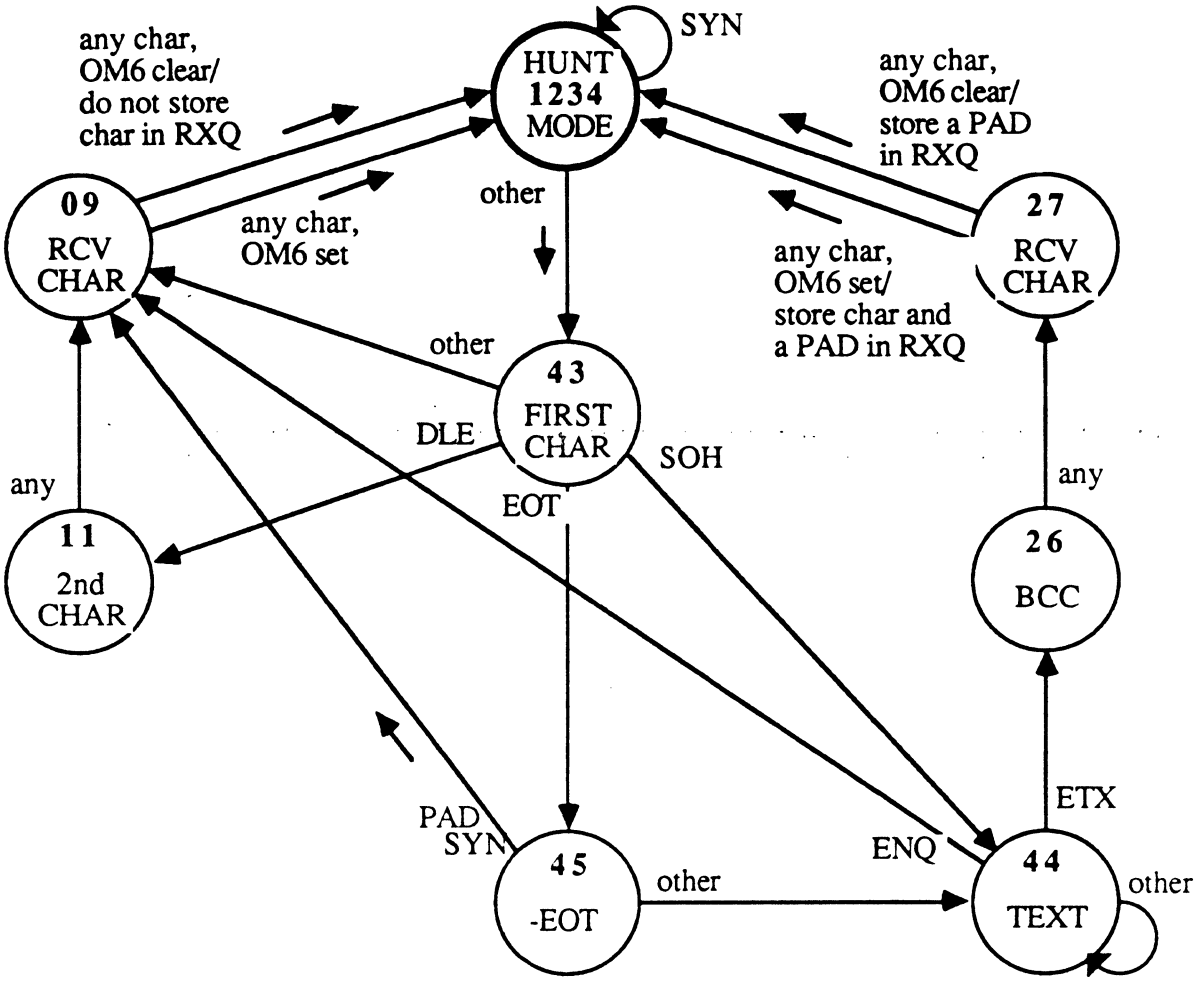
= Hold character and set common state to send characters in temporary buffer to the chip.

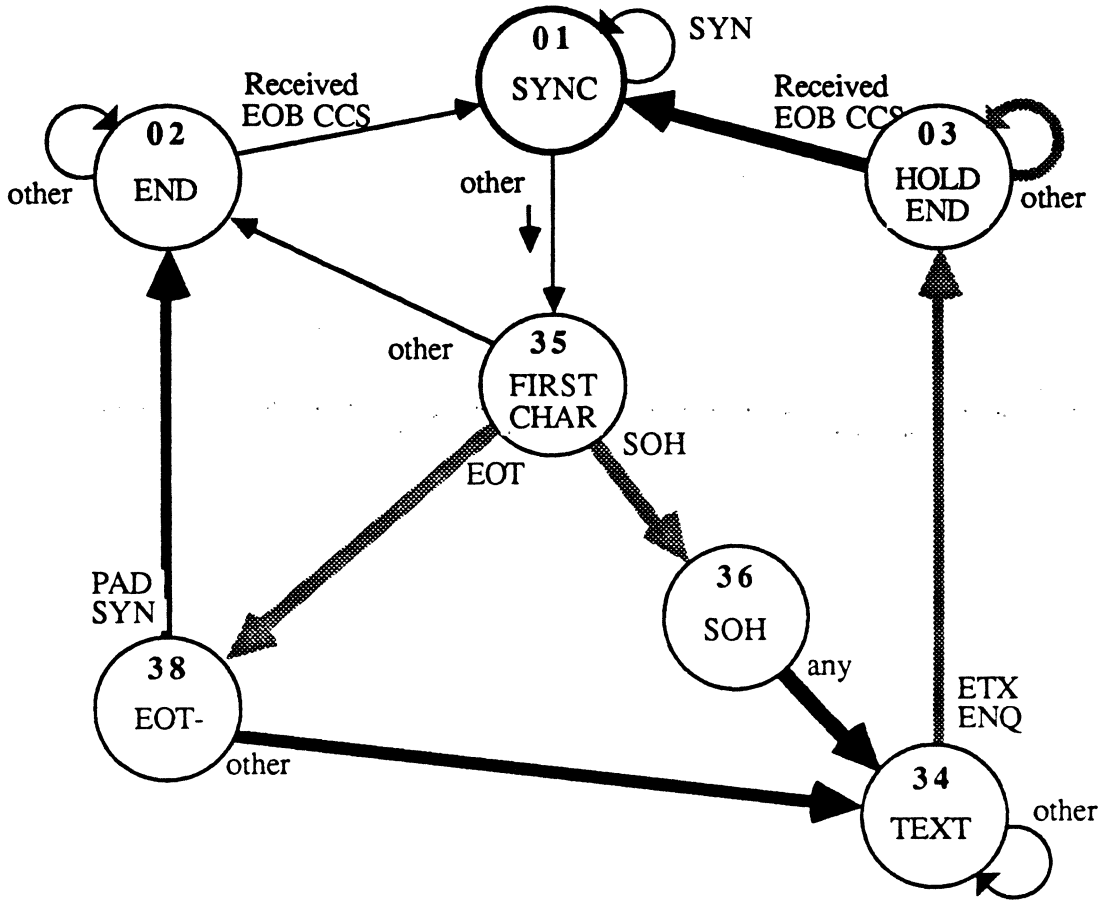

SYN
HUNT
1234
MODE
any char,
OM6 clear/
do not store
char in RXQ
any char,
OM6 set
09
RCV
CHAR
other
any char,
OM6 clear/
store a PAD
in RXQ
any char,
OM6 set/
store char and
a PAD in RXQ
27
RCV
CHAR
41
FIRST
CHAR
other
any
11
2nd
CHAR
SOH
STX
any
26
BCC
42
TEXT
ETX
other



= Hold character in temporary buffer.

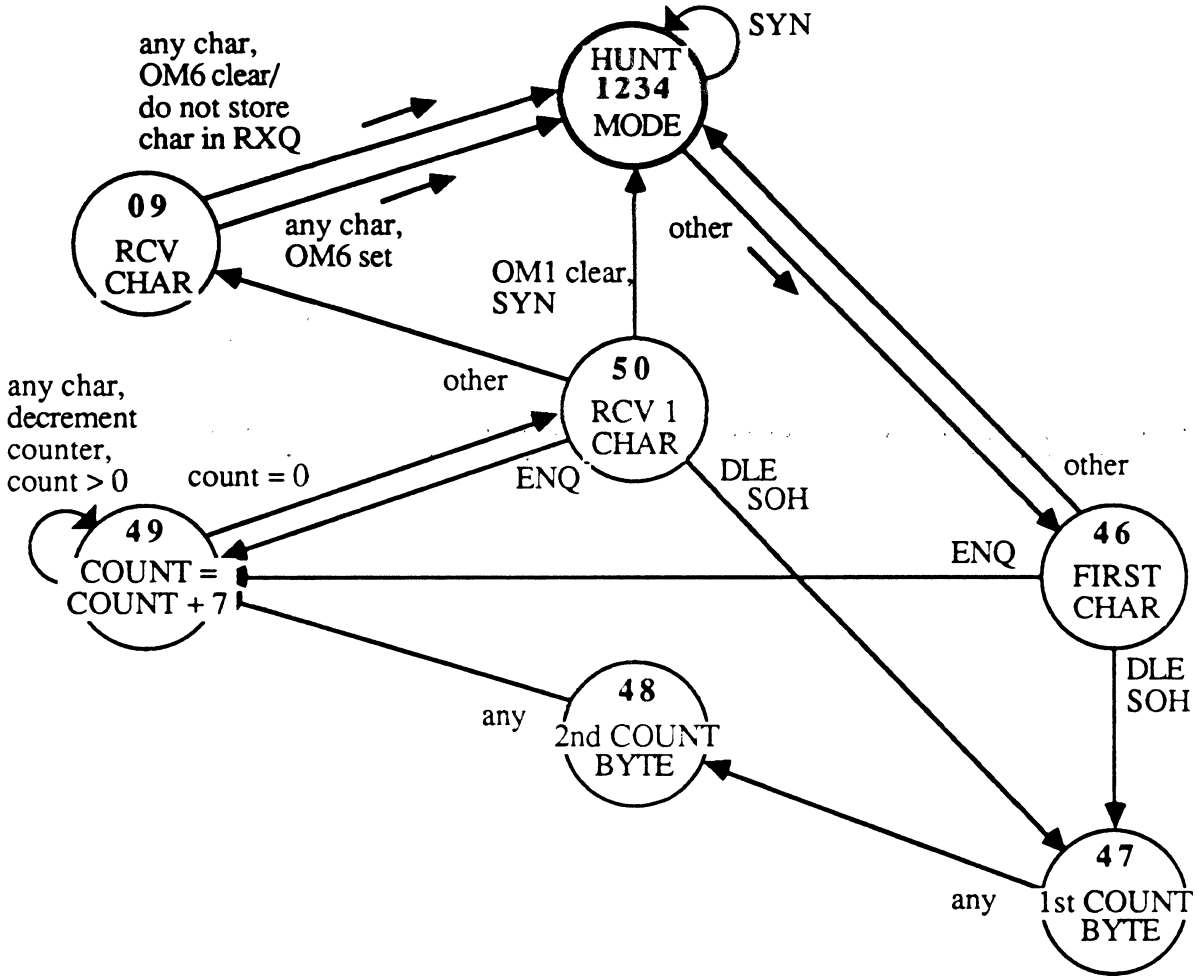
= Hold character and set common state to send characters in temporary buffer to the chip.

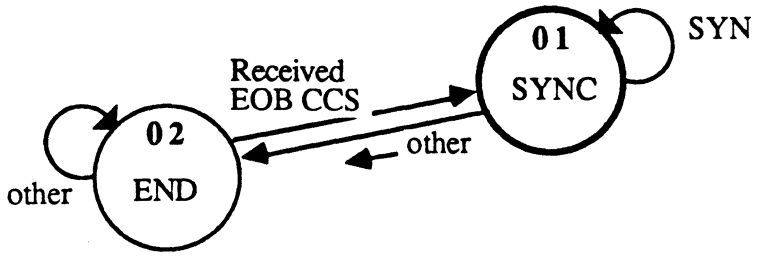

HUNT
1234
MODE
SYN
any char,
OM6 clear/
do not store
char in RXQ
any char,
OM6 clear/
store a PAD
in RXQ
09
RCV
CHAR
any char,
OM6 set
other
27
RCV
CHAR
any char,
OM6 set/
store char and
a PAD in RXQ
other
43
FIRST
CHAR
DLE
SOH
EOT
any
11
2nd
CHAR
any
26
BCC
PAD
SYN
45
-EOT
other
ENQ
44
TEXT
other
ETX



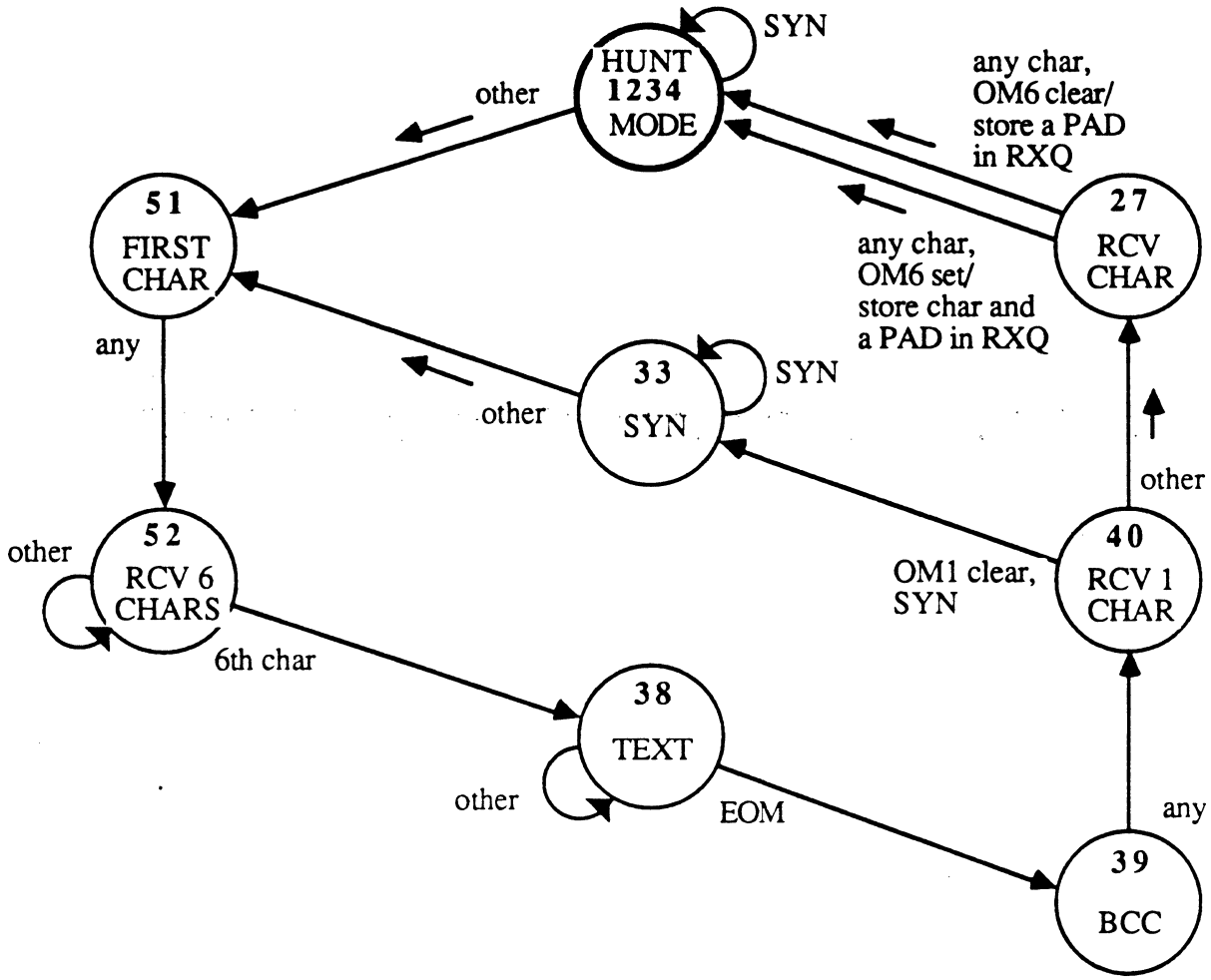
= Hold character in temporary buffer.

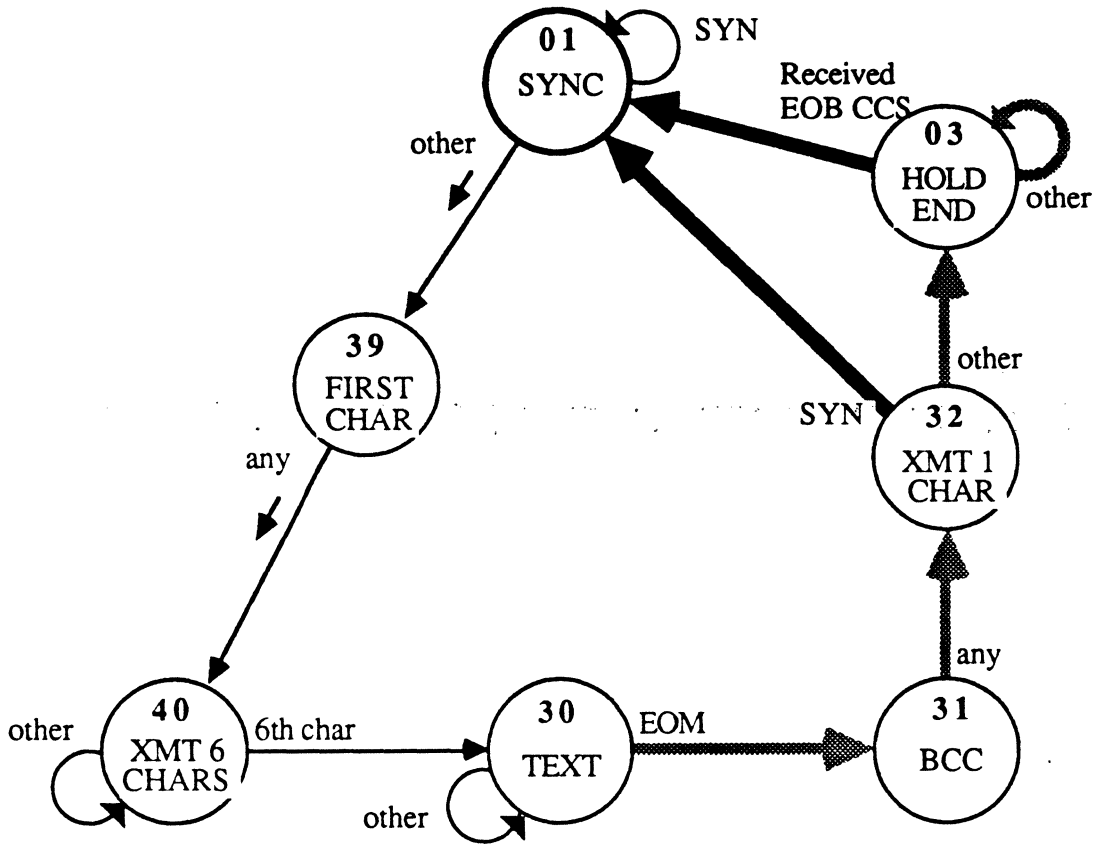
= Hold character and set common state to send characters in temporary buffer to the chip.


any char,
OM6 clear/
do not store
char in RXQ
HUNT
1234
MODE
SYN
09
RCV
CHAR
any char,
OM6 set
other
OM1 clear,
SYN
50
RCV 1
CHAR
other
any char,
decrement
counter,
count > 0
count = 0
ENQ
DLE
SOH
other
49
COUNT =
COUNT + 7
ENQ
46
FIRST
CHAR
DLE
SOH
any
48
2nd COUNT
BYTE
any
47
1st COUNT
BYTE



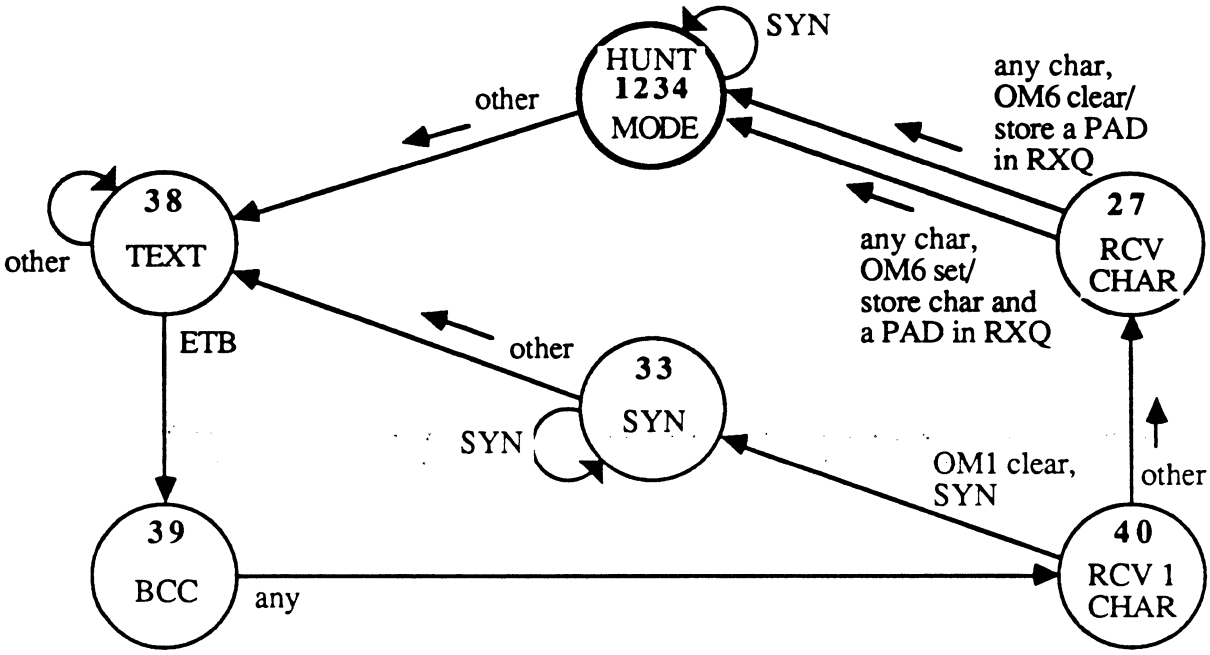
Whole message must be protected from sync fill.

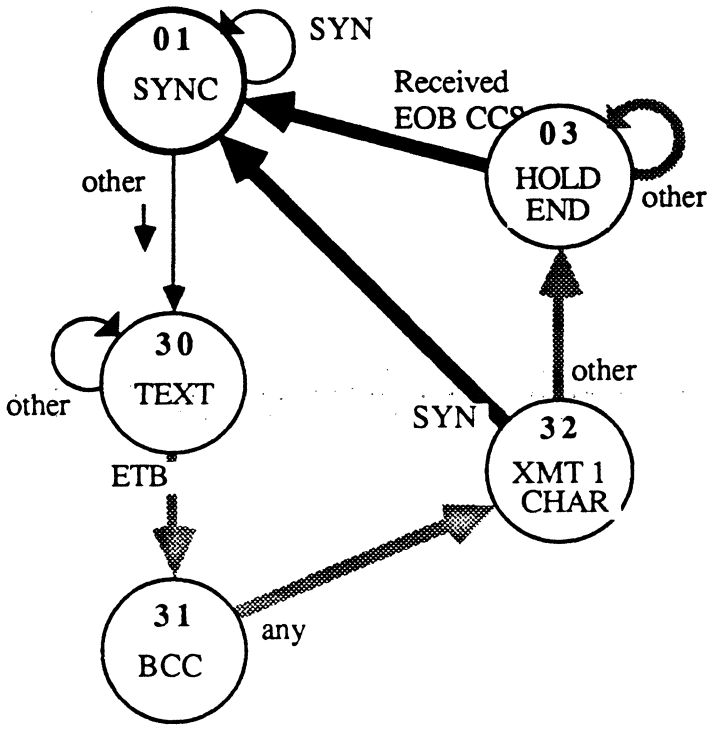

HUNT
1234
MODE
SYN
other
any char,
OM6 clear/
store a PAD
in RXQ
51
FIRST
CHAR
27
RCV
CHAR
any char,
OM6 set/
store char and
a PAD in RXQ
any
33
SYN
SYN
other
other
other
52
RCV 6
CHARS
40
RCV 1
CHAR
OM1 clear,
SYN
6th char
38
TEXT
other
EOM
any
39
BCC



= Hold character in temporary buffer.

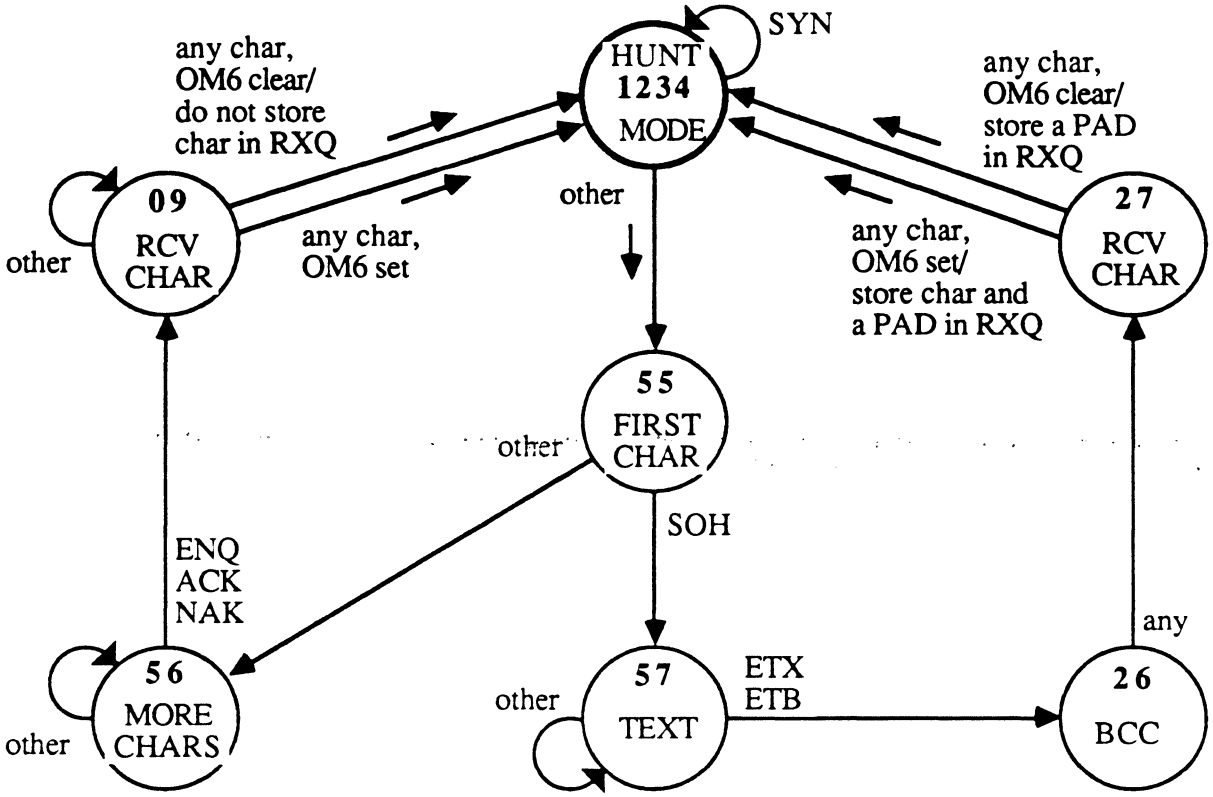
= Hold character and set common state to send

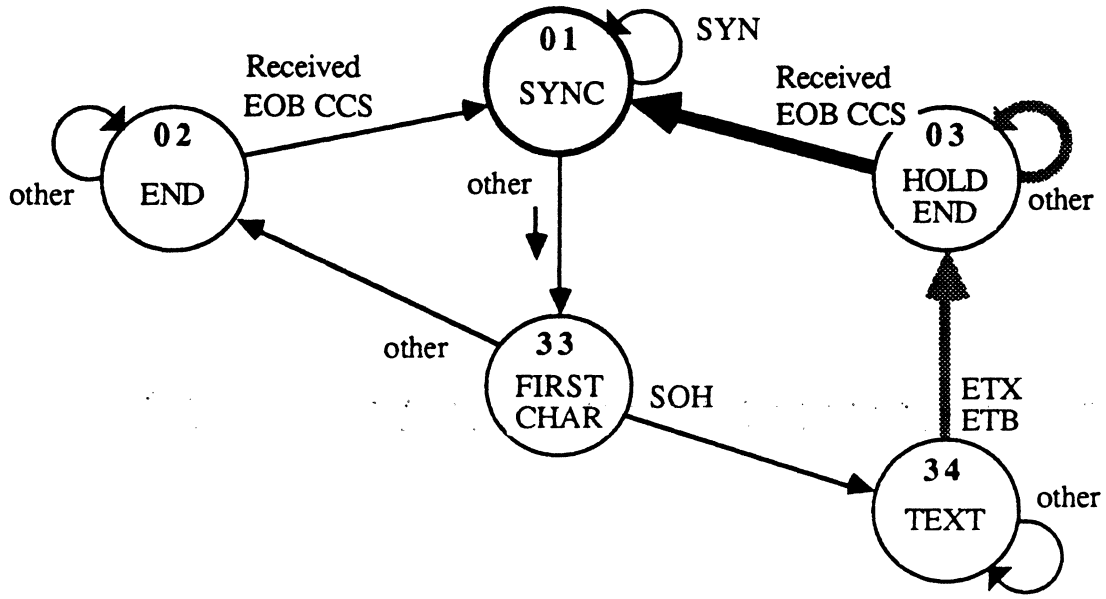

SYN
HUNT
1234
MODE
other
any char,
OM6 clear/
store a PAD
in RXQ
38
TEXT
other
27
RCV
CHAR
any char,
OM6 set/
store char and
a PAD in RXQ
ETB
other
33
SYN
SYN
OM1 clear,
SYN
other
39
BCC
any
40
RCV 1
CHAR



= Hold character in temporary buffer.

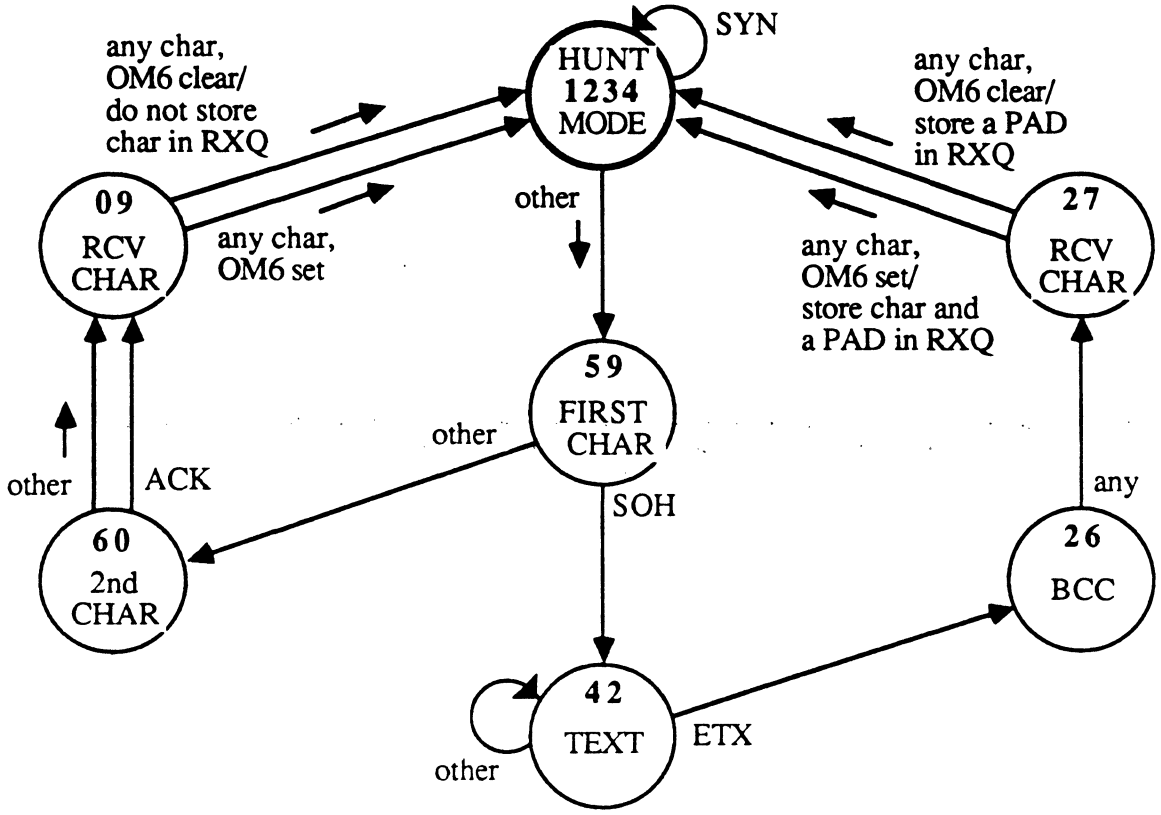
= Hold character and set common state to send characters in temporary buffer to the chip.

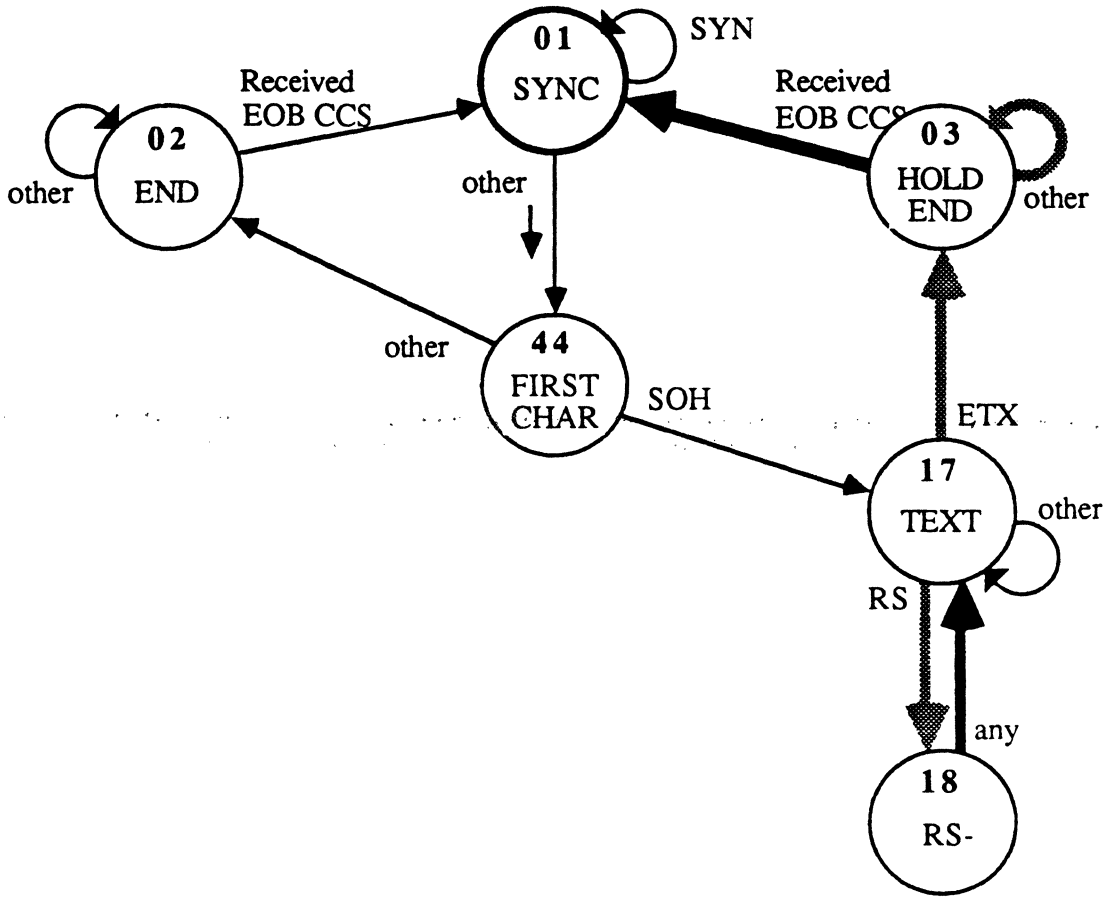

SYN
HUNT
1234
MODE
any char,
OM6 clear/
do not store
char in RXQ
any char,
OM6 clear/
store a PAD
in RXQ
09
RCV
CHAR
other
any char,
OM6 set
other
any char,
OM6 set/
store char and
a PAD in RXQ
27
RCV
CHAR
55
FIRST
CHAR
other
SOH
ENQ
ACK
NAK
any
56
MORE
CHARS
other
other
57
TEXT
ETX
ETB
26
BCC



= Hold character in temporary buffer.

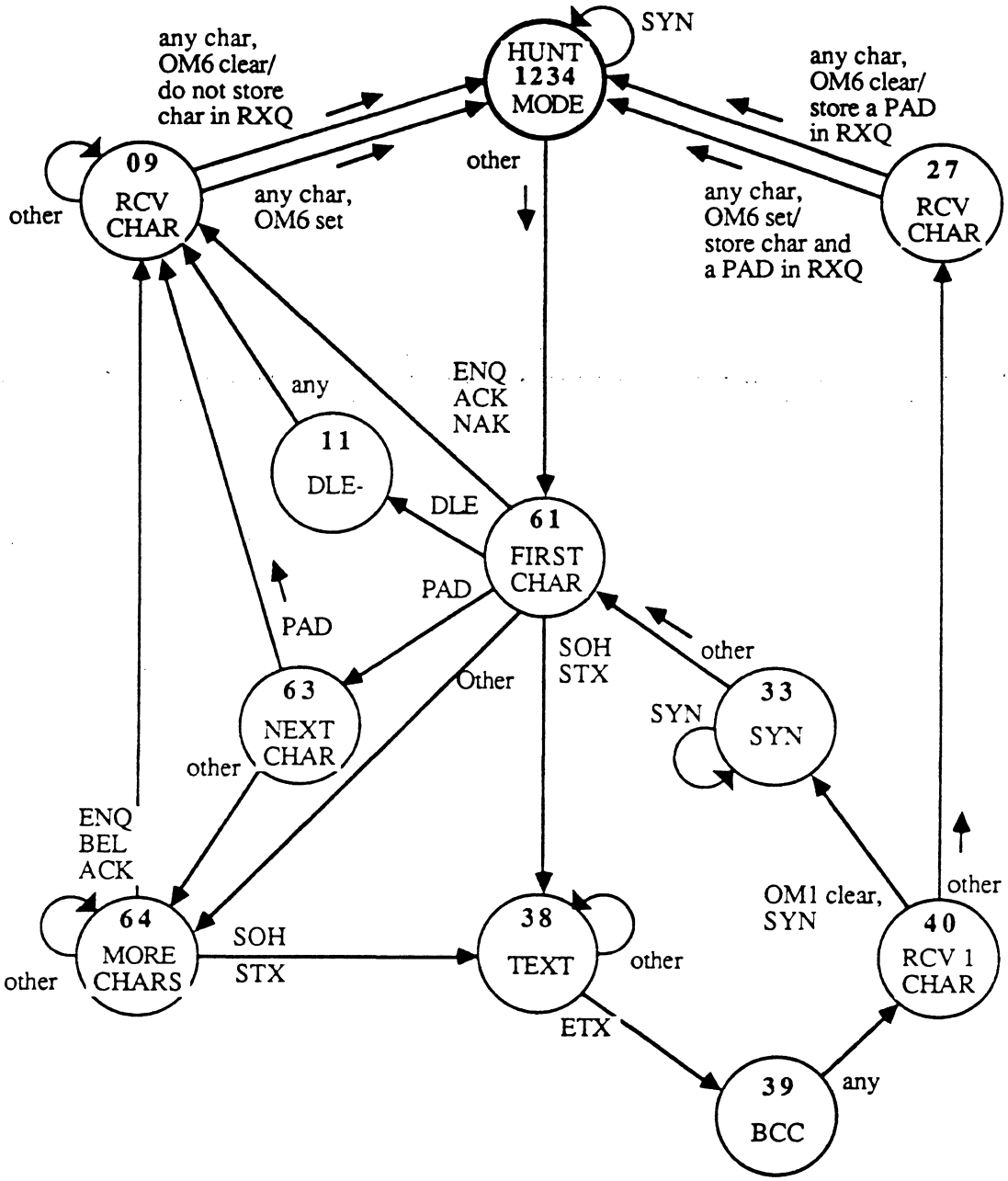
= Hold character and set common state to send characters in temporary buffer to the chip.

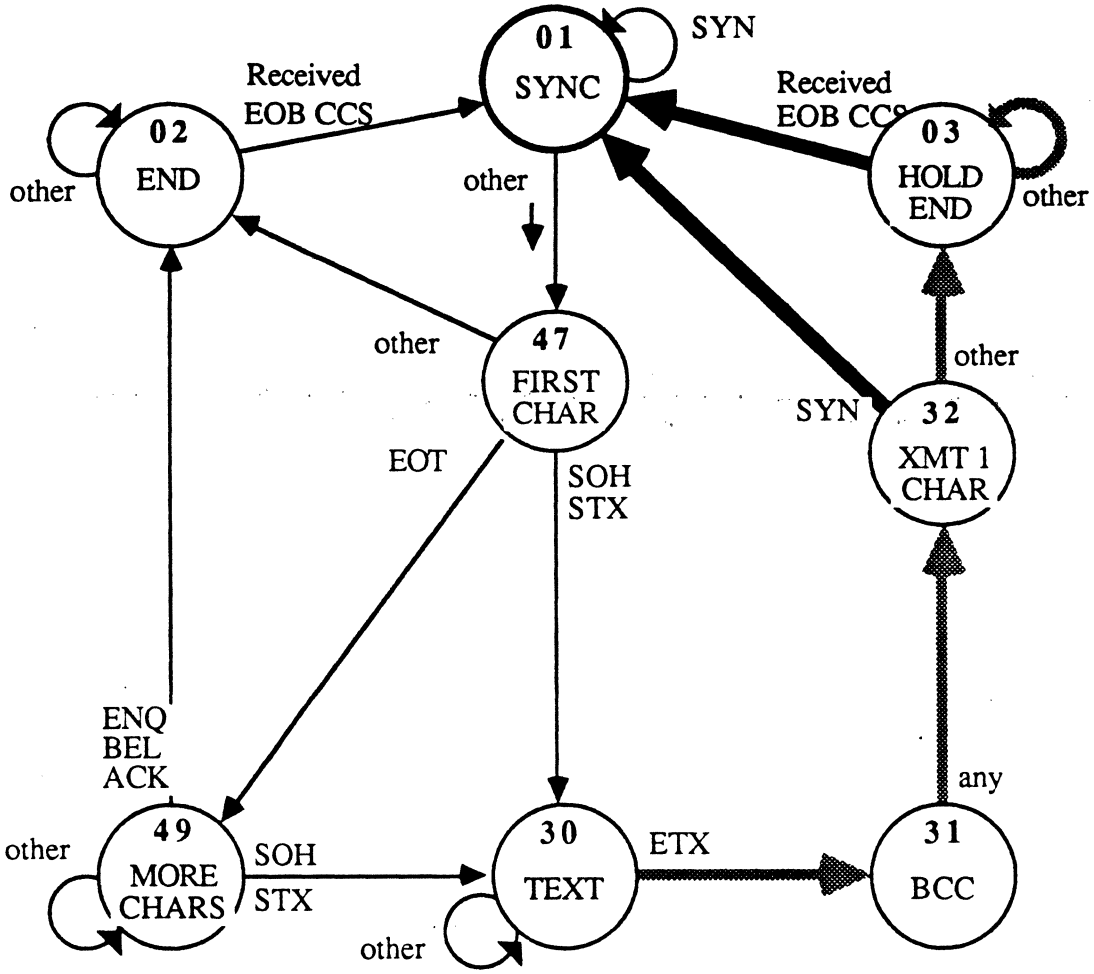

HUNT
1234
MODE
SYN
any char,
OM6 clear/
do not store
char in RXQ
any char,
OM6 set
09
RCV
CHAR
other
59
FIRST
CHAR
other
SOH
60
2nd
CHAR
other
ACK
42
TEXT
other
ETX
26
BCC
any
27
RCV
CHAR
any char,
OM6 clear/
store a PAD
in RXQ
any char,
OM6 set/
store char and
a PAD in RXQ

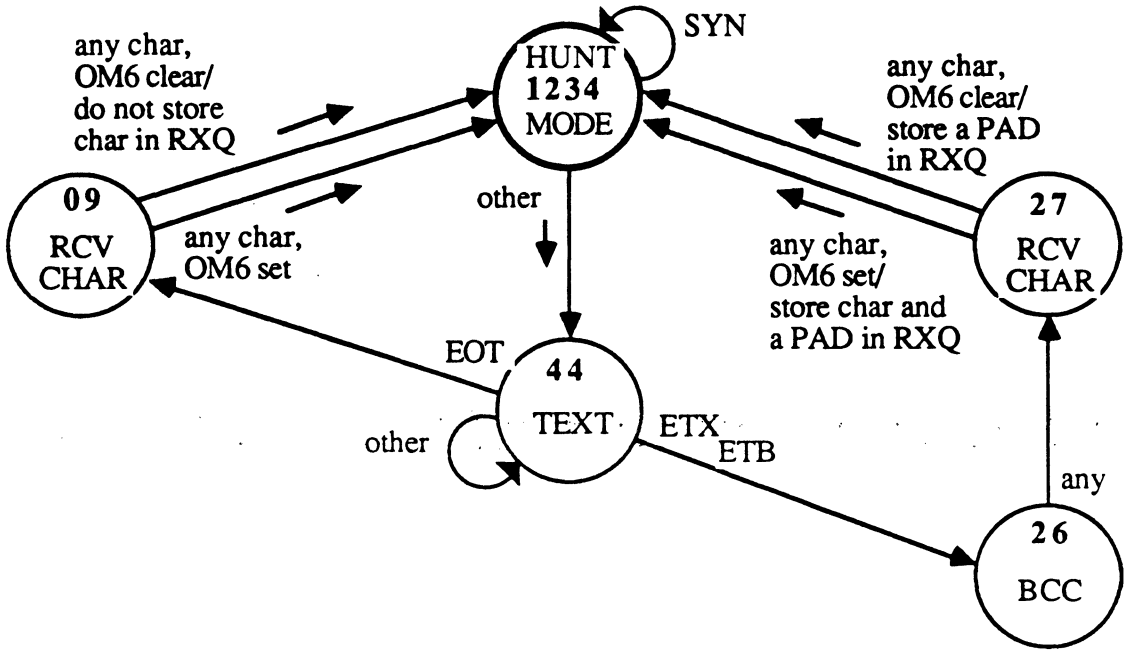


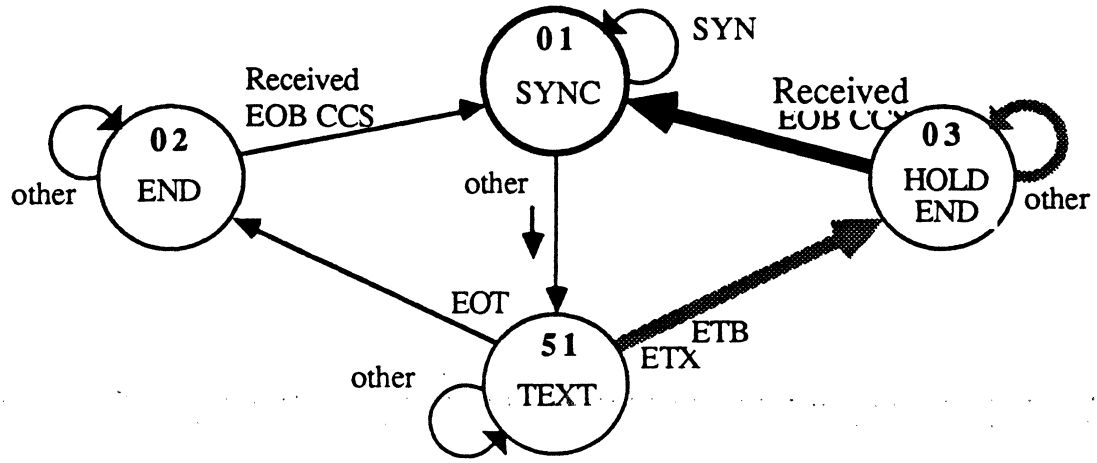
= Hold character in temporary buffer.

= Hold character and set common state to send characters in temporary buffer to the chip.


HUNT
1234
MODE
SYN
any char,
OM6 clear/
do not store
char in RXQ
any char,
OM6 clear/
store a PAD
in RXQ
09
RCV
CHAR
other
any char,
OM6 set
other
any char,
OM6 set/
store char and
a PAD in RXQ
27
RCV
CHAR
any
ENQ
ACK
NAK
11
DLE-
DLE
61
FIRST
CHAR
PAD
PAD
63
NEXT
CHAR
other
Other
SOH
STX
other
33
SYN
SYN
ENQ
BEL
ACK
64
MORE
CHARS
other
SOH
STX
38
TEXT
other
ETX
OM1 clear,
SYN
other
40
RCV 1
CHAR
39
BCC
any

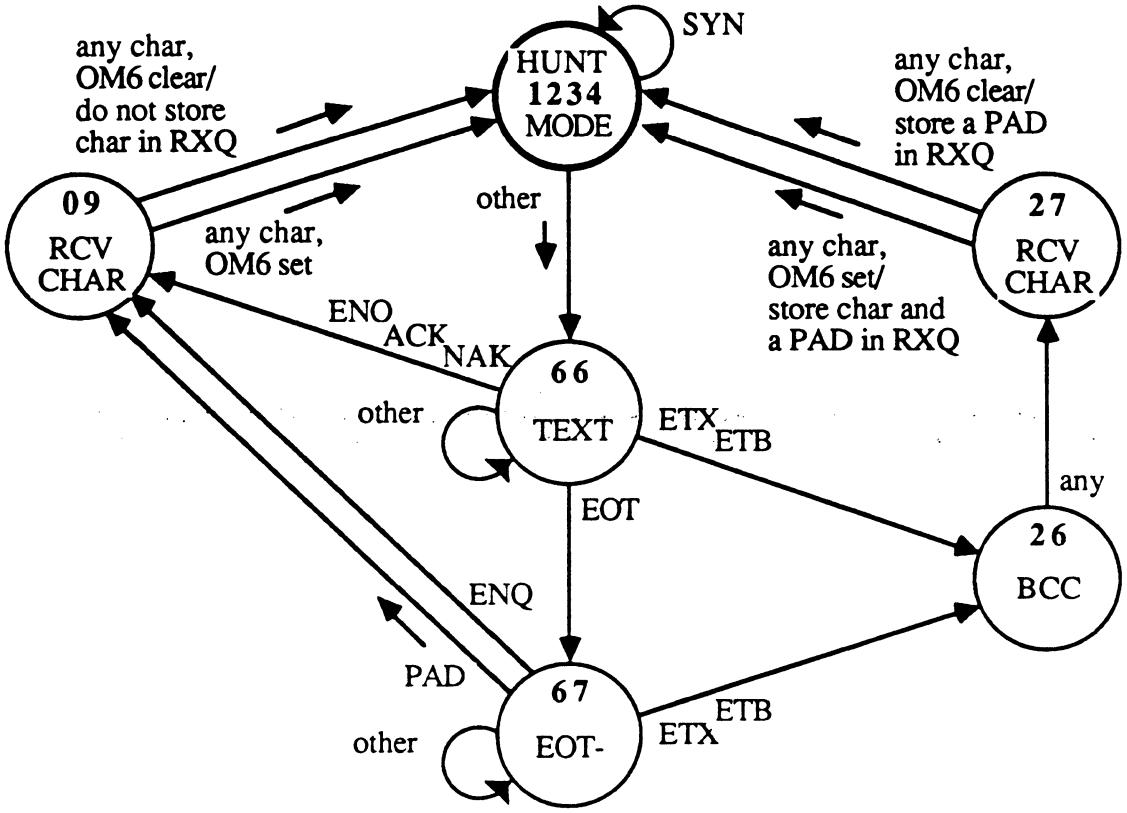

01
SYNC
SYN
Received
EOB CCS
Received
EOB CCS
02
END
other
other
03
HOLD
END
other
other
47
FIRST
CHAR
other
EOT
SOH
STX
SYN
32
XMT 1
CHAR
other
ENQ
BEL
ACK
any
other
49
MORE
CHARS
SOH
STX
30
TEXT
ETX
31
BCC
other

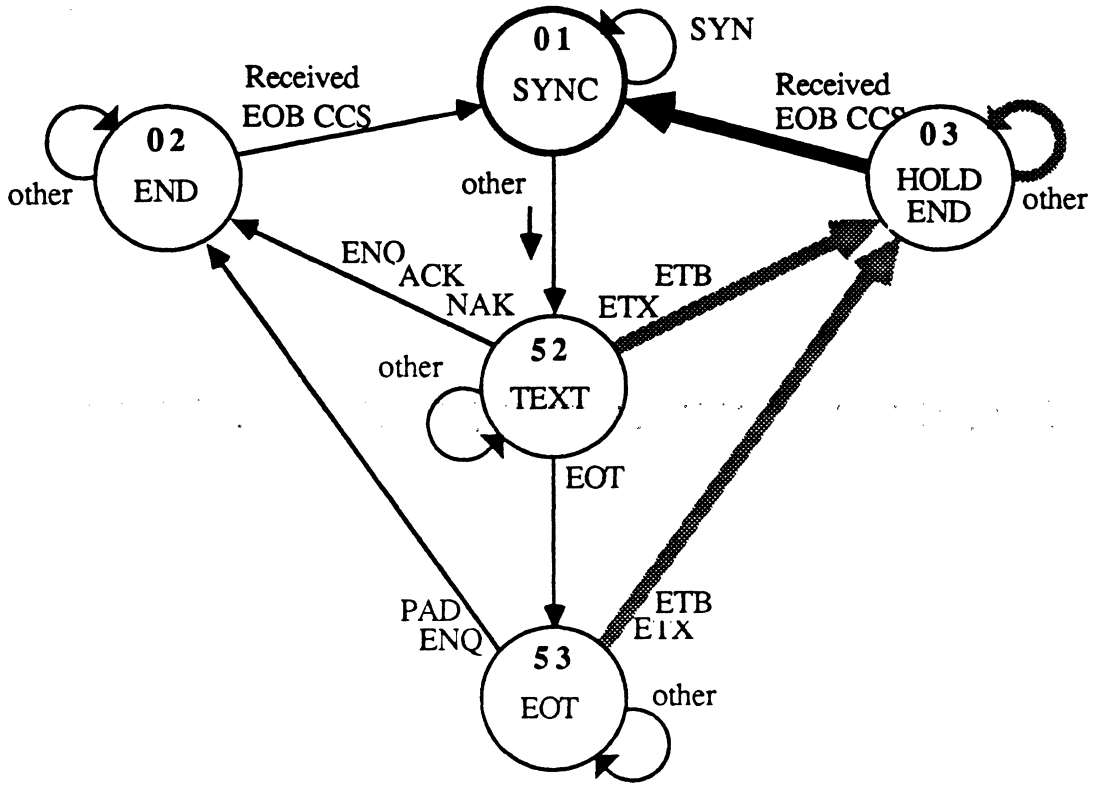

SYN
HUNT
1234
MODE
any char,
OM6 clear/
do not store
char in RXQ
any char,
OM6 clear/
store a PAD
in RXQ
09
RCV
CHAR
any char,
OM6 set
other
27
RCV
CHAR
any char,
OM6 set/
store char and
a PAD in RXQ
EOT
44
TEXT
other
ETX
ETB
any
26
BCC



= Hold character in temporary buffer.

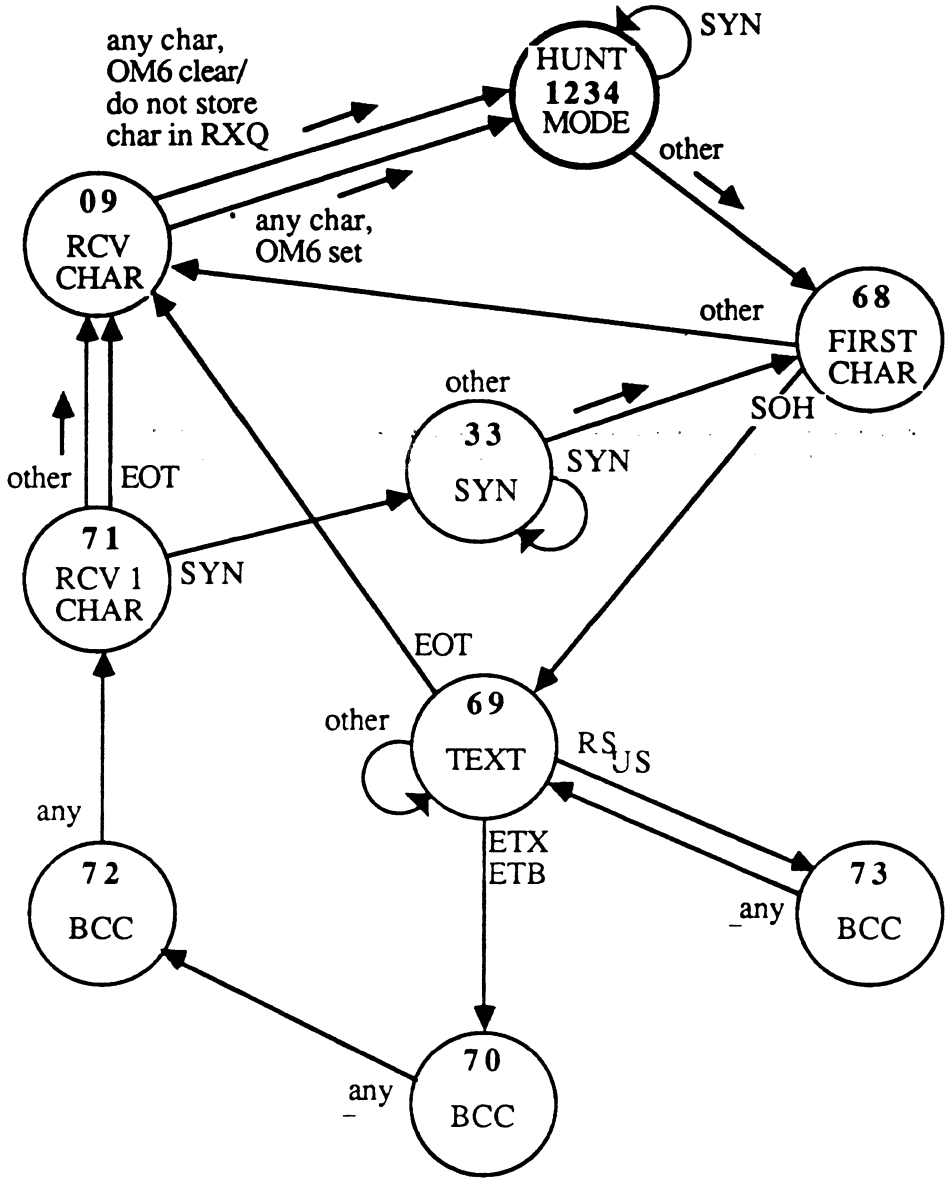
= Hold character and set common state to send characters in temporary buffer to the chip.

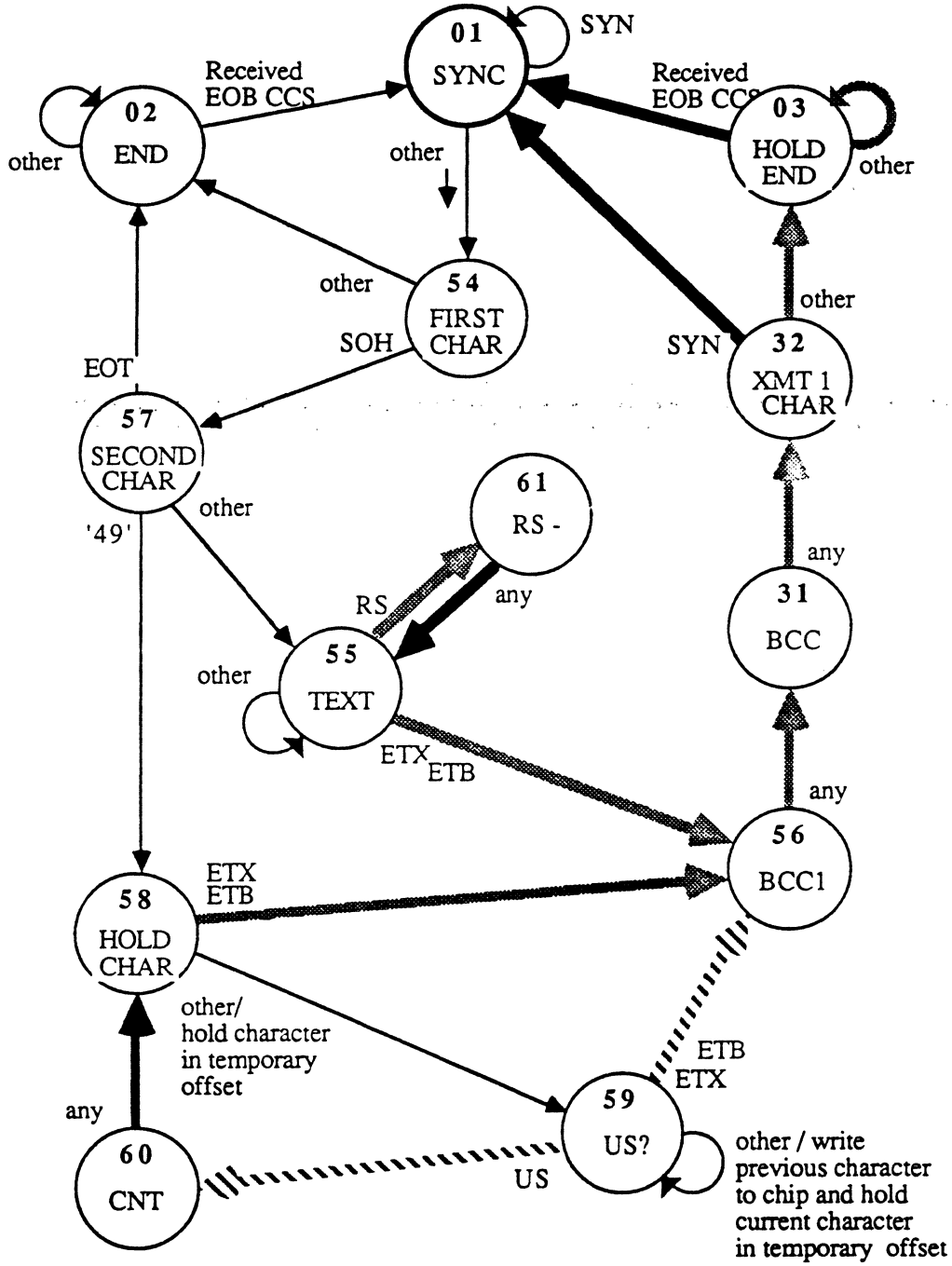

SYN
HUNT
1234
MODE
any char,
OM6 clear/
do not store
char in RXQ
any char,
OM6 clear/
store a PAD
in RXQ
09
RCV
CHAR
any char,
OM6 set
other
27
RCV
CHAR
any char,
OM6 set/
store char and
a PAD in RXQ
ENO
ACK
NAK
66
TEXT
other
ETX
ETB
EOT
any
26
BCC
ENQ
PAD
67
EOT-
other
ETB
ETX

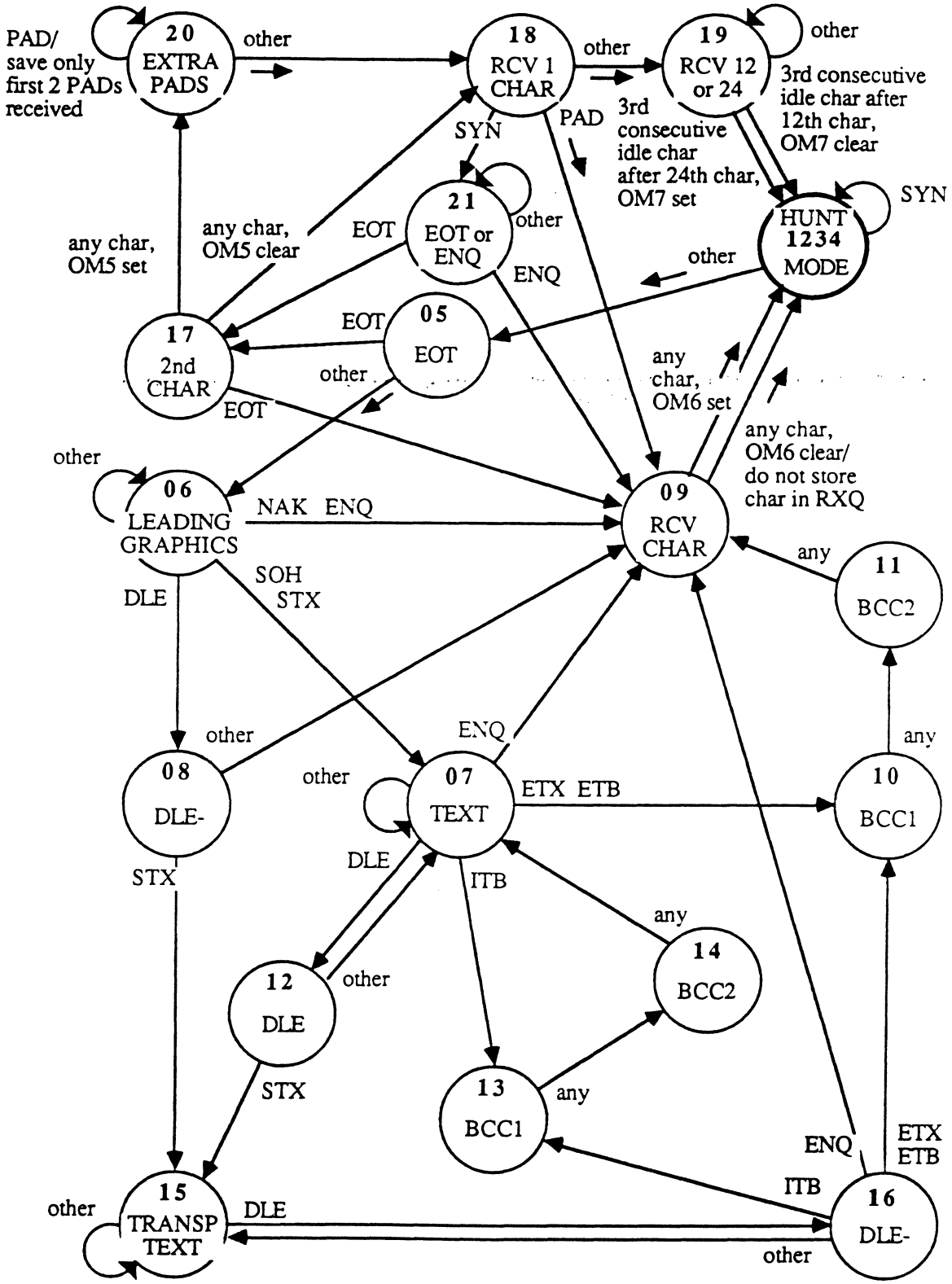


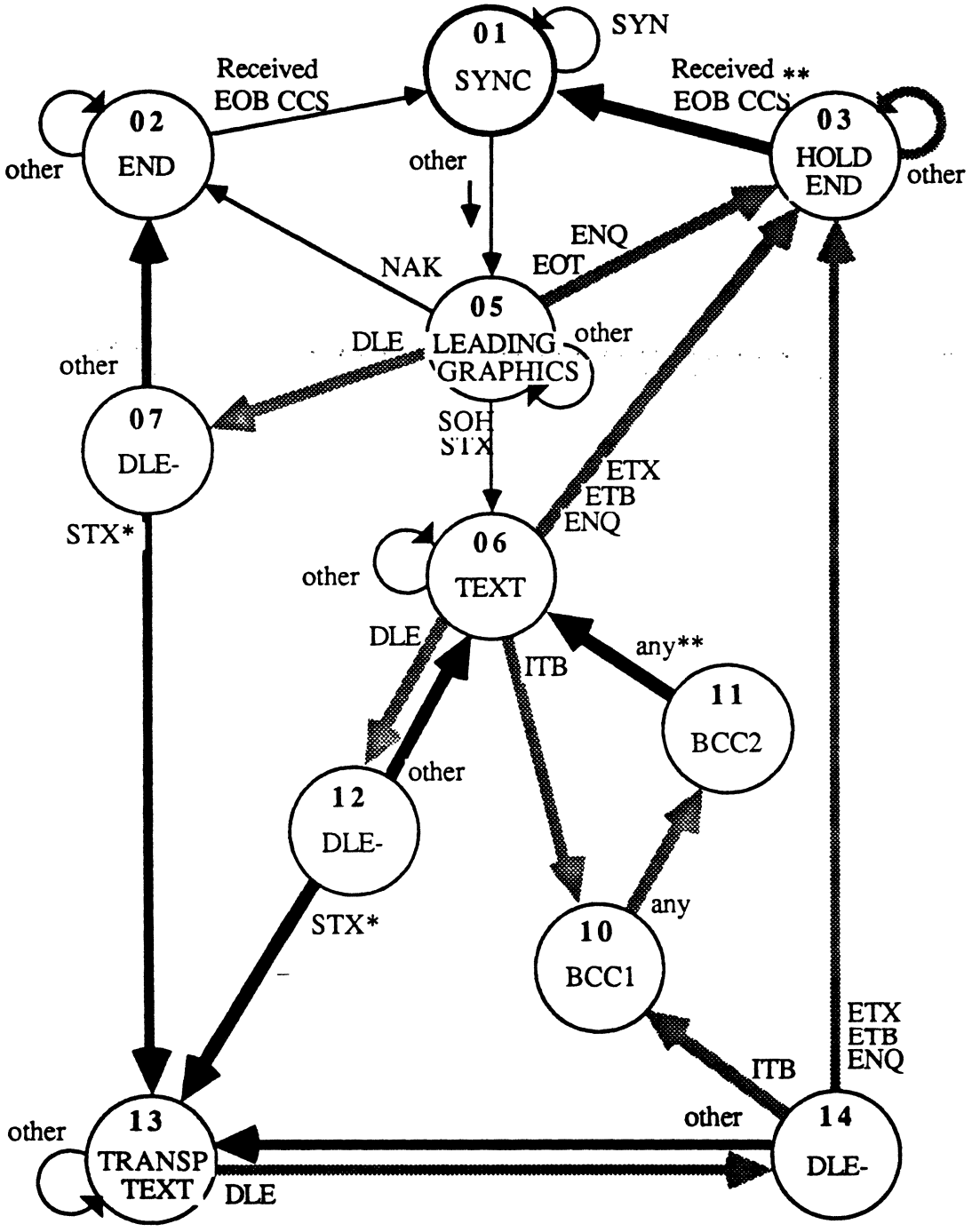
= Hold character in temporary buffer.

= Hold character and set common state to send characters in temporary buffer to the chip.


any char,
OM6 clear/
do not store
char in RXQ
HUNT
1234
MODE
SYN
other
09
RCV
CHAR
any char,
OM6 set
other
68
FIRST
CHAR
other
33
SYN
SYN
SOH
other
EOT
71
RCV 1
CHAR
SYN
EOT
69
TEXT
other
RS US
any
72
BCC
ETX
ETB
any
73
BCC
any
70
BCC


01
SYNC
SYN
Received
EOB CCS
Received
EOB CCS
02
END
other
other
03
HOLD
END
other
other
54
FIRST
CHAR
SOH
other
EOT
SYN
32
XMT 1
CHAR
other
57
SECOND
CHAR
'49'
other
61
RS -
any
RS
any
31
BCC
55
TEXT
other
ETX
ETB
any
56
BCC1
ETX
ETB
58
HOLD
CHAR
other/
hold character
in temporary
offset
ETB
ETX
any
59
US?
other / write
previous character
to chip and hold
current character
in temporary offset
60
CNT
US
= Move previous character from temporary offset to temporary buffer and hold current character in temporary buffer.
= Hold character in temporary buffer.
= Hold character and set common state to send characters in temporary buffer to the chip.


PAD/
save only
first 2 PADs
received
20
EXTRA
PADS
other
18
RCV 1
CHAR
other
19
RCV 12
or 24
other
3rd consecutive
idle char after
12th char,
OM7 clear
SYN
PAD
3rd
consecutive
idle char
after 24th char,
OM7 set
HUNT
1234
MODE
SYN
other
any char,
OM5 set
any char,
OM5 clear
EOT
21
EOT or
ENQ
other
ENQ
EOT
05
EOT
17
2nd
CHAR
other
EOT
any
char,
OM6 set
any char,
OM6 clear/
do not store
char in RXQ
other
06
LEADING
GRAPHICS
NAK ENQ
09
RCV
CHAR
any
11
BCC2
SOH
STX
DLE
other
ENQ
any
08
DLE-
other
07
TEXT
ETX ETB
10
BCC1
DLE
ITB
STX
any
14
BCC2
12
DLE
other
STX
13
BCC1
any
ENQ
ETX
ETB
ITB
other
15
TRANSP
TEXT
DLE
16
DLE-
other

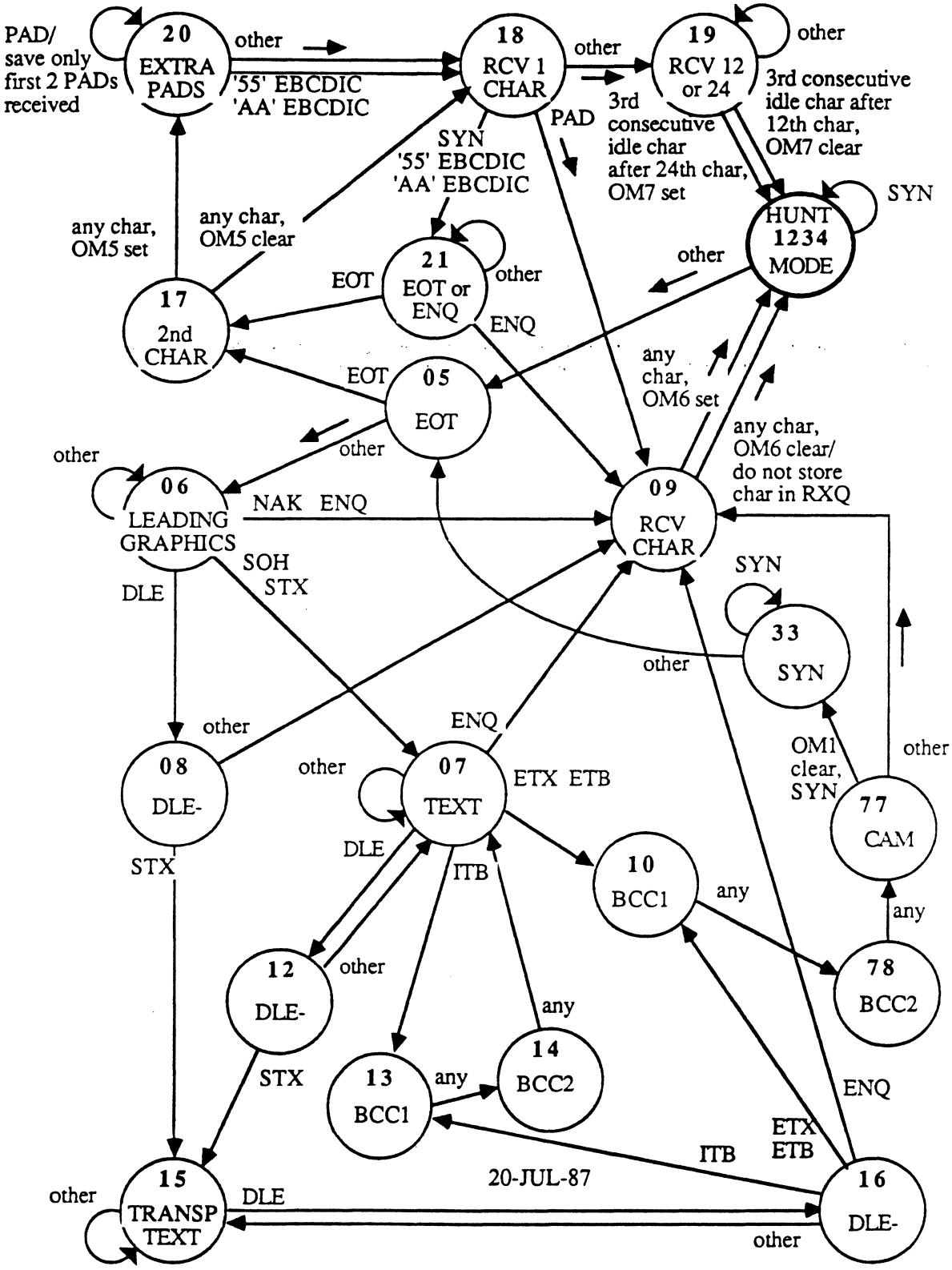


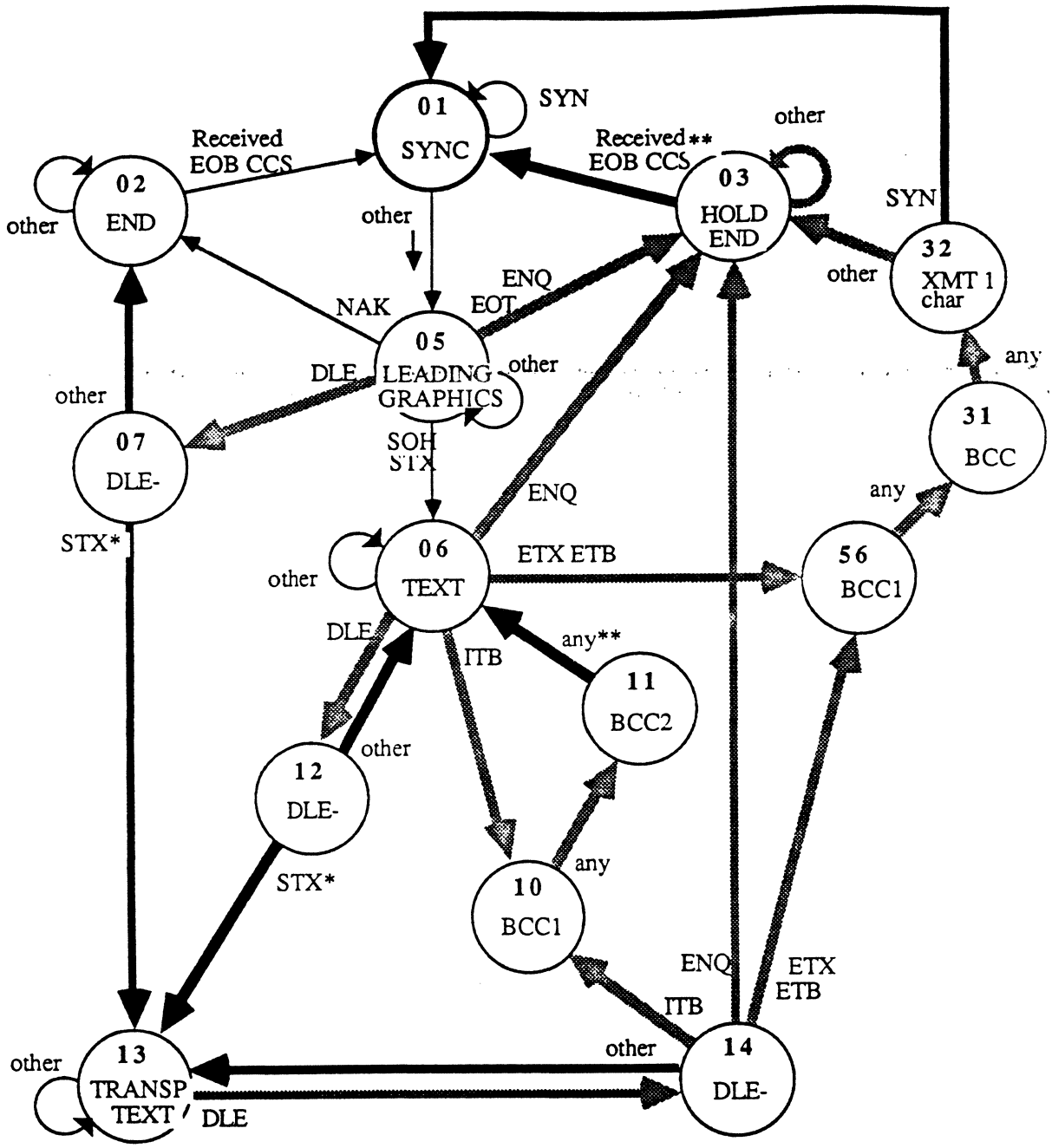
* = Set transparent mode flag.

** = Clear transparent mode flag.

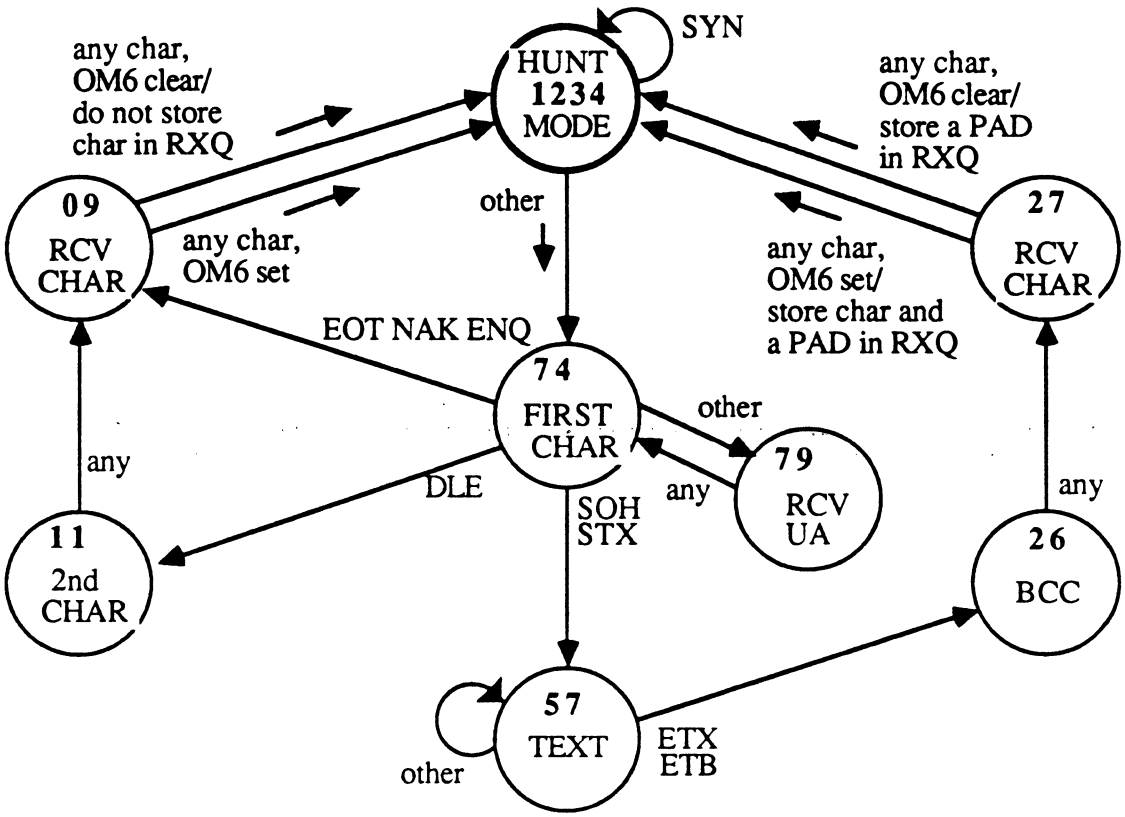
= Hold character in temporary buffer.

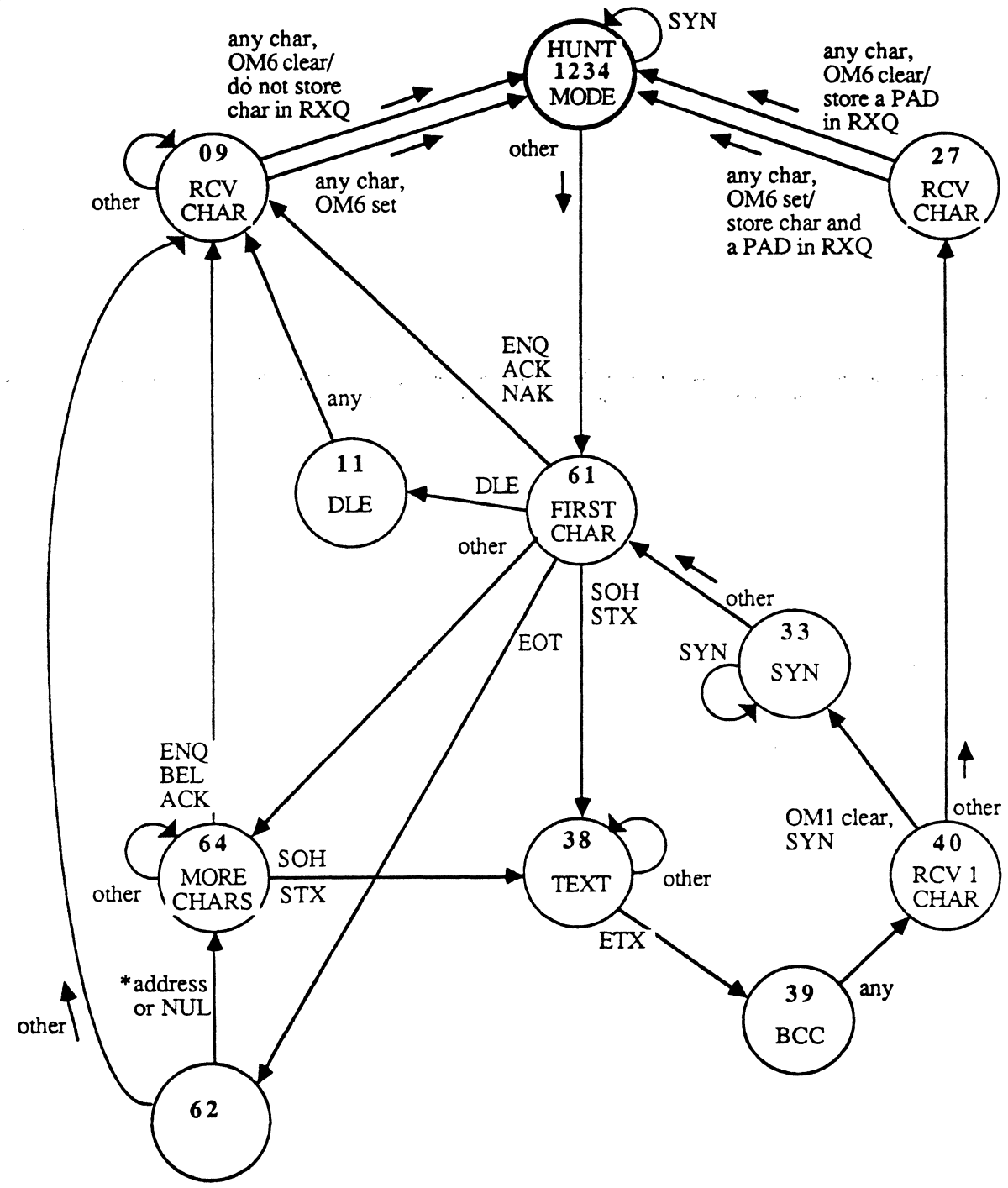
= Hold character and set common state to send characters in temporary buffer to the chip.


PAD/
save only
first 2 PADs
received
20
EXTRA
PADS
other
'55' EBCDIC
'AA' EBCDIC
18
RCV 1
CHAR
other
19
RCV 12
or 24
other
3rd consecutive
idle char after
12th char,
OM7 clear
3rd
consecutive
idle char
after 24th char,
OM7 set
PAD
SYN
'55' EBCDIC
'AA' EBCDIC
SYN
HUNT
1234
MODE
other
any char,
OM5 set
any char,
OM5 clear
21
EOT or
ENQ
other
EOT
ENQ
17
2nd
CHAR
EOT
05
EOT
other
any
char,
OM6 set
other
other
06
LEADING
GRAPHICS
NAK ENQ
09
RCV
CHAR
any char,
OM6 clear/
do not store
char in RXQ
SOH
STX
DLE
SYN
33
SYN
other
other
ENQ
08
DLE-
other
07
TEXT
ETX ETB
OM1
clear,
SYN
other
77
CAM
STX
DLE
ITB
10
BCC1
any
any
12
DLE-
other
78
BCC2
any
14
BCC2
13
BCC1
any
STX
ENQ
ETX
ETB
ITB
20-JUL-87
other
15
TRANSP
TEXT
DLE
16
DLE-
other

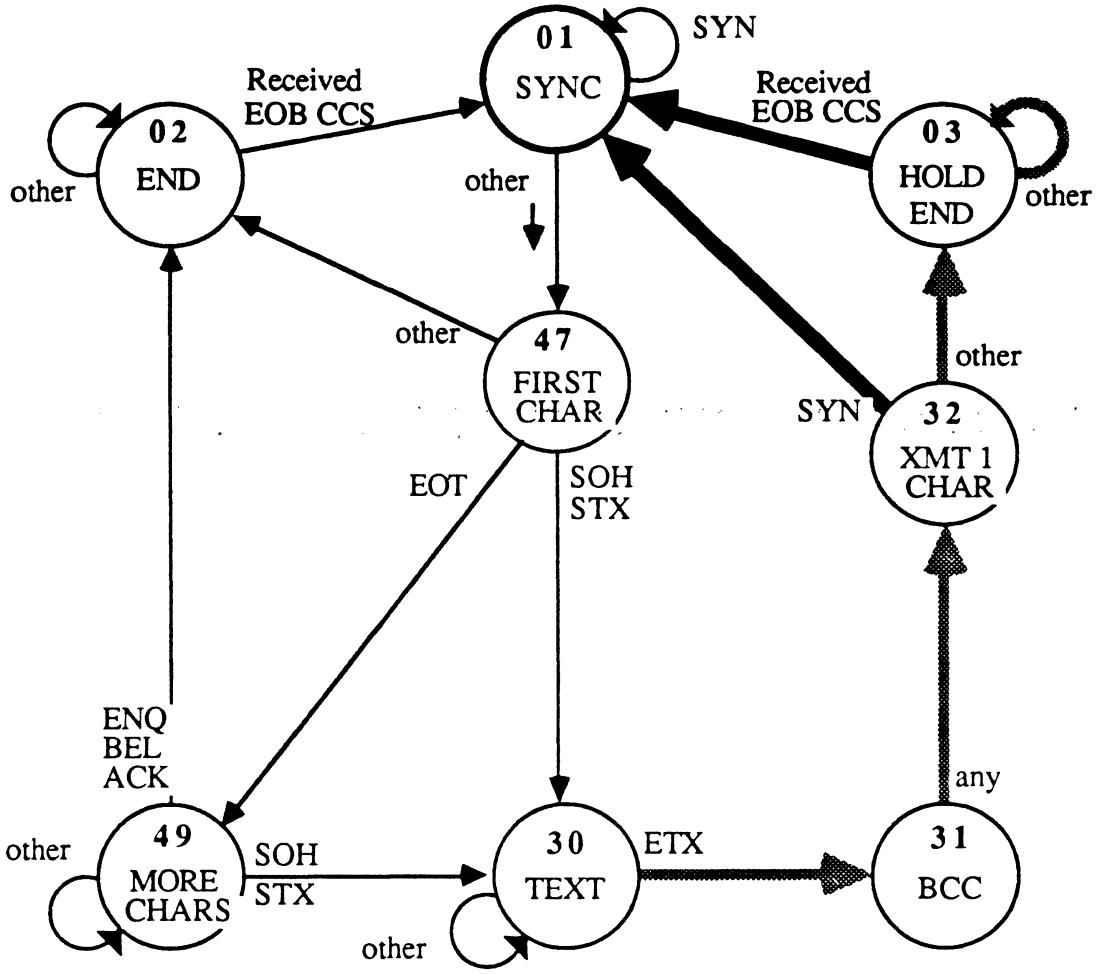


* = Set transparent mode flag.
** = Clear transparent mode flag.
▬▬ = Hold character in temporary buffer.
▬▬ = Hold character and set common state to send characters in temporary buffer to the chip.


SYN
HUNT
1234
MODE
any char,
OM6 clear/
do not store
char in RXQ
any char,
OM6 clear/
store a PAD
in RXQ
09
RCV
CHAR
any char,
OM6 set
other
any char,
OM6 set/
store char and
a PAD in RXQ
27
RCV
CHAR
EOT NAK ENQ
74
FIRST
CHAR
other
79
RCV
UA
any
any
DLE
SOH
STX
11
2nd
CHAR
26
BCC
57
TEXT
ETX
ETB
other

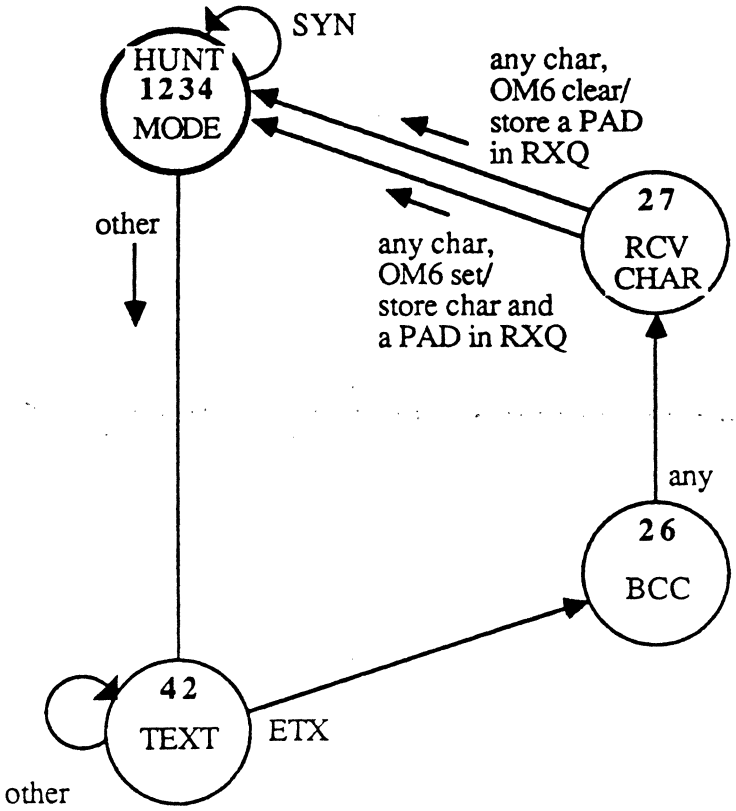


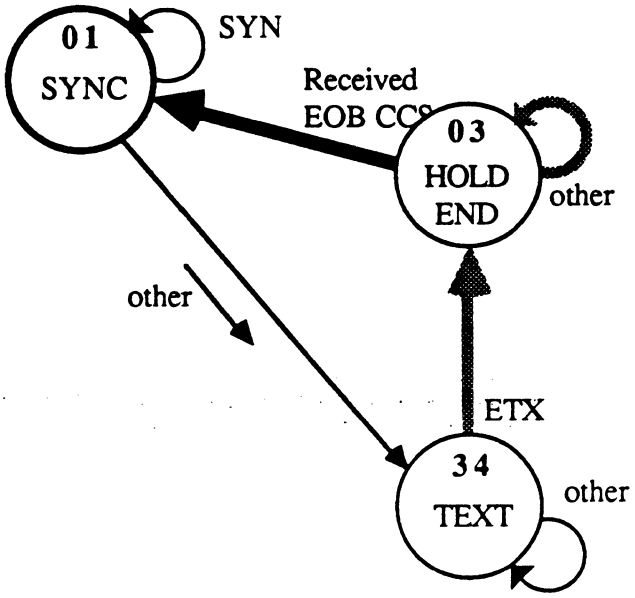
* Address = $20 - $7D



= Hold character in temporary buffer.

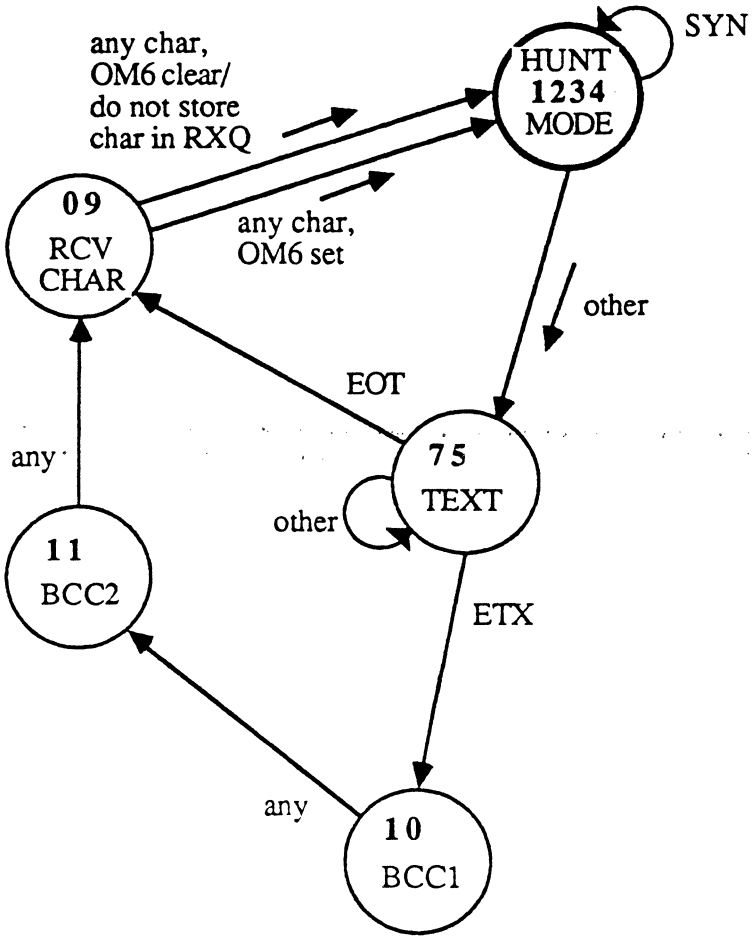
= Hold character and set common state to send characters in temporary buffer to the chip.

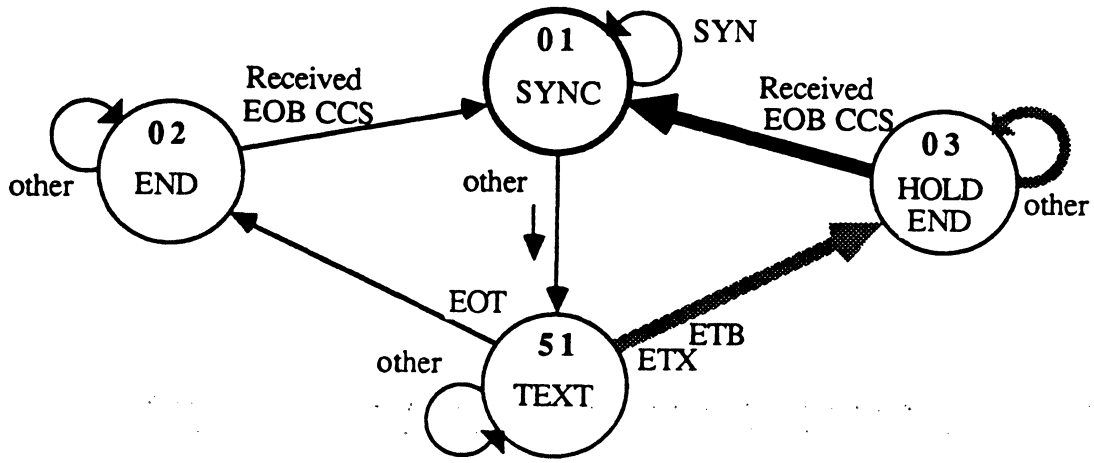

SYN
HUNT
1234
MODE
any char,
OM6 clear/
store a PAD
in RXQ
other
27
RCV
CHAR
any char,
OM6 set/
store char and
a PAD in RXQ
any
26
BCC
42
TEXT
ETX
other



= Hold character in temporary buffer.

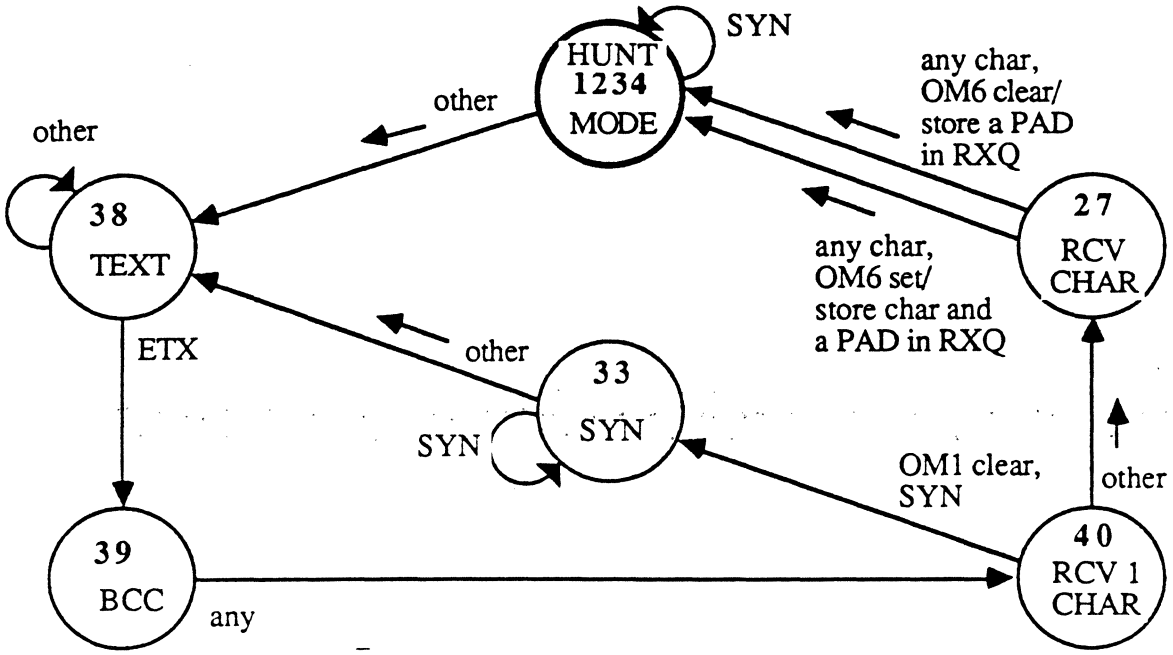
= Hold character and set common state to send characters in temporary buffer to the chip.

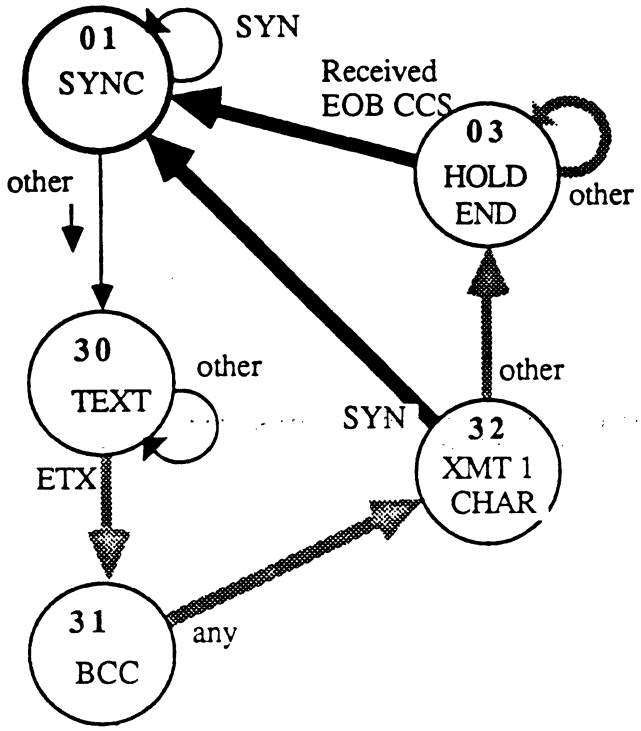

SYN
HUNT
1234
MODE
any char,
OM6 clear/
do not store
char in RXQ
09
RCV
CHAR
any char,
OM6 set
other
EOT
any
75
TEXT
other
11
BCC2
ETX
any
10
BCC1



= Hold character in temporary buffer.

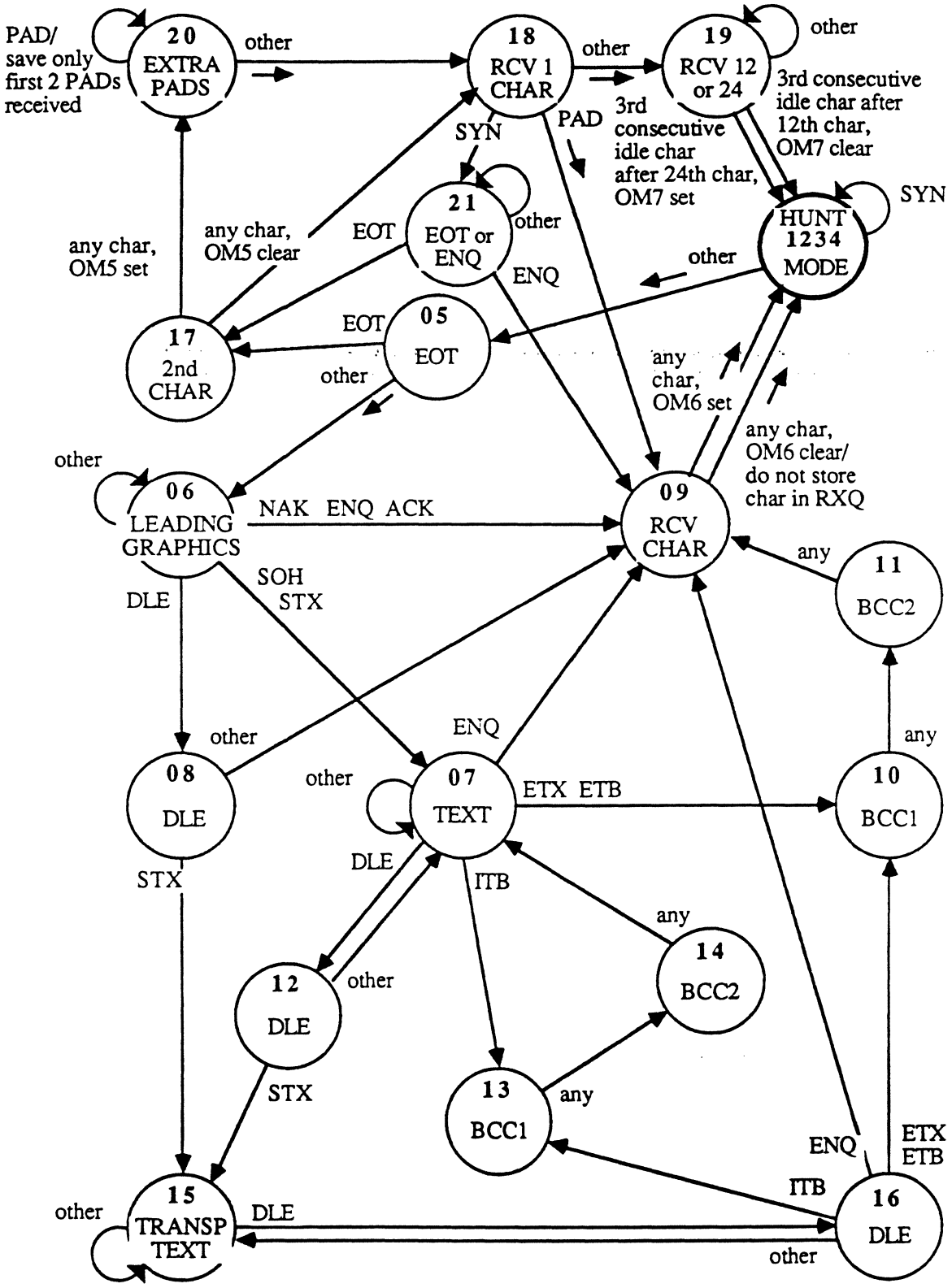
= Hold character and set common state to send characters in temporary buffer to the chip.

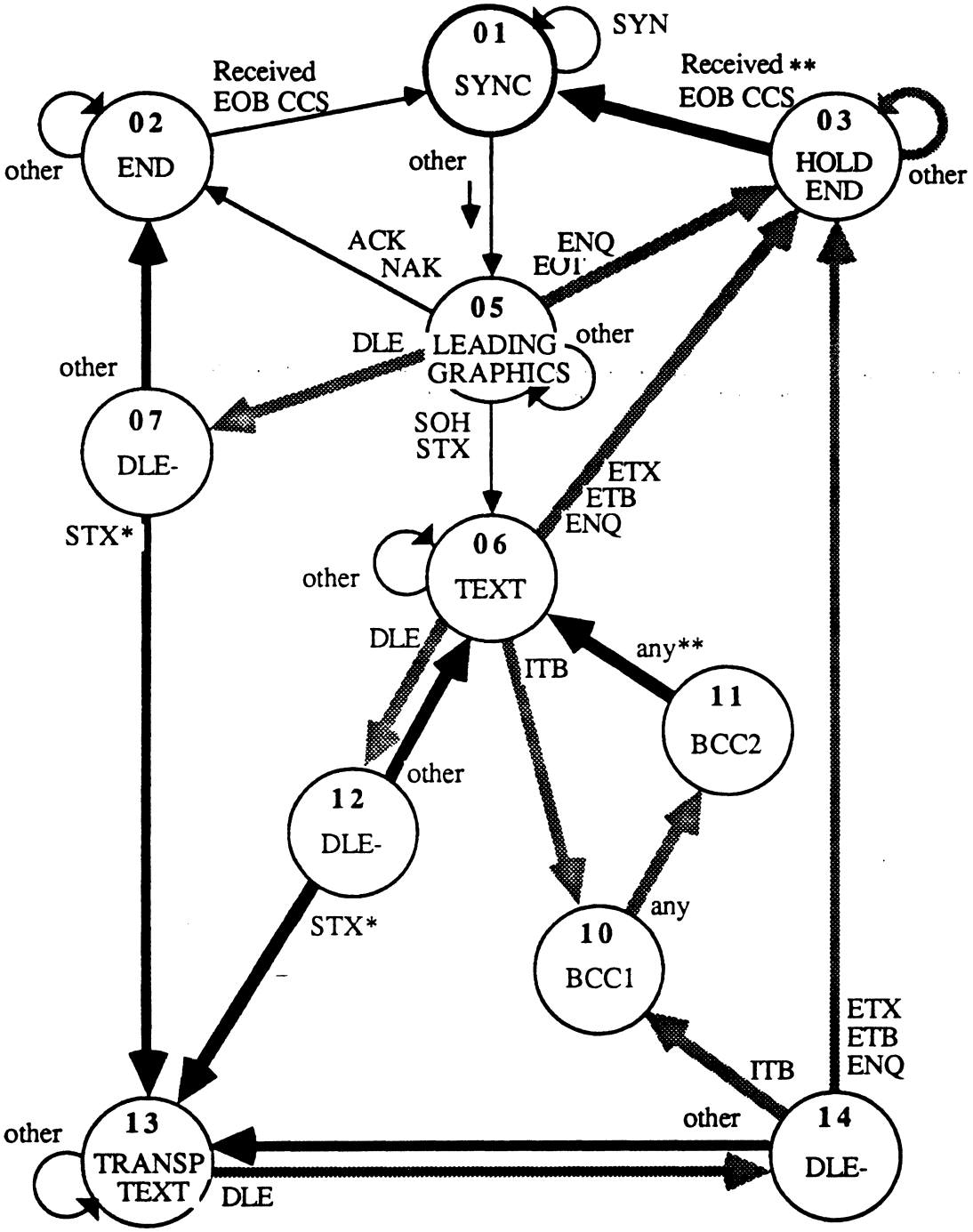

HUNT
1234
MODE
SYN
other
other
38
TEXT
ETX
other
33
SYN
SYN
any char,
OM6 clear/
store a PAD
in RXQ
27
RCV
CHAR
any char,
OM6 set/
store char and
a PAD in RXQ
OM1 clear,
SYN
other
39
BCC
any
40
RCV 1
CHAR



= Hold character in temporary buffer.

= Hold character and set common state to send characters in temporary buffer to the chip.


PAD/
save only
first 2 PADs
received
20
EXTRA
PADS
other
18
RCV 1
CHAR
other
19
RCV 12
or 24
other
3rd consecutive
idle char after
12th char,
OM7 clear
SYN
PAD
3rd
consecutive
idle char
after 24th char,
OM7 set
SYN
HUNT
1234
MODE
other
21
EOT or
ENQ
other
EOT
ENQ
any char,
OM5 set
any char,
OM5 clear
EOT
17
2nd
CHAR
05
EOT
other
any
char,
OM6 set
any char,
OM6 clear/
do not store
char in RXQ
other
06
LEADING
GRAPHICS
NAK ENQ ACK
09
RCV
CHAR
any
11
BCC2
SOH
STX
DLE
other
ENQ
any
08
DLE
other
07
TEXT
ETX ETB
10
BCC1
DLE
ITB
STX
any
14
BCC2
12
DLE
other
STX
13
BCC1
any
ENQ
ETX
ETB
ITB
other
15
TRANSP
TEXT
DLE
16
DLE
other
DLE
other

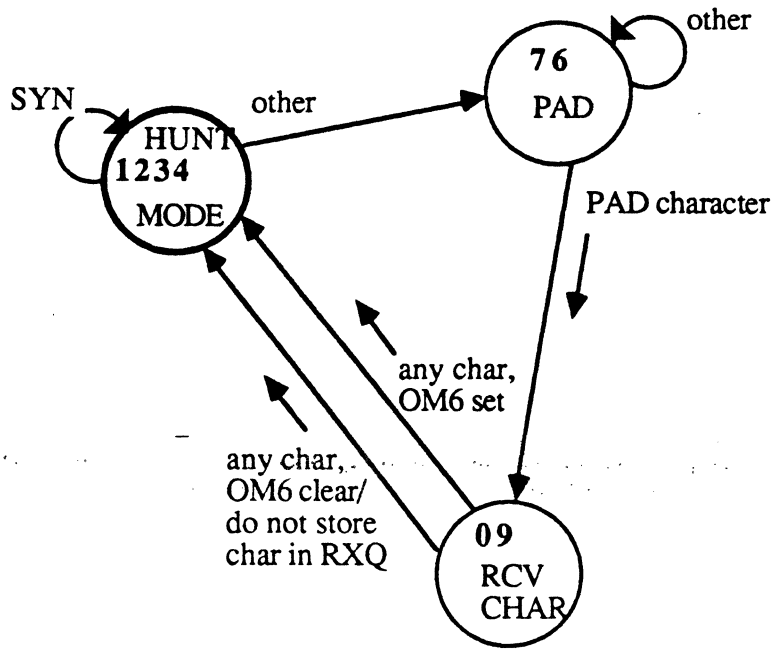


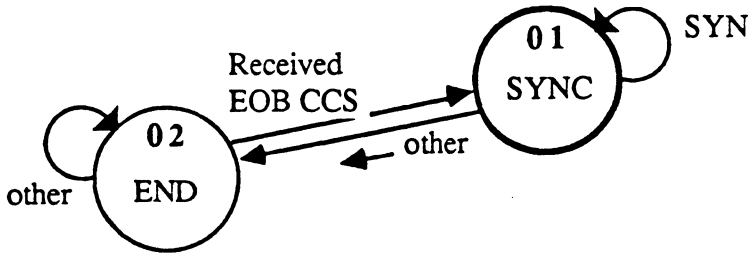
* = Set transparent mode flag.

** = Clear transparent mode flag.

▬▬ = Hold character in temporary buffer.

▬▬ = Hold character and set common state to send characters in temporary buffer to the chip.


SYN
HUNT
1234
MODE
other
76
PAD
other
PAD character
any char,
OM6 set
any char,
OM6 clear/
do not store
char in RXQ
09
RCV
CHAR


01
SYNC
SYN
Received
EOB CCS
other
02
END
other

Section 11.0
Product Release Information

Contents

11.1 Introduction

This section contains the "bug list," software and hardware release notices, and software advisory notices that Product Operations creates. Place any notes or additional notices you receive in this section of the Technical Reference. Note: Revision Level 6.1 is the current release of software for the 6740 DCP.

11.2 Software Release Notices

The following notices support each software revision level for the 6740 DCP:

- 6740 DCP Software Advisory Notice, October 1986, Part No. 08596
- 6740 DCP Software Advisory Notice, February 1987, Part No. 08623
- 6740 DCP Software Advisory Notice, May 1987, Part No. 08654, Rev A
- 6740 DCP Software Advisory Notice, May 1987, Part No. 08658, Rev A

11.3 DOCNET

6740 DCP documentation is located in two libraries of DOCNET: TIP (see Table 11-1) and ANOTE (see Table 11-2). Copies of these documents are included in this section.

11.9 Passing Control Characters Transparently in VCTP Mode

In the 6740, certain control characters are used by the control port for special operations. For a complete list of these control characters and their definition, see Chapter 2 of the *6740 Operator's Guide.*

One control character, **<ctl>-F,** is used by the control port to pass the NEXT CHARACTER through the system transparently. This character is very useful when you are in VCTP mode, especially if there are two or more VCTP connections. For example, typing "E TEMPQUICK" while in the VCTP mode logs you out of the VCTP when the system sees the "Q." You can avoid this by using the **<ctl>-F** character.

You should use the following two formulas while VCTPing:

To pass an ASCII character "Q," precede it with the number of **<ctl>-F** characters that are calculated when using the following formula:

$$2^{(n-1)}$$

where n = the number of hops.

Note: In a point-to-point network, there is one hop. In a 3-node linear network, there are two hops.

To pass CONTROL character "ESC," precede it with the number of **<ctl>-F** characters calculated when using the following formula:

$$2^{n}-1$$

where n = the number of hops.

Note: In a point-to-point network, there is one hop. In a 3-node linear network, there are two hops.

Using this feature allows you to pass a "Q" or "ESC" without being logged out of VCTP mode.

11.10 6740 Release 7.1 SAN

Section 12.0
Instruction Set

Contents

12.1 Introduction

This section supplies the worksheets needed to order and prepare for the installation of the 6740 DCP. This section created by Product Support Engineering aids the AE in designing the 6740 DCP network. The design package was formerly known as the Product Planning Kit (PPK). There are three major subsections in this package:

1) Paragraph 12.2, Order Planning

You must complete these forms just after the sale, and they must accompany the order form.

2) Paragraph 12.3, Physical Site Planning

The customer completes this form, which assists him in planning for his 6740 DCP installation, after the order has been received and processed but before the actual installation. Note: The purpose of these worksheets is to ensure that you complete all the preliminary work before installation. An installation should take only one or two days. By properly answering the questions on these worksheets, you can save many hours or even days at the customer site.

3) Paragraph 12.3, Checklist

This section establishes the ground rules so that both Codex and the customer understand what constitutes an installation. Although some of this information must be filled out during the actualinstallation, complete as much information as possible before that time. Note: Complete all relevant worksheets in Paragraph 12.4. Inaddition to assisting the actual installation of the product, it provides a permanent history of the customer's configuration.

12.2.5 6740 TP Processor Set Requirements Worksheet

Use this worksheet to record and verify the TP thread requirements (Figure 12-2). This worksheet is divided into 16 segments (one segment for each of the possible threads on a TP Processor Set). Once a TP thread is added to numbers 5 and 11, you must add a Hex Expander card (PC 67455), including its options, to the customer's order. **Note:** One TP Processor and two Hex Expanders are included with each base unit package.

The bottom section of the worksheet provides total fields for throughput, buffers, and NP link calls. Refer to the following description for specific information.

- **Protocol:** Specify asynchronous or synchronous protocol name (e.g., IBM BSC), code type (e.g., ASCII), or character structure.

- **CPS Throughput:** Specify total throughput for the XMT and RCV data in cps. **Note:** The throughput for all 16 threads *must* be less than or equal to 4800 cps.

- **ADC:** Adaptive Data Compression option (PC 67430) only works on threads 1 through 4 on a TPP. **Note:** Do not order Hex Expander cards with this option, because ADC only works on TP Processor threads.

- **DTE Split Speed:** Determine if the DTE XMT and RCV speeds are identical. If the XMT and RCV speeds are not identical, you must order the Split Speed and Synchronous Clock Stop option.

- **Synchronous Clock Stop:** Specify if the Synchronous Clock Stop option is required. This option is recommended for leased line synchronous applications to increase throughput. If you enter YES, the Split Speed and Synchronous Clock Stop options must be ordered.

- **Number of Buffers:** Determine the maximum number of buffers required for each thread. For asynchronous applications, enter XON and XOFF. Otherwise, complete the formula on the worksheet to determine the number of buffers. **Note:** The number of buffers for all 16 threads *must* be less than or equal to 117 buffers.

- **Call Type:** Specify Dial or Lease type. Synchronous data is only Lease type. Asynchronous data uses both call types.

- **Source:** Enter the Destination Node number User's Device type for Lease type calls.

- **Destination:** Enter the Destination Node number and the User's Device type for Lease call types.

Total number of NP link calls and 6740 nodes through a NP link. Enter these totals in the 6740 Node Link Requirements worksheet.

12.0 Instruction Set

Customer _____ Node No./Location _____ Date_____
Register Tracking No. _____ Sales Order No. _____ Sheet ____ of ____

TP Thread No.	Protocol	CPS Throughput Tx + Rx	ADC Y/N	DTE Split Speed Y/N	No. of Buffers or XON/XOFF	Call Type (D, R, L)	Source User Device	Destination Node No./ User Device	Notes	
1										TPP
2										
3										
4										
5										Hex Expander
6										
7										
8										
9										
10										
11										Hex Expander
12										
13										
14										
15										
16										

Total throughput < 4800 cps	If YES, don't order TPE cards.	If YES, order PC 66106 or 66107 on a per card basis.	Total buffers < 117 for this TP set. See formula below	Total calls over NP Link No. 1
				Total calls over NP Link No. 2
				Total calls over NP Link No. 3
				Total calls over NP Link No. 4

$$\text{TP Thread Buffers} = \frac{\text{Maximum Frame Size} \times OS}{126}$$

where OS = No. of outstanding frames allowed by HD protocols, or
OS = (No. of outstanding frames x 2) for FD protocols

6740 Node/Network/Gateway Worksheet

Node Name ________________________ Node Number ________ Location________________

Configuration ______________ Date ________________

Node (NODE) Record

Parameter No.	Parameter Name	Range	Default	Operator Entries
#6	BUFFER UTIL THRESH	0 - 100	75	
#7	PROC LOAD THRESH	0 - 100	75	
#8	STAT TIME FACTOR	6 - 60	6	
#9	REPORTING DESTINATION	n/a	n/a	
#10	VCTP MODE	H,U	H	

Network Control Port (NCP) Record

Parameter No.	Parameter Name	Range	Default	Operator Entries
#12	REPORTING DISPLAY MODE	T, P	T	
#13	OPERATING DISPLAY MODE	T, P	T	

Gateway (GATEs) Record (s = 1 to 8)

Parameter No.	Parameter Name	Range	Operator Entries							
#2	ENTRY #	1 - 16								
#3	NODE #	1 - 255								
#4	NODE NAME	9 char.								
#5	GATEWAY LINK	Area Spec								

Parameter No.	Parameter Name	Range	Operator Entries							
#2	ENTRY #	1 - 16								
#3	NODE #	1 - 255								
#4	NODE NAME	9 char.								
#5	GATEWAY LINK	Area Spec								

Parameter No.	Parameter Name	Range	Operator Entries							
#2	ENTRY #	1 - 16								
#3	NODE #	1 - 255								
#4	NODE NAME	9 char.								
#5	GATEWAY LINK	Area Spec								

Parameter No.	Parameter Name	Range	Operator Entries							
#2	ENTRY #	1 - 16								
#3	NODE #	1 - 255								
#4	NODE NAME	9 char.								
#5	GATEWAY LINK	Area Spec								

6740 Network Port Processor and Network Port Link Worksheet

Node Name _____ Node Number _____ Location_____

Configuration _____ Date _____

Network Port Processor (NPj) Record

Parameter No.	Parameter Name	Range	Default	Operator Entries
–	NPj	j = 2, 4 - 14	--	
#6	BUFFER UTIL THRESH	0 - 100	75	
#7	PROC LOAD THRESH	0 - 100	75	

Network Port Link (NPjLm) Record

Parameter No.	Parameter Name	Range	Default	Operator Entries			
—	NPjLm	j = 2, 4 - 14 m = 1 - 4	—				
#14	TYPE	N, M, GM, GN, E	E				
#15	ADDRESS	A, B	A				
#16	DIRECT FRAME SIZE (MAX)	10 - 999	300/200				
#18	RETRANSMIT RATE THRESH	1 - 999	10				
#19	ERROR THRESHOLD	0 - 100	1				
#20	STATIC LINK DELAY	S, M, L	S				
#86	T2 TIMER	3 - 63, N	20				
Info Only	DESTINATION LINK	Area Spec	n/a				

6740 Network Port Thread Worksheet (Muxport Thread)

Node Name _____ Node Number _____ Location_____

Configuration _____ Date _____

Network Port Thread (NPjLmTx) Record

Parameter No.	Parameter Name	Range	Default	Operator Entries			
—	NPjLmTx	j = 2, 4 - 14 m = 1 - 4; x = 1 - 128	--				
#21	CALL TYPE	D, L	L				
#22	CLASS	U, R	U				
#23	USER GROUP	1 - 16	n/a				
#24	HUNT GROUP	1 - 16	n/a				
#25	EOT CHARACTER	00 - FF	04				
#26	IDLE TIMER	0 - 255	0				
#27	DESTINATION	Area Spec	n/a				
#44	RX QUOTA	1 - 99	2				
#47	SLOT WEIGHT	1 - 60	60				
#54	RX DATAGRAM	Y, N	N				
#55	FLOW CONTROL	Y, N	Y				
#56	AUTO ECHO	N, C	C				
#65	GARBLE TYPE	C, S, N	N				
#66	GARBLE CHARACTER	00 - FF	3F				

Parameter No.	Parameter Name	Range	Default	Operator Entries			
—	NPjLmTx	j = 2, 4 - 14 m = 1 - 4; x = 1 - 128	--				
#21	CALL TYPE	D, L	L				
#22	CLASS	U, R	U				
#23	USER GROUP	1 - 16	n/a				
#24	HUNT GROUP	1 - 16	n/a				
#25	EOT CHARACTER	00 - FF	04				
#26	IDLE TIMER	0 - 255	0				
#27	DESTINATION	Area Spec	n/a				
#44	RX QUOTA	1 - 99	2				
#47	SLOT WEIGHT	1 - 60	60				
#54	RX DATAGRAM	Y, N	N				
#55	FLOW CONTROL	Y, N	Y				
#56	AUTO ECHO	N, C	C				
#65	GARBLE TYPE	C, S, N	N				
#66	GARBLE CHARACTER	00 - FF	3F				

6740 Terminal Port Processor and Terminal Port Thread Worksheet

Node Name _____ Node Number _____ Location_____

Configuration _____ Date _____

Terminal Port Processor (TPk) Record

Parameter No.	Parameter Name	Range	Default	Operator Entries
--	TPk	k = 4 - 15	--	
#6	BUFFER UTIL THRESH	0 - 100	75	
#7	PROC LOAD THRESH	0 - 100	75	
#11	ERROR THRESH	0 - 255	1	
#87	DATA COMPRESSION	Y, N	N	

Terminal Port Thread (TPkTn) Record

Parameter No.	Parameter Name	Range	Default	Operator Entries			
—	TPkTn	k = 5 - 14 n = 1 - 16	--				
#21	CALL TYPE	D, L	L				
#22	CLASS	U, R	n/a				
#23	USER GROUP	1 - 16	n/a				
#24	HUNT GROUP	1 - 16	n/a				
#25	EOT CHARCTER	00 - FF	04				
#26	IDLE TIMER	0 - 255	0				
#27	DESTINATION	Area Spec	-				
#28	TEMPLATE	9 characters	-				
Info Only	PORT ID						

Parameter No.	Parameter Name	Range	Default	Operator Entries			
—	TPkTn	k = 5 - 14 n = 1 - 16	--				
#21	CALL TYPE	D, L	L				
#22	CLASS	U, R	n/a				
#23	USER GROUP	1 - 16	n/a				
#24	HUNT GROUP	1 - 16	n/a				
#25	EOT CHARCTER	00 - FF	04				
#26	IDLE TIMER	0 - 255	0				
#27	DESTINATION	Area Spec	-				
#28	TEMPLATE	9 characters	-				
Info Only	PORT ID						

6740 Asynchronous Template Worksheet

Node Name _____ Node Number _____ Location_____

Configuration _____ Date _____

Asynchronous Template (TEMPz) Record

Parameter No.	Parameter Name	Range	Default	Operator Entries			
--	TEMPz	z = 1 - 64	--				
#28	NAME	9 characters	--				
#29	TYPE	A, S, B, E	E				
#30	SUBTYPE	1 - 6	1				
#31	AUTOSPEED	Y, N	N				
#32	EXT CLOCKING	Y, N	N				
#37	TX SPEED	50 - 19200	1200				
#38	RX SPEED	50 - 19200	1200				
#39	DATA BITS	5 - 8	8				
#40	STOP BITS	1, 1.5, 2	1				
#41	PARITY	E, M, O, S, N	N				
#43	RTS/CTS DELAY	0 - 255	1				
#44	RX QUOTA	1 - 99	5				
#45	XON THRESHOLD	1 - 99	3				
#46	XOFF THRESHOLD	1 - 99	4				
#47	SLOT WEIGHT	1 - 60	60				
#48	TX QUOTA	2 - 33	5				
#49	OP MODE	00 - FF	00				
#50	EIA SIGNALS	H = High L = Low T = Transparent					
	where: MSB = SPARE		H				
	2nd MSB = MB		L				
	3rd MSB = RTS		H				
	4th MSB = DTR		H				
	4th LSB = CTS		H				
	3rd LSB = RI		T				
	2nd LSB = DCD		H				
	LSB = DSR		H				
#51	DATA COMPRESSION	Y, N	N				
#52	DATA COMP EFF THRESH	0 - 200	100				
#53	ON-LINE DIAGNOSTICS	Y, N	N				
#54	RECEIVE DATAGRAM	Y, N	N				
#55	FLOW CONTROL	Y, N	N				
#56	AUTO ECHO	Y, N, C	N				
#57	FLYBACK DELAY	Y, N	N				
#58	FILL REC CHAR 1	00 - FF	0D				
#59	FILL REC CHAR COUNT 1	0 - 255	10				
#60	FILL REC CHAR 2	00 - FF	0A				
#61	FILL REC CHAR COUNT 2	0 - 255	10				
#62	FILL REC CHAR 3	00 - FF	0C				
#63	FILL REC CHAR COUNT 3	0 - 255	10				
#64	FILL PAD CHAR	00 - FF	00				
#66	GARBLE CHAR	00 - FF	3F				
#67	DRI TYPE	E, C, D	D				
#68	DRI EIA	DSR,RI,CTS,DCD	CTS				
#69	DRO TYPE	E, C, D	D				
#70	DRO EIA	SPARE or MB	SPARE				
#71	XON CHAR	00 - FF	11				
#72	XOFF CHAR	00 - FF	13				

6740 Synchronous Template Worksheet

Node Name _____ Node Number _____ Location_____

Configuration _____ Date _____

Synchronous Template (TEMPz) Record

Parameter No.	Parameter Name	Range	Default	Operator Entries			
--	TEMPz	z = 1 - 64	--				
#28	NAME	9 characters	--				
#29	TYPE	A, S, B, E	E				
#30	SUBTYPE	1 - 6	1				
#37	TX SPEED	50 - 19200	1200				
#38	RX SPEED	50 - 19200	1200				
#39	DATA BITS	5 - 8	8				
#41	PARITY	E, M, O, S, N	N				
#42	CODE TYPE	A, E, T, N	A				
#43	RTS/CTS DELAY	0 - 255	1				
#44	RX QUOTA	1 - 99	5				
#47	SLOT WEIGHT	1 - 60	60				
#48	TX QUOTA	2 - 99	5				
#49	OP MODE	00 - FF	00				
#50	EIA SIGNALS						
	where: MSB = SPARE	H = High L = Low T = Transparent	H				
	2nd MSB = MB		L				
	3rd MSB = RTS		H				
	4th MSB = DTR		H				
	4th LSB = CTS		H				
	3rd LSB = RI		T				
	2nd LSB = DCD		H				
	LSB = DSR		H				
#51	DATA COMPRESSION	Y, N	N				
#52	DATA COMP EFF THRESH(	- 200	100				
#74	CHARACTER DELAY	0 - 4999	100				

6740 BOP Template Worksheet

Node Name _____ Node Number _____ Location_____

Configuration _____ Date _____

BOP Template (TEMPz) Record

Parameter No.	Parameter Name	Range	Default	Operator Entries			
--	TEMPz	z = 1 - 64	--				
#28	NAME	9 characters	--				
#29	TYPE	A, S, B, E	E				
#30	SUBTYPE	1, 2	1				
#35	TX CLOCK	I, E					
#36	RX CLOCK	I, E					
#37	TX SPEED	50 - 19200	1200				
#38	RX SPEED	50 - 19200	1200				
#43	RTS/CTS DELAY	0 - 255	1				
#44	RX QUOTA	1 - 99	5				
#47	SLOT WEIGHT	1 - 60	60				
#48	TX QUOTA	2 - 99	5				
#49	OP MODE	00 - FF	00				
#50	EIA SIGNALS						
	where: MSB = SPARE	H = High L = Low T = Transparent	H				
	2nd MSB = MB		L				
	3rd MSB = RTS		H				
	4th MSB = DTR		H				
	4th LSB = CTS		H				
	3rd LSB = RI		T				
	2nd LSB = DCD		H				
	LSB = DSR		H				
#51	DATA COMPRESSION	Y, N	N				
#52	DATA COMP EFF THRESH	0 - 200	100				
#74	CHARACTER DELAY	0 - 4999	100				

6740 Autospeed Template Worksheet

Node Name _____ Node Number _____ Location_____

Configuration _____ Date _____

Autospeed Template (ASPDy) Record

Parameter No.	Parameter Name	Range	Default	Operator Entries			
--	TEMPz	y = 1 - 6	--				
#33	RECOGNITION CHAR	00 - FF	0D				
#34	SUBSTITUTION CHAR	00 - FF	0D				
#37	TX SPEED	50 - 9600	1200				
#38	RX SPEED	50 - 9600	1200				
#39	DATA BITS	5 - 8	8				
#40	STOP BITS	1, 1.5, 2	1				
#41	PARITY	E, M, O, S, N	N				
#43	RTS/CTS DELAY	0 - 255	1				
#44	RX QUOTA	1 - 99	5				
#45	XON THRESHOLD	1 - 99	3				
#46	XOFF THRESHOLD	1 - 99	4				
#47	SLOT WEIGHT	1 - 60	60				
#48	TX QUOTA	2 - 33	5				
#49	OP MODE	00 - FF	00				
#55	FLOW CONTROL	Y, N	N				
#56	AUTO ECHO	Y, N, C	N				
#57	FLYBACK DELAY	Y, N	N				
#58	FILL REC CHAR 1	00 - FF	0D				
#59	FILL CHAR COUNT 1	0 - 255	10				
#60	FILL REC CHAR 2	00 - FF	0A				
#61	FILL CHAR COUNT 2	0 - 255	10				
#62	FILL REC CHAR 3	00 - FF	0C				
#63	FILL CHAR COUNT 3	0 - 255	10				
#64	FILL PAD CHAR	00 - FF	00				
#66	GARBLE CHAR	00 - FF	3F				
#67	DRI TYPE	E, C, D	D				
#68	DRI EIA	DSR,RI,CTS,DCD	CTS				
#69	DRO TYPE	E, C, D	D				
#70	DRO EIA	SPARE or MB	SPARE				
#71	XON CHAR	00 - FF	11				
#72	XOFF CHAR	00 - FF	13				

6740 UDR Template Worksheet

Node Name _____ Node Number _____ Location_____

Configuration _____ Date _____

UDR Hunt Group Template (HUNTn) Record

Parameter No.	Parameter Name	Range	Default	Operator Entries			
--	HUNTn	n = 1 - 16	--				
#79	DESCRIPTION	12 char	n/a				
#80	LOGOFF MESSAGE	16 char	n/a				
#81	DISCONNECT INHIBITED	Y, N	N				
#82	BUSY OUT TIME	0 - 255	1				
#83	QUEUING NODE	Node Spec	n/a				

UDR User Group Template (USERn) Record

Parameter No.	Parameter Name	Range	Operator Entries				
--	USERn	n = 1 - 16					
#84	ALTERATIONS	C, R, T, S, 1 - 16					

12.6 CoEDS Worksheets

The following pages contain the CoEDS Worksheets:

- 6740 Rack Layout
- 6740 Product Code Summary
- 6740 Node/Network/Gateway Worksheet
- 6740 Network Port Processor (NPjLm) Worksheet
- 6740 Terminal Ports (TPkTn) Worksheet
- 6740 Async Template (TEMPn) Worksheet
- 6740 AutoSpeed Definition (ASPDy) Worksheet
- 6740 Synchronous Template (TEMPn) Worksheet
- 6740 BOP Template (TEMPn) Worksheet
- 6740 UDR Hunt Group (HUNTn) Worksheet
- 6740 UDR User Group (USERn) Worksheet
- 6740 Stored Lines/Slot Parameters Worksheet

6740 Rack Layout

Customer

Node Name Boston Node No. 1 Location_____

Order No. System No. Tracking No.

Power Supply																
---	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CTL Port	Mstr Proc A	Init Prom	Quad NP Sync MXP UDR CMem ADC	NP Proc	TPP	TPP	TPP	TPP	TPP	TPP	TPP	TPP	TPP	TPP 3-Bus	Hex	Hex

Prod. Code	Description	Qty
67402	Initial EPROM Card	1
67404	6740 Node Chip	1
67440	Synchronous Support Package	1
67405	Internetworking Software	1
67435	User Destination Routing	1
67401	System Expansion Software	1
67430	Adaptive Data Compression	1
67460	Network Port Processor Set	1
67450	Terminal Port Processor	10
67457	3 Position TP Bus Card	1
67455	Terminal Hex Expander	2
67400	6740 Basic System, 115V, TPP/Hex/Hex	1

6740 Product Code Summary

Customer Order No. | System No. | Tracking No.

Prod. Code	Description	Total	Incl	Add'l
67402	Initial EPROM Card	1	0	1
67404	6740 Node Chip	1	0	1
67440	Synchronous Support Package	1	0	1
67405	Internetworking Software	1	0	1
67435	User Destination Routing	1	0	1
67401	System Expansion Software	1	0	1
67430	Adaptive Data Compression	1	0	1
67460	Network Port Processor Set	6	6	0
67461	Quad Network Port EIA Interface Card	2	0	2
67450	Terminal Port Processor	34	6	28
67457	3 Position TP Bus Card	7	0	7
67455	Terminal Hex Expander	14	12	2
67400	6740 Basic System, 115V, TPP/Hex/Hex	6	0	6

6740 Node/Network/Gateway Worksheet

Customer

Node Name Boston Node No. 1 Location_____

Node Parameters

Parameter	Range	Def	Configuration
Buffer Util Thresh	0-100	75	_____
Proc Loading Thresh	0-100	75	_____
Stat Time Factor	6-60	6	_____
Reporting Destination	Area Spec	n/a	_____
VCTP Mode	H, U	H	_____

Network Control Port (NCP) Parameters

Parameter	Range	Def	Configuration
Report Display Mode	T, P	T	_____
Operating Display Mode	T, M	T	_____

Gateway Nodes (GATE)

Entry No.	Node No. (1-255)	Node Name (9 Chars)	Gateway Link (Area Spec)
1	___	_____	_____
2	___	_____	_____
3	___	_____	_____
4	___	_____	_____
5	___	_____	_____
6	___	_____	_____
7	___	_____	_____
8	___	_____	_____
9	___	_____	_____
10	___	_____	_____
11	___	_____	_____
12	___	_____	_____
13	___	_____	_____
14	___	_____	_____
15	___	_____	_____
16	___	_____	_____

6740 Network Port Processor (NPjLm) Worksheet

Customer

Node Name Boston **Node No.** 1 **Location**_____

Configuration_____

Parameter	Range	Def				
NP Proc #	2, 4-14		2			
Copy NP Proc			____			
Buffer Util	0-100	75	75			
Link #	1-4	n/a	1	2	3	4
Copy NP Link			___	___	___	___
Type	N,GN,M,GM	E	N	N	E	E
Address	A, B	A	B	B	___	___
Direct Frame Size	10-999	300	300	300	___	___
Transit Frame Size	10-999	300	300	300	___	___
Re-Xmt Threshold	1-999	10	10	10	___	___
Error Threshold	0-100	1	1	1	___	___
Static Link Delay	S, M, L	S	S	S	___	___
T2 Timer	3-63,N	20	20	20	___	___
Destination Link	Area Spec	n/a	[2]NP2L2	[3]NP2L2	_____	_____

6740 Terminal Ports (TPkTn) Worksheet

Customer
Node Name Boston Node No. 1 Location_____
Configuration_____

Parameter	Range	Def				
P Proc #	4-15		4			
uff Util Thres	0-100	75	75			
roc Loading	0-100	75	75			
rror Thresh	0-255	1	1			
hread	1-16		1	2	3	4
opy TP Thread			---	---	---	---
all Type	D, L	L	D	D	D	D
lass	U, R	n/a	R	R	R	R
ser Group	1-16	n/a	n/a	n/a	n/a	n/a
unt Group	1-16	n/a	3	3	3	3
OT Character	00-FF	04	04	04	04	04
dle Timer	0-255	0	0	0	0	0
estination	Area Spec		n/a	n/a	n/a	n/a
lame	9 Char		Compress	Compress	Compress	Compress

Parameter	Range	Def				
hread	1-16					
opy TP Thread			---	---	---	---
all Type	D, L	L	---	---	---	---
lass	U, R	n/a	---	---	---	---
ser Group	1-16	n/a	---	---	---	---
unt Group	1-16	n/a	---	---	---	---
OT Character	00-FF	04	---	---	---	---
dle Timer	0-255	0	---	---	---	---
estination	Area Spec		---	---	---	---
lame	9 Char		---	---	---	---
			---	---	---	---

6740 Async Template (TEMPn) Worksheet (Sheet 1 of 2)

Customer

Node Name Boston **Node No.** 1 **Location**_____

Parameter	Range	Def				
Temp #	1-64	n/a	1	2	3	___
Copy Temp			___	___	___	___
Name	9 Char	n/a	Compress	Autospeed	Asyn96	___
Type	A, S, B, E	E	A	A	A	___
Type	1-6	1	1	1	1	___
Autospeed	Y, N	N	N	Y	Y	___
Ext Clocking	Y, N	N	N			___
Tx Speed	50-19200	1200	19200			___
Rx Speed	50-19200	1200	19200			___
Data Bits	5-8	8	8			___
Stop Bits	1, 1.5, 2	1	1			___
Parity	E, M, O, S, N	N	None			___
CTS Delay	0-255	1	1			___
Rx Quota	1-99		20			___
Xon Thresh	1-99		10			___
Xoff Thresh	1-99		15			___
Slot Weight	1-60		60			___
Tx Quota	2-33		20			___
Op Mode	00-FF	00	00			___
EIA Signals						
Spare	H = Hi	H	H	H	H	___
MB	L = Lo	L	L	L	L	___
RTS	T = Trans-	H	H	H	H	___
DTR	parent	H	H	H	H	___
CTS		H	H	H	H	___
RI		T	T	T	T	___
DCD		H	H	H	H	___
DSR		H	H	H	H	___

6740 AutoSpeed Definition (ASPDy) Worksheet

Customer

Node Name Boston Node No. 1 Location_____

Parameter	Range	Def						
ASPD #	1 - 6	n/a	1	2	___	___	___	___
Copy ASPD #			___	___	___	___	___	___
Recognition Char	00-FF	0D	0D	0D	___	___	___	___
Substitution Char	00-FF	0D	0D	0D	___	___	___	___
TX Speed	50-19200	1200	1200	9600	___	___	___	___
Rx Speed	50-19200	1200	1200	9600	___	___	___	___
Data Bits	5 - 8	8	8	8	___	___	___	___
Stop Bits	1, 1.5, 2	1	1	1	___	___	___	___
Parity	E, M, O, S, N	N	None	None	___	___	___	___
RTS/CTS Delay	0 - 255	1	1	1	___	___	___	___
Rx Quota	1 - 99		10	20	___	___	___	___
Xon Thresh	1 - 99		5	10	___	___	___	___
Xoff Thresh	1 - 99		7	15	___	___	___	___
Slot Weight	1 - 60		20	60	___	___	___	___
Tx Quota	2 - 33		10	20	___	___	___	___
Op Mode	00-FF	00	00	00	___	___	___	___
Flow Cntl	Y, N	N	N	N	___	___	___	___
Auto Echo	Y, N, C	N	N	N	___	___	___	___
Flyback Delay	Y, N	N	N	N	___	___	___	___
Fill Rec Char 1	00-FF	0D	0D	0D	___	___	___	___
Fill Char Count 1	0-255	10	10	10	___	___	___	___
Fill Rec Char 2	00-FF	0A	0A	0A	___	___	___	___
Fill Char Count 2	0-255	10	10	10	___	___	___	___
Fill Rec Char 3	00-FF	0C	0C	0C	___	___	___	___
Fill Char Count 3	0-255	10	10	10	___	___	___	___
Fill Pad Char	00-FF	00	00	00	___	___	___	___
Garble Char	00-FF	3F	3F	3F	___	___	___	___
DRI Type	E, C, D	D	D	D	___	___	___	___
DRI EIA	DSR, RI, CTS, DCD	CTS	CTS	CTS	___	___	___	___
DRO Type	E, C, D	D	D	D	___	___	___	___
DRO EIA	Spare, MB	Spare	Spare	Spare	___	___	___	___
Xon Char	00-FF	11	11	11	___	___	___	___
Xoff Char	00-FF	13	13	13	___	___	___	___

12-2

6740 Synchronous Template (TEMPn) Worksheet

Customer

Node Name Boston **Node No.** 1 **Location**_____

Parameter	Range	Def				
Temp #	1-64	n/a	4	___	___	___
Copy Temp			___	___	___	___
Name	9 Char	n/a	BSC96	___	___	___
Type	A, S, B, E	E	S	___	___	___
Subtype	1-16	1	1	___	___	___
Tx Clock	I, E	I	I	___	___	___
Rx Clock	I, E, IS	I	I	___	___	___
Tx Speed	50-19200	1200	9600	___	___	___
Rx Speed	50-19200	1200	9600	___	___	___
Data Bits	5-8	8	8	___	___	___
Parity	E, M, O, S, N	N	None	___	___	___
Code Type	A, E, T, N	A	EBCDIC	___	___	___
RTS/CTS Delay	0-255	1	1	___	___	___
Rx Quota	1-99		20	___	___	___
Slot Weight	1-60		60	___	___	___
Tx Quota	2-99		20	___	___	___
Op Mode	00-FF	00	00	___	___	___
EIA Signals						
Spare	H = Hi	H	H	___	___	___
MB	L = Lo	L	L	___	___	___
RTS	T = Trans-	H	H	___	___	___
DTR	parent	H	H	___	___	___
CTS		H	H	___	___	___
RI		T	T	___	___	___
DCD		H	H	___	___	___
DSR		H	H	___	___	___
Data Comp	Y, N	N	N	___	___	___
Data Comp Eff Thr	0-200	100	100	___	___	___
Char Delay	0-4999	100	100	___	___	___

6740 BOP Template (TEMPn) Worksheet

Customer

Node Name Boston Node No. 1 Location_____

Parameter	Range	Def				
Temp #	1-64	n/a	5	___	___	___
Copy Temp			___	___	___	___
Name	9 Char	n/a	BOP96	___	___	___
Type	A, S, B, E	E	B	___	___	___
Subtype	1, 2	1	1	___	___	___
Tx Clock	I, E	I	I	___	___	___
Rx Clock	I, E, IS	I	I	___	___	___
Tx Speed	50-19200	1200	9600	___	___	___
Rx Speed	50-19200	1200	9600	___	___	___
RTS/CTS Delay	0-255	1	1	___	___	___
Rx Quota	1-99		20	___	___	___
Slot Weight	1-60		60	___	___	___
Tx Quota	2-99		20	___	___	___
Op Mode	00-FF	00	00	___	___	___
EIA Signals						
Spare	H = Hi	H	H	___	___	___
MB	L = Lo	L	L	___	___	___
RTS	T = Trans-	H	H	___	___	___
DTR	parent	H	H	___	___	___
CTS		H	H	___	___	___
RI		T	T	___	___	___
DCD		H	H	___	___	___
DSR		H	H	___	___	___
Data Comp	Y, N	N	N	___	___	___
Data Comp Eff Thr	0-200	100	100	___	___	___
Char Delay	0-4999	100	100	___	___	___

6740 UDR Hunt Group (HUNTn) Worksheet

Customer **Page** 18 **of** 23

Node Name Boston **Node No.** 1 **Location**______________

Parameter	Range	Def	Configuration
Hunt Group #	1-16	n/a	1
Description	12 Char	n/a	____________
Logoff Message	16 Char	n/a	____________
Disconnect Inhibited	Y, N	N	____________
Busy Out Time	0-255	1	____________
Queuing Node	Node Spec	n/a	1

TP	Ports															
______	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
______	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
______	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
______	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
______	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
______	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
______	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
______	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
______	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
______	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
______	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
______	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
______	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
______	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
______	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
______	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
______	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
______	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

6740 UDR User Group (USERn) Worksheet

Customer

Node Name Boston **Node No.** 1 **Location**______________

Parameter	Range	Configuration
User Group	1-16	1
Eligible Hunt Groups	1-16	1 2 3 4
Service	C, R, T, S	___

TP	Ports															
______	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
______	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
______	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
______	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
______	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
______	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
______	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
______	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
______	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
______	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
______	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
______	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
______	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
______	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
______	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
______	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
______	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
______	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

6740 Stored Lines/Slot Parameters Worksheet

Customer

Node Name Boston **Node No.** 1 **Location**_____

Stored Lines (:Linename)

Stored Line Name	Stored Line Text

Slots (SLOTn)

Slot # (1-16)	Start (YY/MM/DD HH:MM)	Increment (YY/MM/DD HH:MM)	End (YY/MM/DD HH:MM)	SL Name (9 char)
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				