



Call Processing States

The system internal processing uses a simple state machine representation to track the current condition of all resources in the system. Transitions between states occur as a result of externally generated events (incoming calls, for example), commands from the host, or impulse/output pulse rule processing.

Two variables are maintained on a per-port basis to track the current state of a port: Major states (MStates) and Supplementary States (SStates). MStates represent points within specific call processing routines; SStates monitor detailed activity within those routines. Because of the structure of the state machine and the nature of call processing activity, several SStates can exist simultaneously under a single MState.

The current MState and SState for a port can be viewed using the system Diagnostics Port Display screen (refer to the *Cisco VCO/4K System Administrator's Guide*). This screen is especially useful in the debugging process because it shows what actions are being performed for a specific port, any impulse/output pulse rule processing activity, and all links and voice paths associated with that port.

This appendix contains a listing of all MStates and SStates. Each state is defined and indicates which resource types may be in that state.

Major States (MStates)

CP_ANALYZE

Resource Types: CPA ports only.

Definition: CPA port is linked into a call and is set to detect call progress tones or presence of voice. An output pulse rule that involves tone detection (WAIT SUP or FINAL SUP token being processed) is being executed.

SStates: None.

CP_ATT

Resource Types: Service circuits, outgoing ports (all types).

Definition:

- CPA port, DTMF receiver, DVC port, IPRC port, MF receiver, output pulse channel—Port is linked into a call, with no other action taking place (not set to detect digits tones, present voice prompts, or output pulse digits). An impulse/output pulse rule or resource control command is being processed.

- DCC port—Port is linked into a call but is not being used. Either the DCC port is reserved but has no associated line/trunk port, or the DCC port plus its associated line/trunk port are being placed into a conference (intermediate step). A reserved port returns to this state after use until the entire conference is torn down by the host command. One or more Conference Control (\$6D) commands have been processed. Specific state of the port is indicated by the SState.
- Outgoing port—Port is linked into a call, with no other action taking place (outpulse rule processing has not started and port is not off hook). An Outgoing Port Control (\$69) command is being processed.

SStates:

- CPA port, DVC port, IPRC port, MF receiver—None.
- DTMF receiver—DLY_ANS (8), DLY_TIME (1), DLY_TONE (2), DLY_WINK (4), DLY_ANN (10).
- DCC port—CF_SET (SET), CF_ACK (ACK), CF_RSVR (R).

CP_CONF

Resource Types: DCC ports only.

Definition: DCC port has an associated line/trunk port and is actively participating in a conference. One or more Conference Control (\$6D) commands have been processed. The associated line/trunk port is in CP_SETUP MState.

SStates: CF_SET (SET), CF_ACK (ACK), CF_RSVR (R), CF_1WAY (1), CF_2WAY (2).

CP_CPAMON

Resource Types: CPA ports only.

Definition: CPA port is being monitored for end of call tone.

SStates: None.

CP_DCON

Resource Types: All port types.

Definition: Call disconnect state; applicable to all unused ports.

SStates: None.

CP_DELAY

Resource Types: All port types.

Definition: DTMF collection is delayed for an event.

SStates: None.

CP_DIAG

Resource Types: CPA port, DTMF receiver, MF receiver.

Definition: Port is being used by either the Service Circuit or T1 Test utility.

SStates: None.

CP_DIAL

Resource Types: All port types.

Definition: Dialing state.

SStates: None.

CP_DIG

Resource Types: DTMF receiver, MF receiver.

Definition:

- DTMF receiver—Port is linked into a call, is enabled, has received the first digit, and is collecting the remainder of the digit string. A DTMF Collection Control (\$67) command is being processed.
- MF receiver—Port is linked into a call, is enabled, and is collecting the digit string. An MF Collection Control (\$68) command is being processed.

SStates: None.

CP_DISC

Resource Types: Incoming ports (all types except COS = A, when the port is off hook, hardware, and idle software), outgoing ports (all types except COS = A, when the port is off hook, hardware, idle software, and UTC with COS = O).

Definition: A physical release has been performed on the port and Permanent Signal processing is taking place. The specific action being performed is indicated by the SState. A port remains in this MState until it goes on hook.

SStates: RDR_DONE, RDR_FBUSY, RDR_QUIET.

CP_DONECOLLECT

Resource Types: All port types.

Definition: One of three possible meanings:

- DTMF collection has completed—either a success or failure.
- A resource has been released.
- An impulse rule has been aborted.

SStates: None.

CP_DTMF

Resource Types: Incoming ports (all types), outgoing ports (all types).

Definition: DTMF digits are being collected from the incoming/outgoing port, and a DTMF receiver is linked into the call. A DTMF Collection Control (\$67) command is being processed for the incoming/outgoing port.

SStates: None.

CP_FDIG

Resource Types: DTMF receiver only.

Definition: Port is linked into a call, is enabled, and is waiting to receive the first digit. A DTMF Collection Control (\$67) command is being processed for the incoming/outgoing port.

SStates: None.

CP_FEXC

Resource Types: All port types.

Definition: Call was passed to final exception handling. This MState is not available for customer use at this time.

SStates: None.

CP_GARD

Resource Types: incoming ports (all types), outgoing ports (all types).

Definition:

- UTC, T1, E+M—Guard timing is being performed for the port as a result of an on hook or the port being activated via the Card Maintenance screen **P** command or the Change Port Status (\$90) command. If guard timing is due to an on hook, the SState is GD_NORMAL and the port goes to an MState of CP_IDLE after 150 ms. If guard timing is due to port activation, the SState is either GD_WTRLS or GD_WTRLSH. If on hook, the port goes to an MState of CP_IDLE after 150 ms. If off hook, the port remains in this state until an on hook is detected. The port has gone on hook and guard timing is being performed. The port goes to CP_IDLE state after 150 ms.
- SLIC, DID—Guard timing is being performed for the port as a result the port being activated via the Card Maintenance screen **P** command or the Change Port Status (\$90) command. The SState is either GD_WTRLS or GD_WTRLSH. If on hook, the port goes to an MState of CP_IDLE after 150 ms. If off hook, the port remains in this state until an on hook is detected.

SStates: GD_NORMAL, GD_WTRLS, GD_WTRLSH.

CP_HOST

Resource Types: Incoming ports with COS = A (all types) and virtual ports.

Definition: Forced origination for an idle, off hook port with COS = A (always off hook) or a virtual port. An Incoming Port Control (\$6A) command has been performed.

SStates: None.

CP_IDLE

Resource Types: All.

Definition: No activity on the port.

SStates: None.

CP_INPULSE

Resource Types: Incoming ports, outgoing ports.

Definition: An impulse rule is being executed for the port. Processing involving digit collection, rehungting a service circuit, presenting a voice prompt or beep tone, or waiting a specified amount of time is indicated by the SState.

SStates: DIALING (02), WT_ANNC (04), WT_BEEP (08), WT_DTMF (01), WT_MF (01), WT_TALK (10), WT_TIM (40).

CP_MBUSY

Resource Types: All.

Definition:

- Service circuits—Port is in maintenance busy condition (busied out) and is out of service. The condition is due to either port failure or the port has been taken out of service using the system administration Card Maintenance screen **P** command or the Change Port Status (\$90) command.
- Incoming ports, outgoing ports—Port is in maintenance busy condition (busied out) and is out of service. The condition is due to port failure, inward seize on an outgoing port, or the port has been taken out of service using the system administration Card Maintenance screen **P** command or the Change Port Status (\$90) command.

SStates: DIAG_AUTO (4), DIAG_CMAINT (1), DIAG_IDLE (0), DIAG_OEND (3), DIAG_PATH (2).

CP_MF

Resource Types: All port types.

Definition: Waiting for MF receiver to be available. This MState is not available for customer use at this time.

SStates: None.

CP_MFWT

Resource Types: Incoming ports, outgoing ports.

Definition: MF digits are being collected from the incoming/outgoing port, and an MF receiver is linked into the call. An MF Collection Control (\$68) command is being processed for the incoming/outgoing port.

SStates: None.

CP_MON

Resource Types: All port types.

Definition: Port is being monitored with the CPMON tool. This MState is not available for customer use at this time.

SStates: None.

CP_NOTINDB

Resource Types: All port types.

Definition: Port address is not allocated in the database (invalid port status requested by the host)—notifies the host that the card on which this port resides is in the NOTINDB state. This MState is not available for customer use at this time; it cannot be used to display the port status on the software administration's Port Display screen.

SStates: None.

CP_OOS

Resource Types: All port types.

Definition: Card containing the port is OOS—notifies the host that the card on which this port resides is in the OOS state. This MState is not available for customer use at this time; it cannot be used to display the port status on the software administration's Port Display screen.

SSates: None.

CP_OUTPULSE

Resource Types: Incoming ports, outgoing ports.

Definition: An outpulse rule is being executed for the port. Processing involving digit outpulsing, waiting for supervision, and waiting a specified amount of time is indicated by the SState.

SSates: DIAL_DIG, WAIT_SUP, WAIT_TIM.

CP_PRIMARY

Resource Types: All port types.

Definition: Waiting for primary ringback completion. This MState is not available for customer use at this time.

SSates: None.

CP_RDR

Resource Types: Incoming ports (all types except for COS = A), outgoing ports (all types except for COS = A and UTC with COS = O).

Definition: Reorder processing is being performed for the port, and the reorder tone is being presented. This MState always has an SState of WT_PSC.

SSates: WT_PSC.

CP_RECORD

Resource Types: All port types.

Definition: A port, usually an IPRC port, is being used to record a custom prompt.

SSates: None.

CP_SELFTEST

Resource Types: CPA, SRC.

Definition: Card on which the port resides is conducting internal testing following download of the CPA or SRC application to the card. Ports remain in this state until all tests are passed, then are brought into service (CP_IDLE).

SSates: None.

CP_SETUP

Resource Types: Incoming ports, outgoing ports.

Definition: Port is either off hook and waiting for further host action or is participating in a conference.

SStates: None.

CP_SPEECH

Resource Types: Incoming ports, outgoing ports.

Definition: Spoken digits or yes/no responses are being collected from the incoming/ outgoing port, and an SRC port is linked into the call.

SStates: None.

CP_STAB

Resource Types: Incoming ports, outgoing ports.

Definition: Port is involved in a stable call. A call is considered stable when a voice path has been established between an incoming port and an outgoing port. Both ports must be off hook (answered). When a command is received for either port in a stable call, the ports transition out of stable state while the actions specified in the command are being processed. The state to which the ports transition is determined by the action being performed.

SStates: None.

CP_TALK

Resource Types: Incoming ports, outgoing ports.

Definition: Voice prompts are being presented to the incoming/outgoing port, and a DVC or IPRC port is linked into the call. A Voice Port Control (\$6C) command is being processed for the incoming/outgoing port.

SStates: None.

CP_TONE

Resource Types: Outpulse channels.

Definition: Outpulse channel is linked into a call and digits or tones are being outpulsed.

SStates: None.

CP_WAIT

Resource Types: All port types.

Definition: Waiting for an answer from the far end within an outpulse rule. This MState is not available for customer use at this time.

SStates: None.

CP_WAITACK

Resource Types: All port types.

Definition: DTMF collection is waiting for a SETUP ACK message. DTMF collection is being restarted on this port.

SStates: None.

CP_WANS

Resource Types: Incoming ports only.

Definition: Port is waiting for outgoing port to complete output rule processing or receive final answer supervision from the far end. An outgoing port is linked into the call; the outgoing port is waiting for final supervision or an output rule is being executed.

SStates: None.

CP_WTFSUP

Resource Types: Incoming and outgoing ports.

Definition: Port is waiting for final answer supervision from the distant end. An output rule has been processed for the port (may be output rule 0 – null rule).

SStates: None.

CP_WTIM

Resource Types: All port types.

Definition: Waiting for unspecified period of time. This MState is not available for customer use at this time.

SStates: None.

CP_WTONE

Resource Types: All port types.

Definition: Port is waiting for a tone. This MState is not available for customer use at this time.

SStates: None.

CP_WWINK

Resource Types: All incoming/outgoing port types.

Definition: Waiting for a wink within an output rule.

SStates: None.

Supplementary States (SStates)

Several Supplementary States (SStates) can exist simultaneously under a single MState. When more than one SState is present, the Diagnostics menu Port Display screen combines the names or abbreviations of the SStates. The character(s) that appear next to the SState name indicate the abbreviation that may be seen on the screen for each SState.

CF_1WAY (1)

Resource Types: DCC ports only.

Definition: Port is being used for a one-way voice path from a conference. One or more associated line/trunk ports are linked to this DCC port. The DCC port is also linked to a resource chain containing all DCC ports involved in the conference.

MStates: CP_CONF.

CF_2WAY (2)

Resource Types: DCC ports only.

Definition: Port is being used for a two-way voice path to/from a conference. One associated line/trunk port is linked to this DCC port. The DCC port is also linked to a resource chain containing all DCC ports involved in the conference.

MStates: CP_CONF.

CF_ACK (ACK)

Resource Types: DCC ports only.

Definition: Port has received instructions from call processing and is acknowledging them.

MStates: CP_ATT, CP_CONF.

CF_RSVR (R)

Resource Types: DCC ports only.

Definition: Port has been reserved for a conference by the host via the Conference Control (\$6D) command. The DCC port continues to be in this SState until the entire conference is torn down by the host. For example, if a DCC port has been reserved and is participating in a conference, it retains the SState of CF_RSVR when its associated line/trunk port goes on hook; the DCC port transitions from CP_CONF to CP_ATT and remains reserved (dedicated) for that conference.

MStates: CP_ATT, CP_CONF.

CF_SET (SET)

Resource Types: DCC ports only.

Definition: Port is receiving instructions from call processing as to what action to perform next.

MStates: CP_ATT, CP_CONF.

DIAG_AUTO (4)

Resource Types: Outgoing ports.

Definition: Outgoing port has been busied out by the system because the auto make busy error threshold has been reached. Threshold value is set for all ports in a resource group using the system administration Resource Group Summary screen.

MStates: CP_MBUSY.

DIAG_CMAINT (1)

Resource Types: All.

Definition: Port has been busied out (deactivated) using the system administration Card Maintenance screen **P** command or the Change Port Status (\$90) command.

MStates: CP_MBUSY.

DIAG_IDLE (0)

Resource Types: CPA ports, DVC ports, IPRC ports, T1 channels.

Definition:

- CPA ports, DVC ports, IPRC ports—Port is busied out for an unknown reason. The reason is unknown because the card is being downloaded (application software for CPA, voice prompts for DVC and IPRC). The true SState is displayed when the download is complete.
- T1 channels—Channel is busied out for an unknown reason. The reason is unknown because the card is in maintenance mode due to loss of carrier or loss of framing.

MStates: CP_MBUSY.

DIAG_OEND (3)

Resource Types: Outgoing ports.

Definition: Outgoing port has been busied out by an inward seizure from the far end.

MStates: CP_MBUSY.

DIAG_PATH (2)

Resource Types: All.

Definition: Port has been busied out (deactivated) using the system administration Card Maintenance screen **P** command and a voice path has been established between this port and another using the system administration Set Path utility.

MStates: CP_MBUSY.

DIALING (02)

Resource Types: Incoming ports, outgoing ports.

Definition: Port is waiting to receive digits. An impulse rule IP ANI or IP FIELD token is being processed, and a DTMF or MF receiver port is linked into the call. The incoming/outgoing port remains in this state until all digits are collected or a timeout occurs. A timeout aborts the rule, otherwise rule processing continues.

MStates: CP_INPULSE.

DIAL_DIG (01)

Resource Types: Incoming ports, outgoing ports.

Definition: Digits or tones are being outpulsed over this port. An outpulse rule OP ANI, OP DIGIT or OP FIELD token is being processed, and an outpulse channel is linked into the call. Incoming/outgoing port remains in this state until all digits/tones are outpulsed.

MStates: CP_OUTPULSE.

DLY_ANN (10)

Resource Types: DTMF receivers.

Definition: A DTMF Collection Control (\$67) (Enhanced) command is being processed. The command specified to wait until voice prompts were presented before enabling the DTMF receiver.

MStates: CP_ATT.

DLY_ANS (8)

Resource Types: DTMF receivers.

Definition: A DTMF Collection Control (\$67) (Enhanced) command is being processed. The command specified to wait until true answer supervision is detected before enabling the DTMF receiver.

MStates: CP_ATT.

DLY_TIME (1)

Resource Types: DTMF receivers.

Definition: A DTMF Collection Control (\$67) (Enhanced) command is being processed. The command specified to wait a length of time before enabling the DTMF receiver.

MStates: CP_ATT.

DLY_TONE (2)

Resource Types: DTMF receivers.

Definition: A DTMF Collection Control (\$67) (Enhanced) command is being processed. The command specified to wait until after a tone is presented before enabling the DTMF receiver.

MStates: CP_ATT.

DLY_WINK (4)

Resource Types: DTMF receivers.

Definition: A DTMF Collection Control (\$67) (Enhanced) command is being processed. The command specified to wait until a wink is detected before enabling the DTMF receiver.

MStates: CP_ATT.

GD_NORMAL (0)

Resource Types: Incoming ports (UTC, T1, E+M), outgoing ports (UTC, T1, E+M).

Definition: Guard timing is being performed for the port as a result of an on hook. The port goes to an MState of CP_IDLE after 150 ms.

MStates: CP_GARD.

GD_WTRLS (1)

Resource Types: Incoming ports (all types), outgoing ports (all types).

Definition: Guard timing is being performed for the port as a result of the port being activated via the Card Maintenance screen **P** command. If on hook, the port goes to an MState of CP_IDLE after 150 ms. If off hook, port remains in this state until an on hook is detected.

MStates: CP_GARD.

GD_WTRLSH (2)

Resource Types: Incoming ports (all types), outgoing ports (all types).

Definition: Guard timing is being performed for the port as a result of the port being activated via the Change Port Status (\$90) command. If on hook, the port goes to an MState of CP_IDLE after 150 ms. If off hook, the port remains in this state until an on hook is detected.

MStates: CP_GARD.

RDR_DONE

Resource Types: Incoming ports (all types except for COS = A), outgoing ports (all types except for COS = A and UTC with COS = O).

Definition: Permanent Signal processing has been completed for this port. During this SState, the port is presented with quiet tone until system reset or the port goes on hook. If the port goes on hook at this time, a Permanent Signal Condition (\$D2) report is sent to the host, indicating the condition has cleared. A Port Change of State (\$DA or \$DB) report may be sent as specified if either of the following commands were used in the call:

- Outgoing Port Control (\$69) command—Disconnect Control Code setting.
- Incoming Port Control (\$6A) command—Incoming Port Control Code setting.

MStates: CP_DISC.

RDR_FBUSY

Resource Types: Incoming ports (all types except for COS = A), outgoing ports (all types except for COS = A and UTC with COS = O).

Definition: A Permanent Signal Condition has been detected for this port. When the port enters this SState, a Permanent Signal Condition (\$D2) report is sent to the host, indicating the condition exists. During this SState, the port is presented with reorder tone for up to 15 seconds. If port goes on hook at this time, a \$D2 report is sent to the host, indicating the condition has cleared. A Port Change of State (\$DA or \$DB) report may be sent as specified if either of the following commands were used in the call:

- Outgoing Port Control (\$69) command—Disconnect Control Code setting.
- Incoming Port Control (\$6A) command—Incoming Port Control Code setting.

MStates: CP_DISC.

RDR_QUIET

Resource Types: Incoming ports (all types except for COS = A), outgoing ports (all types except for COS = A and UTC with COS = O).

Definition: Permanent Signal processing is beginning for this port. When the port enters this SState, a physical release of the port is performed by the system. During this SState, the port is presented with quiet tone for up to 30 seconds. If the port goes on hook at this time, a Port Change of State (\$DA or \$DB) report may be sent as specified if either of the following commands were used in the call:

- Outgoing Port Control (\$69) command—Disconnect Control Code setting.
- Incoming Port Control (\$6A) command—Incoming Port Control Code setting.

MStates: CP_DISC.

WAIT_SUP (02)

Resource Types: Incoming ports, outgoing ports.

Definition: Port is waiting for signaling/supervision from the distant end. An outpulse rule WAIT SUP token is being processed. The signaling or supervision for which the port is waiting is determined by the supervision template specified in the data field [xx]. If voice band signaling is specified, a CPA port is linked into the call. The incoming/outgoing port remains in this state until the signaling/supervision is received or a timeout occurs (if specified).

MStates: CP_OUTPULSE.

WAIT_TIM (01)

Resource Types: Incoming ports, outgoing ports.

Definition: Port is waiting a specified length of time. An outpulse rule WAIT TIME token is being processed. The incoming/outgoing port remains in this state until the specified length of time has passed.

MStates: CP_OUTPULSE.

WT_ANNC (04)

Resource Types: Incoming ports, outgoing ports.

Definition: Call processing is attempting to allocate a voice port to link to this call. An inpulse rule SPEAK token is being processed and the first attempt to allocate a voice port failed. Call processing waits 3 seconds, then hunts again for a voice port (DVC or IPRC). If a voice port is available, it is allocated and rule processing continues. If it is still unavailable, rule processing aborts.

MStates: CP_INPULSE.

WT_BEEP (08)

Resource Types: Incoming ports, outgoing ports.

Definition: A beep tone is being outpulsed over this port. An inpulse rule TONE ENAB, TONE END, TONE CLR, TONE FDIG, or TONE NOW token is being processed, and an outpulse channel is linked into the call. Up to three beeps can be stacked for processing; one beep being processed and two waiting for processing. The incoming/outgoing port remains in this state until all beep tones are presented.

MStates: CP_INPULSE.

WT_DTMF (01)

Resource Types: Incoming ports, outgoing ports.

Definition: Call processing is attempting to allocate a DTMF receiver to link to this call. An inpulse rule IP ANI or IP FIELD token is being processed and the first attempt to allocate a DTMF receiver failed. Call processing waits 3 seconds, then hunts again for a receiver. If a DTMF receiver is available, it is allocated and rule processing continues. If it is still unavailable, rule processing aborts.

MStates: CP_INPULSE.

WT_MF (01)

Resource Types: Incoming ports, outgoing ports.

Definition: Call processing is attempting to allocate an MF receiver to link to this call. An inpulse rule IP ANI or IP FIELD token is being processed and the first attempt to allocate an MF receiver failed. Call processing waits 3 seconds, then hunts again for a receiver. If an MF receiver is available, it is allocated and rule processing continues. If it is still unavailable, rule processing aborts and the call is torn down.

MStates: CP_INPULSE.

WT_PSC

Resource Types: Incoming ports (all types except for COS = A), outgoing ports (all types except for COS = A and UTC with COS = O).

Definition: Reorder processing is being performed for the port. The port is presented with reorder tone for up to 15 seconds. If the port goes on hook, Reorder processing ends and a Port Change of State (\$DA or \$DB) report is sent to the host, indicating the port can be used for calls. If no on hook is reported within 15 seconds, a physical release is performed on the port and Permanent Signal processing begins.

MStates: CP_RDR.

WT_TALK (08)

Resource Types: Incoming ports, outgoing ports.

Definition: A voice prompt is being presented to this port. An impulse rule SPEAK token is being processed, and a Voice port (DVC or IPRC) is linked into the call. Most rule processing, such as digit collection, can occur while the prompt is being presented. Other tokens, such as TONE NOW, WAIT TIME, and subsequent SPEAK tokens are not processed concurrently with presentation of a voice prompt because they would abort the prompt. Rule processing does not end until all voice prompts specified have been presented or aborted.

MStates: CP_INPULSE.

WT_TIM (40)

Resource Types: Incoming ports, outgoing ports.

Definition: Port is waiting a specified length of time. An impulse rule WAIT TIME token is being processed. The incoming/outgoing port remains in this state until the specified length of time has passed.

MStates: CP_INPULSE.