

CODE MASTER

**AN
OPEN APPLICATION INTERFACE (OAI)
INSTALLATION GUIDE**

NEC America, Inc.

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Chapter 1 Introduction

This guide provides specific field entries that need to be made in the process of installing and configuring Code Master. In addition to this guide, use the following manuals for this installation:

Applications Manager (APM) Installation Manual – Contains step-by-step instructions for installing the software from the release media.

Applications Manager (APM) Operations Manual – Explains how applications like Code Master are configured in the APM environment, using the entries and values provided in this guide.

NEAX System Manuals – Give very detailed explanations about the assignments that need to be made with the NEAX2400 Maintenance Administration Terminal (MAT) commands, the NEAX2000 Customer Administration Terminal (CAT), or the NEAX2000 Maintenance Operations Console (MOC). [See “NEAX Command Assignments” on page 13.](#)

Briefly, the installation and set up of Code Master involves the following processes:

Software Installation

Code Master software must first be loaded from the release media. Log in to the APM Platform Management Menu, select the Installation of Applications/ Packages option, and follow the instructions provided in the **APM Installation Manual** to complete this part of the installation.

Application Configuration

Code Master is internally supported by the APM and must be configured in the APM environment. Chapter 2 of this guide provides the information that must be entered into this APM configuration file. Use the instructions provided in the **APM Operations Manual** to make the entries provided in this section.

Database Requirements

Code Master requires two databases which are constructed and maintained through the APM Database Administration option. The process begins with the creation of a master definition file and its related master database. Then an application definition file is constructed which enables the processing of the master database file into a Code Master application database. Chapter 3 of this guide defines the information which must be included in these definition and database files. Use the instructions provided in the **APM Operations Manual** to make the entries contained in this section.

NEAX Command Assignments

Before Code Master will function, specific data settings must be assigned at the NEAX2400 Maintenance Administration Terminal (MAT) commands, the NEAX2000 Customer Administration Terminal (CAT), or the NEAX2000 Maintenance Operations Console (MOC). [Chapter Chapter 4 on page 13](#) of this guide specifies the necessary commands and the values at which they are to be set. Use the instructions provided in the appropriate **NEAX System Manuals** to make the entries contained in this section.

Notes

1. Only one application may access the NEAX Authorization Code Facility (ACF) at a time. Therefore, when Code Master is running, no other application can use the ACF.
2. An authorization code is not included in a Station Message Detail Record (SM-DR) if it is dialed prior to the outgoing number. It is included in the record if the outgoing number is dialed first. A forced account code is always put into an SM-DR.
3. The verifiable portion of a dialed authorization code is designated during installation. The digits in the designated portion are verified against the database while the remaining digits are ignored by Code Master. This option allows flexibility in determining the sequence of digits which must be dialed as an authorization code. Non-verifiable information may include, for instance:
 - Leading digits that tell the NEAX how many digits must be entered for the authorization code.
 - Specialized information, such as a count of FAX pages for transmission that can be made available to a call accounting program.
4. Code Master does not provide utilities for managing the file or device where the authorization code records are written. It is possible for the hard disk or device to become full unless the user takes steps to prevent that situation.

The installation process, including its presentation in this manual and reference to other manuals that are necessary, is illustrated below:

Code Master Installation Requirements

Discussed in:

Instructions In

**Chapter 1
Introduction**

Software Installation
Software Release Media

**APM Installation
Manual**

**Chapter 2
Application Configuration**

Application Characteristics
Primary Parameter Configuration
OAI Facilities (Optional)
OAI Configuration Parameters (Optional)
User-Defined Parameters

**APM Operations
Manual**

**Chapter 3
Database Requirements**

Master Definition File
Application Definition File
Application Database

**APM Operations
Manual**

**Chapter 4
MAT Assignments**

NEAX2400 MAT Commands
NEAX2000 CAT/MOC Commands

**NEAX2400 IMS
System Manuals
or
NEAX2400 IVS
System Manuals**

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Chapter 2 Application Configuration

Code Master is configured into the APM system using the **Add** function of the Application Configuration option on the APM System Administration menu. To access the Application Configuration option:

1. Enter the APM option from the APM Platform Management Menu.
2. Enter the System Administrator password at the APM password screen.
3. Enter the Application Configuration option from the System Administration menu.

This section contains the information that should be entered to the configuration file for Code Master. For specific instructions on what these parameters mean and how to make these entries, use the **APM Operations Manual**.

Step 1 – Application Characteristics

In adding Code Master to the APM Application Configuration file, define it as an OAI application that does not need a CRT or a communication queue, as follows:

<u>Parameter</u>	<u>Entry</u>	<u>Description</u>
OAI Application (Y,N)	Y	Yes, Code Master is an OAI application because it communicates with the NEAX using OAI processes.
CRT Application (Y,N)	N	No, Code Master does not require a terminal screen that is of the same type as the one used by the APM.
Communication Queue (Y/N)	N	No, Code Master does not need an IPC queue to communicate with other processes.

Step 2 – Primary Configuration Parameters

On the APM Configuration Entry screen, make the entries shown below to the parameters indicated:

<u>Parameter</u>	<u>Entry</u>	<u>Description</u>
Application Name	Code_Master	The name that is to be displayed in the APM menus. This name is displayed however it is entered here; i.e. capital letters, lowercase, etc.
Executable Filename	/oai/app/auth.verify	The path name of the executable file.
Group	(no entry)	(Code Master is not a member of a group of applications.)
Response Mode	I	The action that APM is to take with Code Master when a member of its group terminates; the “I” serves as a default value since Code Master does not belong to a group.
Initialization Batch	N	Code Master is not to be initialized automatically when the OAI system is initialized. (The user can choose “Y” for convenience, if desired.)
Termination Mode	M	Code Master is to receive from the APM a termination message, rather than a kill or termination signal, when it is to terminate.
Standard Output	/dev/null	Code Master’s output is sent to this file for debugging purposes.
Number of Restarts	0	The number of times the APM may restart Code Master in the event that it terminates erroneously; 0 indicates that it is not to be restarted at all.

Step 3 – OAI Facilities

According to instructions in the **APM Operations Manual**, designate the following facility for Code Master using the **Facilities** command on the Configuration Entry screen:

ACF – Authorization Code Facility

Step 4 – Secondary OAI Configuration Parameters

Using the **OAI-Conf** command on the APM Configuration Entry screen, make the entry shown for each of the following parameters required by Code Master. Use the instructions provided for this option in the **APM Operations Manual**:

<u>Parameter</u>	<u>Entry</u>	<u>Description</u>
Database Name #1	/oai/db/cur/cmdb	The path name of the tenant mask database. The database filename <i>cmdb</i> , shown here with its path, should be used as the name of the corresponding Application Definition File (see Database Requirements).
Database Name #2	/oai/db/cur/authdb	The path name of the authorization code database. The database filename <i>authdb</i> , shown here with its path, should be used as the name of the corresponding Application Definition File (see Database Requirements).
Timeout Value #1	60	The number of seconds to spend collecting codes from call attempts before recording.
Timeout Value #2	10	The number of codes to collect before recording them.
Tenant Number	0	The number of the tenant served by Code Master; 0 means all tenants.
Source Link Name	OAI1TCP	The UAP port on the source side of the communication link; entry should correspond to a Link Name in the APM System Configuration file.
Destination Link Name	PBX1TCP	The PBX port on the destination side of the communication link; entry should correspond to a Link Name in the APM System Configuration file.
Association Recovery	15	The number of seconds Code Master will wait before trying to reestablish an association with the NEAX that has been released.

Step 5 – User-defined Parameters

Make the following additional parameter entries through the **User Defined** command on the APM Configuration Entry screen.

<u>Parameter</u>	<u>Entry</u>	<u>Description</u>
User Defined #1	0	Specifies the method of recording authorization codes dialed, using the following values: 0 = no codes recorded 1 = invalid codes only 2 = valid codes only 3 = all codes recorded
User Defined #2	/oai/app/auth.record	Indicates the path name of the executable file for the recorder program.
User Defined #3	/oai/log/auth.log	Indicates the path name of the file or device for recording codes used in attempted calls.

Chapter 3 Database Requirements

Code Master requires the following two databases, both of which are created through the APM:

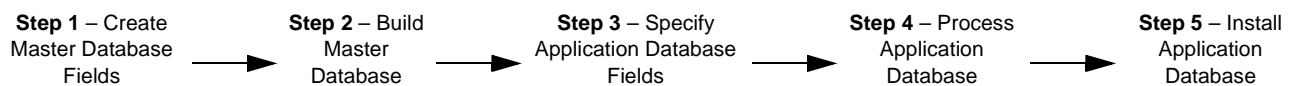
- **Tenant/Mask Database**

This database contains all of the tenants served by Code Master and for each, the mask that defines the contents of the required authorization code. This database is configured as `/oai/db/cur/cmdb`.

- **Authorization Code Database**

This database contains all of the authorization codes that can access Code Master and for each, the tenant to which it is assigned. This database is configured as `/oai/db/cur/authdb`.

Each database is created through the Database Administration option on the APM System Administration Menu. Database creation involves the following five-step process for each required database:



1. **Define Master Database Fields:** This step creates the master definition file that defines the fields in the master database file. Code Master requires two separate sets of files, one for the tenant data and one for the authorization code data.
2. **Build Master Database:** This step involves entering data (e.g., authorization codes) into the master database fields that were just defined in the master definition files in Step 1.
3. **Specify Application Database Fields:** This step creates a definition file for each of the Code Master databases. This file defines how data from the corresponding master file is to be converted to meet the needs of Code Master.
4. **Process Application Database:** This step uses the Process Application Database option on the APM Database Administration menu to create the file that will be used by Code Master. When the **Process** command is activated, data is drawn from the master database and converted to the formats specified in the corresponding application definition file, enabling Code Master to copy its database into a working file.
5. **Install Application Database:** This step installs the Application Database by activating the Install Application Database option on the APM Database Administration menu.

Instructions

The information required for each Code Master database is provided in table form in [Tenant/Mask Database Information on page 14](#) and [Authorization Code Database Information on page 15](#). Using this information alongside of the procedural instructions provided in the **APM Operations Manual**, enter the Database Administration option on the APM System Administration Menu, and build the Code Master databases one at a time. Any messages displayed during these steps are addressed in the Process and Error Messages chapter of the **APM Operations Manual**.

Note: Remember to complete Step 4, Process Application Database, and Step 5, Install Application Database, for each database after entering the information on the following pages in Steps 1 through 3.

Tenant/Mask Database Information

This database contains all of the tenants served by Code Master and, for each, the mask that specifies how the authorization code data must be entered by telephone users. Name the master definition file **cmdb_m** and the application definition file **cmdb**.

Field Description	Master Definition File				Application Definition File	Master Database
	Type	Size	Min. Value	Max. Value	Data Type	Typical Entry
Tenant Number	N	3	000	64†	Integer	0
Mask	A	10			ASCII	1vvvvviii

† – Note that the maximum value for the NEAX2000 is 64 and the maximum value for the NEAX2400 is 255.

Field Definitions:

- **Tenant Number** – The tenant served by Code Master. If the mask is to apply to all tenants, enter exactly one record with a tenant number of 0. Otherwise, specify a record between 1 to 255.

- **Mask** – The ten-character notation that indicates how the authorization code must be entered by telephone users assigned to this tenant, using the following format:

Digit – The exact digit (0-9) that must be entered by the user for Code Master to validate the authorization code.

v – Indicates that this position should be read as a digit of the authorization code of up to ten characters that must be validated (compared to the Authorization Code Database).

i – Used as fillers to complete the authorization code to a length of ten characters. For example, given the typical entry specified above, an authorization code for any tenant is valid if the first digit is “1” and the next six digits match an entry in the Authorization Code Database. The last three digits of the code, if any, will be ignored.

Authorization Code Database Information

This database contains all of the authorization codes and the tenant numbers to which they are assigned. Name the master definition file **authdb_m** and the application definition file **authdb**.

Field Description	Master Definition File				Application Definition File	Master Database
	Type	Size	Min. Value	Max. Value	Data Type	Typical Entry
Authorization Code	A	10			ASCII	574869
Tenant Number Field 1	A	25			ASCII	1,2,3,4,
Tenant Number Field 2	A	25			ASCII	5,6,7,8
Tenant Number Field 3	A	25			ASCII	9,10,11,
Tenant Number Field 4	A	25			ASCII	12,13,14,15,
Tenant Number Field 5	A	25			ASCII	16,17,18,19,20,
Tenant Number Field 6	A	25			ASCII	21,22,23,24,25,
Tenant Number Field 7	A	25			ASCII	26,27,28,29,
Tenant Number Field 8	A	25			ASCII	30,31,32,33,34
Restriction	N	2	0	15	Short Integer	0

Field Definitions:

- **Authorization Code** – An actual authorization code; valid characters are digits 0–9, #, and *. Records are sorted in ascending order. An entry may be less than ten digits long, and should be equal in length to the verifiable portion specified in the mask.
- **Tenant Number Field** – A sequence of one or more tenants entered in the Tenant/Mask database to which this authorization code is assigned; tenant numbers should be entered separated only by commas, no spaces. If multiple tenant number fields are used, the last number in each field must have a comma except for the last tenant number in the last tenant number field does not require a comma. If the tenant number is 0, the authorization code is used by all tenants. The maximum number of tennant numbers is 50.
- **Restriction** - If a restriction code (RSC) is entered, this RSC is returned to the PBX to be assigned to the station using the authorization code facility. After the call is completed, the station will use the default RSC. If the restriction code is 0, the authorization code will use the restriction of the PBX.

Note: *DO NOT change the types and sizes of the fields!*

Chapter 4 NEAX Command Assignments

This guide assumes that data settings that affect the operation of all OAI software on a system-wide basis have already been assigned on the NEAX2400 Maintenance Administration Terminal (MAT) commands, the NEAX2000 Customer Administration Terminal (CAT), or the NEAX2000 Maintenance Operations Console (MOC). Such settings include, for instance, system index values and assignment of Interface I/O Port Data in the Interface Processor (IP). For more information about the system data settings and about the Code Master settings discussed in this section, refer to the following technical manuals for the specific NEAX system in use:

- OAI System Manual.
- Command Manual.
- Job Specification.
- Programming Manual (for RDS, MDS, and HDS systems).
- System Data Design Manual (for ICS systems).

Code Master is only effective if the Authorization Code or Forced Account Code service feature is engaged, and the station has been assigned to use the feature. The following data assignments set up this configuration on the NEAX MAT.

NEAX2400 Commands

Use the NEAX2400 Maintenance Administration Terminal (MAT) to enter these commands.

ASYD: (Assignment of System Data)

This command is used to set the following specific system data indices needed to support Code Master:

System Data 1:

Index 43, bit 0 For remote access to PBX, is authorization code required after ring back tone (RBT)?

0 = Yes

1 = No.

Index 43, bit 2 Will SST be sent after dialing access code?

0 = No

1 = Yes

System Data 2:

Index 3, bit 5 0 = Authorization Code

1 = Forced Account Code

**ASPA:
(Assignment of
Special Access
Code)**

This command is used to designate the kind of service or the route to be used when a trunk access or special access code has been entered. Services include, for instance, speed calling, attendant manual override, individual trunk access, authorization code/forced account code, call park remote retrieval, least cost routing, etc.

- (a) Enter the same tenant number that was configured for the application through the APM.
- (b) Enter Service Code (SSC) as Kind of Service (SRV).
- (c) Enter Normal Service (N) as the Connection Status Index (CI),
- (d) Enter 42 to indicate Authorization Code and Forced Account Code as the Service Feature Index (SID).
- (e) Enter as the Number of Necessary Digits (NND) the number of service access code digits that users will need to input at the D^{term}.

**AMND:
(Assignment of
Maximum
Necessary Digits)**

This command is used to assign the maximum number of digits to be read as the authorization code or forced account code. More than one entry may be made to support multiple patterns.

- (a) Always specify the tenant number (TN) 0, indicating that the MND will apply to authorization codes.
- (b) Specify the destination code (DC) to enable the PBX to recognize the dialed digits as an authorization code.
- (c) Specify the maximum necessary digits (MND), from 1 to 10, that comprise an authorization code, including the destination code.

For example, suppose that you want seven-digit authorization codes with 1 or 2 as the first digit. Use AMND to enter the following data:

```
TN=0, DC=1, MND=7  
and  
TN=0, DC=2, MND=7
```

**AATC:
(Assignment of
Authorization
Code Data)**

This command is used to provide the PBX with a backup database of authorization codes, in case the OAI application is not operating. (Remember that the PBX will verify all digits that the user enters.)

**ASFC:
(Assignment of
Service Feature
Class Data)**

This command is used to assign a Class of Service that allows a Service Feature Index of 27 for stations set up to access Code Master; this command activates the authorization code feature.

**ASDT:
(Assignment of
Station Data)**

This command is used to associate the tenant configured for Code Master and the authorization code service feature class to specific station D^{term} that will be used to access Code Master.

NEAX2000 Commands

Use the NEAX2000 Customer Administration Terminal (CAT), or the NEAX2000 Maintenance Operations Console (MOC) to enter these commands. (Refer to the **NEAX2000 System Manuals** for more information.)

CM20: (Assignment of Access Code)

Y=Tenant Group: Access Code for ID code class change.

1st data Access Code (1-3 digits)

2nd data Service Type

:086: Authorization code

Use A57 for the first digit of the authorization code

:087: Forced Account code

CM42: (Assignment of Maximum Digits for Authorization Code)

Sets ID code digits.

1st data: 11: Authorization code

:12: Forced Account Code

:13: Remote Access to System ID code

2nd data: 01–10: Number of digits (The default is 10 digits.)

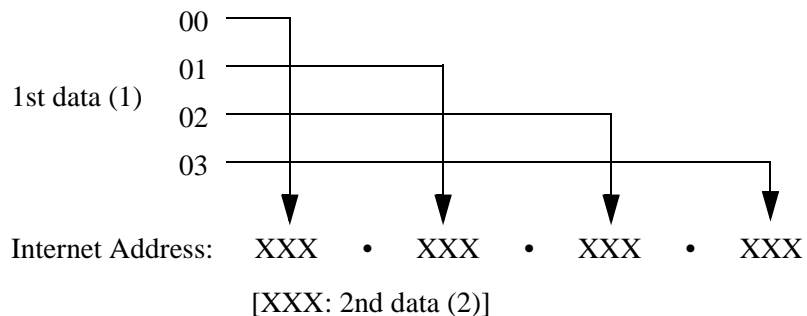
CMD79: (Assignment of Internet Address)

Assigns the Internet Address of TCP/IP-Ethernet.

1st data 00–03: Division No. of Internet Address

2nd data 0–255: Address Data (1–3 digits)

The Internet Address must be assigned to the 1st data 00–03 as follows:



CM08: (Checking ID Codes Using AP01)

Basic Functions

1st data:217Check ID code
 2nd data::0:Check through MP
 :1:Check through AP01 package when using ACF. (Set checking through AP01 package when using ACF.)

CMD53: (Handling of ID Codes When the IP is Down)

Registers ID codes and temporary class data.

1st data:ID code

2nd data :a b b c c d d e e:Temporary class data
 :a: 0–2,9:Temporary class type
 :b b: 01–08:Temporary connection restriction
 class :c c: 01–15:Temporary service restriction class –
 A :d d: 01–15:Temporary service restriction class –
 B :e e: 01–15:Temporary service restriction class –
 C :NONE (Initial value)

Note: *This data uses PBX internal class change data when ACF is in operation and the AP is stopped. The number of digits is set through CMD7B*

CMD7B: (Number of ID Code Digits When IP down)

ACF

1st data:00:Number of ID code digits when AP stops during ACF operation
 2nd data:1–3:Number of ID code digits when AP stops
 :0 (Initial Value):No ACF operation

Chapter 5 Initialization and Termination

Once Code Master and its databases are created, it is ready to be initialized. Enter the APM Operations Menu and initialize Code Master through the Non-CRT Application Control option, according to instruction provided in the **APM Operations Manual**. An “*” will appear next to the application name once Code Master runs successfully.

If an error occurs during initialization, verify that the application is configured correctly in the APM, and that its databases are defined and contain valid data. Also verify that the PBX is configured correctly to support OAI and Code Master.

Code Master can be terminated at any time. From the Non-CRT Application Control option of the APM Operations Menu, select the **Terminate** command, followed by the Code Master application, as instructed in the APM Operations Manual. Once Code Master has terminated, the “*” disappears and the PBX will refer to its own table of authorization codes (AATC command) to determine the validity of call attempts.

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Appendix A Error Messages

#1 “**errno = <errno> reading <filename>.**”

The specified UNIX error occurred while trying to read the specified database file. Perhaps there are no records in the database, the UNIX permissions are wrong for the file, or the file name is wrong.

#2 “**Invalid mask -- <mask>**”

An invalid format was detected in a record of the Tenant/Mask Database. The criteria for a valid mask is: (1) length of 10 characters or less; (2) only a combination of digits, the letter I (upper or lower case), or the letter V (upper or lower case); and (3) two Vs cannot be separated by any I's.

#3 “**No authorization codes in data base.**”

The Authorization Code Database does not contain any records. Verify that the master database has records and that the application database has been processed and installed.

#4 “**No memory allocated for authorization codes.**”

There was insufficient memory for the program to use for the storage of data from the Authorization Code Database.

#5 “**DB load failed -- error = <errno>**”

The specified UNIX error occurred while trying to read the records of the Authorization Code Database. It is possible that the file has gotten corrupted or does not have the correct UNIX permissions. Verify that the application database has been processed and installed correctly.

#6 “**<count> records loaded.**”

This is an informative message letting you know the quantity of authorization codes that have been loaded from the database.

#7 “**Write of pipe fails!**”

The program was unable to send a report of a call attempt to the Recorder. Terminate and restart the application.

#8 “**Cannot set timer (timerset).**”

The program could not set a timer managed by the APM. Terminate the application and the OAI system, then re-initialize the OAI system and the application. If necessary, halt and restart the entire APM system instead.

#9 “**Cannot cancel timer (timerdel).**”

The program could not cancel a timer managed by the APM. Terminate the application and the OAI system, then re-initialize the OAI system and the application. If necessary, halt and restart the entire APM system instead.

#10 “**Open of pipe fails! No recording.**”

The program was unable to establish a means of communicating with the Recorder (via a pipe). If recording is still desired, terminate and restart the application.

#11 “**Cannot spawn child process! No recording.**”

The program was unable to create the Recorder process. If recording is still desired, terminate and restart the application.

#12 “Recorder is killed.”

For an unknown reason, the Recorder did not respond to a command to stop itself, so the parent process “killed” it instead. Any unwritten reports were lost.

#13 “Close of pipe fails!”

The program could not close the pipe to the Recorder. This error is harmless.

#14 “Recorder process begins.”

This is an informative message letting you know that authorization codes from call attempts can now be recorded (one “report” per call attempt).

#15 “No memory allocated for reports.”

There was insufficient memory for the program to use for the recording of authorization codes.

#16 “Recorder stops.”

This is an informative message letting you know that no more authorization codes can be recorded. Any reports in memory have been written to disk.

#17 “Out of space or file deleted.”

The Recorder could not close the log file that contains the recorded authorization codes, probably due to a lack of disk space or the inadvertent deletion of the file.

#18 “Hang-up signal detected. Recorder stops.”

The Recorder received a signal indicating that the application has lost communication with the PBX and is terminating. Any reports in memory have been written to disk.

#19 “Cannot open <filename>.”

The specified database or log file could not be opened. Verify that the pathname is the application database for the Tenant/Mask Database or Authorization Code Database. Verify that the databases have been processed and installed. (See Chapter 3 for assistance.) If this message originated from the Recorder, verify that User-defined Parameter #3 refers to an existing directory.

#20 “No memory allocated for tenant structures.”

There was insufficient memory for the program to use for the storage of data from the Tenant/Mask Database.

#21 “Invalid tenant number (<tenant>).”

The specified tenant number of an authorization code from a call attempt did not match any record in the Tenant/Mask Database. The call was restricted.