

# Overview of the OCx Interface Module

The features of the following OCx interface modules are configured based on the SONET and SDH mode support:

- 1-port OC-48/STM-16 or 4-port OC-12/OC-3 / STM-1/STM-4 + 12-port T1/E1 + 4-port T3/E3 CEM Interface Module (A900-IMA3G-IMSG)
- 1-Port OC-192 or 8-Port Low Rate CEM Interface Module (A900-IMA8S1Z-CX)
- ASR 900 1-Port OC-192 or 8-Port Low Rate CEM 20G Bandwidth Interface Module (A900-IMA1Z8S-CXMS)

### SONET Modes

SONET supports the following Circuit Emulation over Packet (CEP), Structure- Agnostic TDM over Packet (SATOP), and Circuit Emulation over Packet-Switched Network (CESoPSN) modes:

**CEP Modes**

- STS-48C
- STS-12C
- STS-3C
- STS-1
- VT 1.5

**SAToP or CESoP**

- VT1.5-T1
- T3
- CT3-T1

The following table provides required clock and CEM configuration that is supported on each of the SONET mode:

*Table 1: Modes Supported on SONET*

| | STS-48C | STS-12C | STS-3C | STS-1 | VT 1.5 | VT 1.5 T1 | T3 | CT3-T1 |
|---|---|---|---|---|---|---|---|---|
| **Required Configuration** | | | | | | | | |
| **Mode** | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| **Internal/Line Clock Source** | Internal | Internal | Internal | Internal | Internal | Yes | Yes | Yes |
| **ACR/DCR Clock** | NA | NA | NA | NA | NA | Yes | Yes | Yes |
| **CEM Configurations** | | | | | | | | |
| **CEP** | Yes | Yes | Yes | Yes | Yes | NA | Yes | NA |
| **SAToP Framed** | NA | NA | NA | NA | NA | Yes | Yes | Yes |
| **SAToP Unframed** | NA | NA | NA | NA | NA | Yes | Yes | Yes |
| **CESoPSN** | NA | NA | NA | NA | NA | Yes | Yes | Yes |
| **Interworking Multiservice Gateway (iMSG)** [1] | | | | | | | | |
| **iMSG** | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| **Serial Interfaces** | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| **iMSG ACR** | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| **Multilink Interfaces** | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| **VLAN Handoff** | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| **OCx Port Protection** | | | | | | | | |
| **APS** | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| **OCx Path Protection** | | | | | | | | |
| **UPSR** | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| **UPSR over HDLC** | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

[1] Supports Channelized T3/E3or T1/E1

### SDH Modes

SDH supports the following modes:

- AU-4-16c (VC4-16c)
- AU-4-4c (VC4-4c)
- AU-4 (VC4)
- AU-4 — TUG-3 — VC-3 — T3 (TUG-3 — T3)
- AU-4 — TUG-3 — VC-3 — E3 (TUG-3 — E3)
- AU-4 — TUG-3 — TUG-2 — VC-11 (TUG-2 — VC-11)
- AU-4 — TUG-3 — TUG-2 — VC-12 (TUG-2 — VC-12)
- AU-4 — TUG-3 — TUG-2 — VC-12 — E1 (TUG-2 — E1)
- AU-3 — VC-3 — T3 (VC-3 — T3)
- AU-3 — TUG-2 — VC-11 — T1 (TUG-2 — T1)
- AU-3 — TUG-2 — VC-11 (TUG-2 — VC-11)
- AU-3 — TUG-2 — VC-12 (TUG-2 — VC-12)
- AU-3 — VC-3 — E3 (VC-3 — T3)

The following table provides required clock and CEM configuration that is supported on each of the SDH mode. The SDH modes provided in brackets are only for the documentation purpose:

***Table 2: Modes Supported on SDH***

| | VC4-16c | VC4-4c | VC4 | TUG-2-VC11 | TUG-2-VC12 | TUG-3-E3 | TUG-3-T3 | TUG-2-VC11-T1 | TUG-2-VC12-E1 |
|---|---|---|---|---|---|---|---|---|---|
| **Required Configuration** | | | | | | | | | |
| **Mode** | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| **Internal/Line Clock Source** | Internal | Internal | Internal | Internal | Internal | Yes | Yes | Yes | Yes |
| **ACR/DCR Clock** | NA | NA | NA | NA | NA | Yes | Yes | Yes | Yes |
| **CEM Configurations** | | | | | | | | | |
| **CEP** | Yes | Yes | Yes | Yes | Yes | NA | NA | NA | NA |
| **SAToP Framed** | NA | NA | NA | NA | NA | Yes | Yes | Yes | Yes |

| | VC4-16c | VC4-4c | VC4 | TUG-2-VC11 | TUG-2-VC12 | TUG-3-E3 | TUG-3-T3 | TUG-2-VC11-T1 | TUG-2-VC12-E1 |
|---|---|---|---|---|---|---|---|---|---|
| **SAToP Unframed** | NA | NA | NA | NA | NA | Yes | Yes | Yes | Yes |
| **CESoPSN** | NA | NA | NA | NA | NA | Yes | Yes | Yes | Yes |
| **Interworking Multiservice Gateway (iMSG)** | | | | | | | | | |
| **iMSG** | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| **Serial Interfaces** | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| **iMSG ACR** | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| **OCx Port Protection** | | | | | | | | | |
| **MSP** | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| **OCx Path Protection** | | | | | | | | | |
| **SNCP** | Yes | Yes | Yes | Yes | Yes | NA | NA | NA | NA |