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機電系統工程處
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Department of Rapid Transit Systems, TCG

HITACHI
Hitachi Rail Italy, Spa

Ansaldo STS
A Hitachi Group Company

臺北捷運環狀線（第一階段）
機電系統工程、軌道工程、自動收費系統工程
TAIPEI CIRCULAR LINE (PHASE 1)
E&M SYSTEM, TRACK WORKS, AFC SYSTEM
CF610/CF611/CF617

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項次 No.	圖說/章節/項次 Drawing/ Chapter/ Item	審查意見 Review Comments	答覆 Reply Answer
D1	一般 GEN	行控中心內有五部 CMFT，若特定一台 CMFT 針對某一設備進行操作，其他台應無法操作，但是否能得知無法操作之設備是由誰掌握控制權? There are five CMFT console in the OCC. If a specific CMFT is operating on a certain device, other stations should not be able to operate, but can anyone know who controls the device that cannot be operated by other console?	請參閱附件 10 之 4.7.1 章節中，其中主控台通訊狀態表格顯示，目前各主控台操作之其他子系統通訊對象。 Please refer to section 4.7.1 of Annex 10, in which the main console communication status table shows other subsystem communication objects currently operated by each console.
D2	P.43 Page 43	有 PDU(月台點矩陣顯示器 Platform Dot Matrix Display Unit)及 CDU(大廳點矩陣顯示器 Concourse Dot Matrix Display Unit)P.43 圖 3.26 : ATS 訊息設定作業內有 CDU 及 PDU 的欄位提供操作人員進行設定，建議可否將此兩欄位修改為"大廳 PIDS"及"月台 PIDS"，以減少各系統別差異。 There are PDU (Platform Dot Matrix Display Unit) and CDU (Concourse Dot Matrix Display Unit) P.43	現有設計車站內點矩陣顯示器英文簡稱為 DMD，列車內英文簡稱為 PIDS。 In the original design, the English abbreviation of the dot matrix display in the station is referred to as DMD, and the English abbreviation for the train is PIDS.

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		Figure 3.26: There are CDU and PDU fields in the ATS message setting operation. It is suggested that the two fields can be changed to "Lobby PIDS" and "Platform PIDS" to reduce the differences between systems.	
D3	P.62 Page 62	2.2.2.6 列車連動監看 ON-TRAIN INTERLOCKING MONITOR 當發生下列情況時，列車閉路電視系統的連動功能將被觸發。 - 站間停車 - 偵測到車上火災 第二點『偵測到列車上有火災』之字眼是否應釐清為『列車偵煙器作動』? 2.2.2.6 ON-TRAIN INTERLOCKING MONITOR When the following conditions occur, the linkage function of the train CCTV system will be triggered. - Station parking - Fire detected onboard The second point, "Is there a fire on the train," should be clarified as the "train smoke detector"?	在章節 2.2.2.6 頁碼 78 已修正為列車偵煙器作動。 The description has revised to smoke detector activated in Section 2.2.2.6, page 78.
D4	P.63 Page 63	2.2.2.6 列車連動監看(3) 解除： 列車對講機事件(15 號)，隨列車通訊結束自動解除相關攝影機，請修改為操作員可以透過解除按鈕，將事件從連動監看中解除。	功能已經修改於 CMFT 軟體，並於章節 2.2.2.6 頁碼 79 修正陳述。 The function has been modified to the CMFT software and is corrected in Section 2.2.2.6 Page. 79.

項次 No.	圖說/章節/項次 Drawing/ Chapter/ Item	審查意見 Review Comments	答覆 Reply Answer
		2.2.2.6 trains interlocking monitoring (3) lifted: On the train intercom event (No. 15), the relevant camera is automatically release from the rotoation list of the train event when the train communication ends. Please modify it so that the operator can release the event from the linked monitor by pressing the release button.	
D5	P.65 Page 65	2.2.2.5 機廠與測試軌監看 CAMERA ON DEPOT AND TEST TRACK MONITOR #13.#14 牆僅能顯示所有在機廠與測試軌區間和列車上的影像，當#13.#14 未手動建立固定的輪播清單時，CMFT 將自動將機廠與測試軌區間和列車上的進行輪播。 【建議】不要侷限#13.#14 僅能顯示所有在機廠與測試軌區間和列車上的影像，因列車均上主線，機場內列車數不多，應以主線監看為主，待收車進機場後再回復 #13.#14 監看或更多 CCTV 監看。呈上，應開放電視牆監看功能。 #13 and #14 can only display images in the Depot, in Test Track area, and on trains. Without manually setting up fixed rotating play list for #13 and #14, CMFT is to automatically and rotatively play images from the	此功能已修正#13.#14 僅在未建立任何清單的預設清單情況下，指定為僅顯示所有在機廠與測試軌區間和列車上的影像，可以透過修改屬性方式指定任一列車攝影機。 This function has been revised.If no preset list of any list is created, #13 and #14 are specified to display just all the images on the machine factory and test track sections including trains . You can specify any train camera by modifying the attribute mode.

項次 No.	圖說/章節/項次 Drawing/ Chapter/ Item	審查意見 Review Comments	答覆 Reply Answer
		Depot, test track area, and trains. 【Suggestions】: Please do not restrict that #13 and #14 can only display images in the Depot, in Test Track area, and on trains. With few EMUs left in the Depot, most of EMUs are running on the mainline. Therefore, monitoring EMU shall be conducted mainly for the mainline, but not the Depot. When most of the EMUs return back to the Depot, #13 and #14 can be restored to mainly monitor the Depot. Alternatively, more CCTV can be utilized for the monitoring when needed. Also, TV wall is to be setup for monitoring purpose as well.	
D6	P.133 Page 133	請說明下列中文之語意為何?，另與英文內容不一致 『無線派遣台只有兩個席位，故不受一個席位僅能維持接聽一台列車的 PI 限制。行控中心的 TETRA 派遣台提供無線電通話服務，包含手機與車機的通訊，無限派遣台只有兩個席位，故不受一個席位僅能維持接聽一台列車的 PI 限制。僅 CMFT 操作台無法使用。』 Dispatcher in OCC can provide all Tetra function, including Phone Call and Calling form OTC. But all	因功能修正該段敘述已經修正，請參照 2.9 章節頁碼 150 之 OTC 降級模式說明。 Because the functuin is already modified, please refer the chapter2.9 Page 150, about the Fall-Back Mode Description of the OTC.

項次 No.	圖說/章節/項次 Drawing/ Chapter/ Item	審查意見 Review Comments	答覆 Reply Answer
		function is invalid on CMFT console.	
D7	P.149 Page149	語音廣播&點矩陣顯示操作方面可否將操作流程②及選擇項目④加以省略，畫面改以選擇項目(如列車、車站等)，點選項目後變為反白，再選擇播放內容，最後執行播放。如此可以把整個播放流程放置於同一畫面，方便操作。 Whether the operation procedure 2 and the selection item 4 are omitted in the PA & DMD operation, the screen is changed to select an item (such as a train, a station, etc.), the item is highlighted, the content is reversed, then selected the content, and the playback is finally performed. This allows the entire process to be placed on the same screen for easy operation.	操作流程程式已撰寫完成，無法修改。 The operating procedure has been written and cannot be modified.
D8	附件 10 P.25 Annex 10 Page 25	當行控中心 5 台通訊多功能操作台其中一台進行廣播時，其他 4 台是否仍可對其他車站進行廣播(其他子系統一樣)。 When one of the five communication multi-function consoles of the OCC broadcasts, Could the other four stations broadcast to other stations (like other subsystems) ?.	可對其他車站進行廣播。 Yes, the other four stations can still broadcast to other stations.
D9	附件 10 P.32 Annex 10 Page	NO.1、NO.2(廣播)這些代碼後續是否可以變更以利控	NO.1、NO.2 為廣播名稱可由附件 10 中 4.5.1 章節 Page 107

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	32	制員直覺性使用。舉例來說，若點“政令宣導”，再點“NO.X”，才能由“播放內容”中看出要預錄播放的內容為何，不夠直覺建議“NO.X”等內容可改為“XXXXX”的簡單敘述，以利使用者可一目瞭然直覺性使用。 NO.1, NO.2 (Broadcast) Whether these codes can be changed later for the controller's intuitive use. For example, to click the “Government Propaganda Guide” then click “NO.X”, it can just be seen the “playing content”, it is not enough to get information from “NO.X” at the begin. We suggest that simple description name as "XXXXX", allows users to use it intuitively at a glance.	中，修改播放設定中的預錄語音名稱。 NO.1 and NO.2 are audio names. You can modify the pre-recorded voice names in the Playback settings in Page 107, section 4.5.1 of Annex 10.
D10	附件 10 P.40 P.34 Annex 10 Page 40.34	針對“語音廣播”及“點矩陣顯示”預錄開始播放之顯示方式請調整建議應將預錄之播放訊息內容於開始播放頁面進行顯示，而不是只顯示一個“NO.X”的標頭，以利若播放錯誤時，尚可發現進行更正。 For the display mode of "PA broadcast" and "DMD display" pre-recorded playback, please adjust the suggestion to display the content of the pre-recorded playback message on the start playback page instead of displaying only a header of "NO.X". In order to	已修正，詳見附件 10 中 Page 33 章節 3.1.2.4，Page 39 章節 3.2.1.4。 Corrected, see Page 33, Section 3.1.2.4 and Page 39 Section 3.2.1.4 of Annex 10.

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		facilitate playback errors, corrections can still be found.	
D11	附件 10 P.36 Annex 10 Page 36	3.2 點矩陣顯示，有關列車的顯示為 PIDS 及車站的顯示為 DMD 高運量月台上名稱為 PIDS 中運量月台及列車上名稱為 DMD 為減少各系統別差異，請將列車上顯示稱為 DMD，月台上顯示為 PIDS。 The 3.2 point matrix shows that the display of the train is PIDS and the display of the station is the DMD, but in high traffic system, the name of the platform is PIDS. the name is DMD on the train. To reduce the difference between systems, please refer to the train display as DMD. The platform is shown as PIDS.	現有設計車站內點矩陣顯示器英文簡稱為 DMD，列車內英文簡稱為 PIDS。 In the original design, the English abbreviation of the dot matrix display in the station is referred to as DMD, and the English abbreviation for the train is PIDS.
D12	附件 10 P.50 Annex 10 Page 50	CCTV 分割就訓練手冊觀看只有一分割及四分割畫面，是否有更多分割數供控制員選擇設定。 CCTV Splitting See only one split and four split shots of the training manual. Whether there are more splits for selection	契約規範為一分割及四分割。 At Contract specification, there is only one division and four divisions.
D13	附件 10 P.55 Annex 10 Page 55	列車攝影機選擇之【列車選擇】定義說明，會不會有捉不到列車的可能性，若是，如何排除？ Would the definition of “train selection” for the train camera selection not	所有列車資訊皆來自 ATS 訊息，只要 ATS 掌控中的列車，都會被選擇出來。 All train information comes from ATS messages. As long as the trains controlled by ATS, they will be selected from the

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		captured the possibility? If so, how to exclude it?	list of conditions.
D14	附件 10 P.56 Annex 10 Page 56	3.3.3.4 閉路電視–電視牆設定畫面分割數是否留有未來擴充空間(如增加到 16 分割)，以利行控中心固定重點畫面監看而非僅採取輪播方式。	契約規範為一分割及四分割。 At Contract specification, there is only one division and four divisions.
D15	附件 10 P.57 Annex 10 Page 57	列車監看可以增加監看 CCTV 畫面數嗎？只有#15 數量應該不夠。另外，P.57 顯示當列車對講機作動時，#15 & #16 CCTV 皆會顯示畫面，應該只需要一組顯示就可以。另外，所列的列車事件會顯示列車所在位置及作動的車廂嗎？列車事件可考慮增加 door fail to close & open。 Is it possible to incrase CCTV screen of train supervision? Otherwise, in Page 57 describe when passenger intercom is activated, both #15 & #16 screen shows relate camera video, suggest only to show on one screen. Otherwise, do event of train location and car number show on event list? Is it possible to add door fail to close & open event?	正線列車監看為#15#16 牆，若有個別需求各由操作員手動介入輪播清單，選擇相關列車監看條件。 The trains monitored by the main line are preset to be #15#16 wall. If there are individual demands, the operators manually intervene in the carousel list and select the relevant trains conditions to monitor. 列車對講機作動事件若只需要於一個牆面顯示，將統一修正於#15 牆顯示，#16 牆維持 ATS 列車事件訊息。同步修正 3.2.5 章節。 If itercom event on the train is only to be displayed on one wall, it will be uniformly corrected on the #15 wall display. The #16 wall maintains the ATS train event monitored display. Synchronize revision 3.2.5 section. 所列的列車事件會顯示列車車號及作動的車廂，請參考附件 10 Page.57. Train & car number will be shown on event list. Please refer to annex 10 page 57. 列車事件目前有關於車門部門

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			有: 1.異常車門開啟 2.車門內部把手被拉下 3.車門功能障礙 若需要再增加其他硬體一場警世，必須由 ATS 提供相關訊息，軟體在同步修正。 Relevant door alarms currently have the following three: 1. Abnormal Door Opening 2.DIH/DEH Pulled 3.Vehicle Door Obstructed If any new demands want to increase to alert mechanism, ATS team should provide the ICD information.
D16	附件 10 P.58 Annex 10 Page 58	當進行個別呼叫時，同時群組呼叫進線，其系統呈現方式？ When the individual call is calling out and the group call is calling at the same time, how does the system display and proceed the situation?	CMFT 畫面右上角為任何無線電群組來電顯示(未接通前)，CMFT 下方無線電區域為目前進行通訊的無線電資訊，兩者並不衝突。如附件 10 章節 3.4.4.1 中，個別呼叫已經建立，且同時有無線電來電呼叫。 In the upper right corner of the CMFT console is any tetra calling in information (before it is picked up), The TETRA area below the CMFT console is tetra operational plane for communication currently, and the two do not conflict. As in section 3.4.4.1 of Annex 10, individual calls have already been established and there are simultaneous coming calls.
D17	第 2.6.8 節 /P.123 第 3.2.5 節/P.148	列車事件警報訊息 CCTV Activation Alarm：當任一列車上產生異常事件會發送封	車門功能障礙、障礙物偵測異常、脫軌檢測器偵測異常 ，此三項為 ATS 新增項目已修正於

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		包，共包含 9 種事件，1=站間停車。2=偵測到車上火災。3=拉下緊急疏散裝置。4=異常車門開啟。5=車載控制器連結失敗。6=車門內部把手被拉下。7=車門功能障礙。8=障礙物偵測異常。9=脫軌檢測器偵測異常；此與 3.2.5 章節所述列車連動與鎖定情況，站間停車、偵測到車上火災，拉下緊急疏散裝置、異常車門開啟、車載控制器連結失敗、車門內部把手被拉下、乘客按下緊急對講機等，進行相互比較，其中車門功能障礙、障礙物偵測異常、脫軌檢測器偵測異常、乘客按下緊急對講機等 4 項於該兩章節描述不同，請釐清說明。 To compare the Chapter 2.68 CCTV Activation Alarm When any alarm is detected from the train, ATS will send packets to CMFT server. A packet contains 9 events： 1=Unintended Stop between Stations 2=Fire Detection on Board 3=EED Pulled 4=Abnormal Door Opening 5=CC Failure 6=DIH/DEH Pulled 7=Vehicle Door Obstructed 8=Obstacle Detetctor	3.2.5 章節，乘客按下緊急對講機事件不為 ATS 訊息，其來源為 OTC 通知，故不在 2.6.8 章節中陳述。 Abnormal Door Opening, DIH/DEH, Vehicle Door Obstructed, these three items for the ATS additions have been amended in chapter 3.2.5, passengers press the emergency radio event is not ATS message, the source is from OTC notification, It is not stated in section 2.6.8.

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		Activated 9=Derailment Detector Activated and Chapter 3.2.5 On-train CCTV system interlocking function will be triggered when below mentioned event. Train speed = 0 and train is in between two stations Fire detection onboard EED pulled Abnormal door opening CC connection lost DIH/DEH Pulled Vehicle Door Obstructed Obstacle Detetctor Activated Derailment Detector Activated Emergency Intercom used by passengers , there are 4 differents, icluding Vehicle Door Obstructed, Obstacle Detetctor Activated, Derailment Detector Activated, Emergency Intercom used by passengers, Please clarify the explanation.	
D18	第 3.1 節/P.136	當等待佇列中有電話等候中，電腦電話整合電腦的個人來電助理，將偵測 OCC 中有可以接聽電話的席位，而從等候佇列中提取來電進行群響呼叫，直到有人聽電話或該電話發起者掛斷電話。	假設有 3 通分機（Hotline）都是打給同一支目標 Agent，且該 Agent 為可接聽電話狀態： 1. 從第 1 支 Hotline 拿起到目標 Agent 響起要經過幾秒？ 廠商回覆：2 秒 2. 從目標 Agent 停止響鈴到其

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		請說明 3 通來電範圍均為同一席位時，其他席位多久收到來電訊息及群響。 While waiting for a call waiting in the queue, the personal phone assistant of the Computer & Telephony Integration Computer wil extract the call from the waiting queue and detect the seat in the OCC which are the free to answer the call, then inform these seats by group ring way, until someone listens to the call or The call initiator hangs up. Please indicate how long the other seats receive incoming call messages and group ringing when the 3-way calling range is the same seat.	它 Agent 開始群響要經過幾秒？ 廠商回覆 : 17 秒 Assume that there are 3-way extensions (Hotlines) that are all called to the same target Agent, and the Agent is in the state of answerable calls: 1. How many seconds will the process take from the first hotline call until the Target Agent ring ? Manufacturer reply : 2 seconds 2. How many seconds pass from when the target Agent stops ringing to other Agents begin to ring? Manufacturer reply : 17 seconds
D19	第 3.5.4 節 /P.162	為確保旅客於緊急狀況時，車上緊急對講機能正常使用，請增加旅客對講機可自我測試功能。 In order to ensure that passengers can use the emergency intercom normally during emergencies, please increase the passengers' intercom testing itself capability.	列車於駐車區內可與機廠控制員席位進行通訊測試。 Trains in the parking area can be tested with depot controller seats.
D20	第 3.1.1 節 /P.138	車站對講機或直線電話訊息傳送至行控中心 CMFT 工作站，其顯示之位置名稱，請開放使用者自行修改。 The station intercom or line phone message is	車站對講機僅直通旅客詢問處；直線電話顯示位置使用者可自行修改，如附件 10 中 4.1.3.4 章節頁碼 93。 The position of the direct telephone display can be

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		transmitted to the CMFT console of the OCC. The name of the location displayed on the CMFT station,to open the function that users can modify it, please.	corrected through the functions provided by the System Settings --> Group and Phone Book --> DLT Book screen, as described in section 4.1.3.4, Page 93 of Annex 10.
D21	第 2.4.2.3 節 /P.107	對於 CMFT 相關設備之告警，請依各席位權責範圍顯示，並輔以告警音提示。 For CMFT-related equipment alarms, please display according to the scope of each seat's rights and duties, supplemented by an alarm sound prompt.	細部設計已為全部席位共同顯示，並輔以告警音提示。 The Original Design have been configured as been displayed at all seats, supplemented by an alarm sound prompt.
D22	一般 Gen	請列章節說明 LOG 紀錄之滙出方式。 Please list chapters on how to export LOG records.	請參考附件 10 之 4.7.2 章節頁碼 115，說明 LOG 紀錄滙出作業。 Please refer to section 4.3.2, Page115 of Annex 10. To export LOG records can be performed on this screen.
D23	一般 Gen	請列章節說明與介面之通訊協定格式。 Please describe the format of the communication protocol with the interface.	將於附件中提供各系統的介面通訊文件。 附件 12-ATS ICD 文件 附件 13-TETRA API 文件 附件 14-OTC ICD 文件 附件 15-DMD ICD 文件 附件 16-PA ICD 文件 附件 17-DLT API 文件 附件 18-CCTV 介面文件 附件 19-ALARM 系統介面文件 附件 20-PGIS ICD 文件 The interface communication documents for each system will be provided in the attachment.

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			Annex 12-ATS ICD document Annex 13-TETRA API document Annex 14-OTC ICD document Annex 15-DMD ICD document Annex 16-PA ICD document Annex 17-DLT API document Annex 18-CCTV API/ICD document Annex 19-ALATM System document Annex 20-PGIS ICD document
D24	一般 Gen	請列章節說明將無線電系統設備派遣台伺服器、Perseus 閘道器及雙向放大器納入告警管制設備清單。 Please list the chapters to include tetra system equipment-dispatcher servers, Perseus gateways, and bidirectional amplifiers in the list of alarm control devices.	Perseus 閘道器及雙向放大器未傳送該設備告警資訊。派遣台伺服器已列入章節 2.4.3 表 2-6: 告警管制設備清單。 Perseus gateways, and bidirectional amplifiers currently hasn't sent any elevant information to CMFT.The alarm msg form Dispatcher is dedcribed as Chapter 2.4.3, Table 2-6: Alarm Controlled Equipment List
D25	一般 Gen	請列章節說明將列車通訊設備數位影像錄放影機納入告警管制設備清單。 Please list chapters to include the train communication equipment digital video recorder in the list of alarm control equipment.	請參考附件 10 之 4.3.2 章節，可於此畫面進行告警設定與管制。 Please refer to section 4.3.2 of Annex 10. Alarm setting and control can be performed on this screen.
D26	一般 Gen	請列章節說明將未收到 ATS 訊息納入告警管制設備清單。 Please list the chapters to include lost the message from ATS in the list of	已補充相關資訊於章節 2.6 Page 137。 Information has been supplemented in Section 2.6, Page 137.

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		alarm control devices.	
D27	一般 Gen	請列章節說明將 NTP 功能失效之處置方式。 Please refer to the chapters to describe how to dispose of the NTP function.	增加 2.3.4 章節,頁碼 121, NTP 失效處置 Supplemented in Section 2.3.4, Page 121.NTP Out Of Service Disposal
D28	一般 Gen	請列章節說明將 CTS400 設備告警納入告警管制設備清單。 Please list chapters to include CTS400 device alarms in the list of alarm control devices.	CTS400 目前無相關資訊發送至 CMFT。 CTS400 currently hasn't sent any elevant information to CMFT.
D29	一般 Gen	請列章節說明 CMFT 與電視牆之訊號及線路架構。 Please outline the signal and line architecture of the CMFT and video wall.	已補充相關資訊於 2.2.2 章節頁碼 70。 Information has been supplemented in Section 2.2.2, Page 70.
D30	一般 Gen	請列章節說明 CMFT 與列車通訊系統之訊號傳遞 LOG 紀錄架構格式。 Please add a section to describe log recorded format for message transmission between CMFT and On Train Communicaion System.	增加章節 2.7, 頁碼 142 陳述 CMFT 系統 LOG 紀錄之方式與檔案儲存位置。 Section 2.7 added. The method of CMFT log and file saved location are descripted in Page 141.
D31	一般 Gen	請列章節說明 CMFT 與 DMD 系統之訊號傳遞 LOG 紀錄架構格式。 Please add a section to describe log recorded format for message transmission between CMFT and DMD.	增加章節 2.7, 頁碼 142 陳述 CMFT 系統 LOG 紀錄之方式與檔案儲存位置。 Section 2.7 added. The method of CMFT log and file saved location are descripted in Page 141.

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C1	一般 GEN	請說明 LOG 記錄之匯出方式。 Please explain the export of LOG records.	匯出為 CSV 檔案格式，由操作人員自行儲存。 Export file format CSV, provided to the operator to save.
C2	一般 GEN	請說明與介面之通訊協定格式。 Describe the protocol for the interface.	通訊多功能操作台與其他子系統介面之通訊協定格式請參照圖 2-2: 行控中心 CMFT 伺服器軟體佈署圖。 各子系統詳記的通訊協定內容，將於 TC1-67106 通訊多功能操作台 - 維修手冊附件一提供。 CMFT and other subsystem interface protocol please refer Figure 2 2: OCC CMFT SERVER Software Module Allocation. The contents of the communication protocol of each subsystem will be attached to the 1 of annex of the TC1-67106 – Communications Multi Function Terminal – Maintenance Manual.
C3	一般 GEN	請說明當車廂內乘客使用緊急對講機，行控中心之車上閉路電視系統監視畫面自動切換至該車組，其畫面加字編號功能。 Please explain when the passenger inside the train uses the PI, the CCTV system monitoring screen of the OCC will automatically switch to the car group, and the characters of the screen	1. 當車廂內乘客使用緊急對講機，行控中心操控員接聽該通緊急通話時，15 或 16 號電視牆將會自動切換至該車組；其切換方式詳請閱本文件 2.2.2.6 列車連動監看。 2. 列車上攝影機畫面在播放或是儲存時，均會在畫面的左上方顯示列車編號、車廂編號及第幾號攝影機；例如列車編號為 V07 的 D-Car 的第 2 台攝影機，即會顯示 V07DC2。 1. When the passenger inside

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		will be added with the function of numbering.	the train uses the PI and the OCC operationer answers the emergency call, the video wall 15 or 16 will be automatically switched to the train set. The switching method, please refer to this document 2.2.2.6 On-Train Interlocking Monitor. 2. When the camera image on the train is real time played or stored, the train number, carriage number and the number of cameras will be displayed in the upper left of the screen. For example, the second camera of D-Car with train number V07 will display V07DC2.
C4	一般 GEN	請將列車通訊設備數位影像錄影機納入告警管制設備清單。 Please include the digital video recorder for on train communication equipment in the list of alarm control equipment.	遵照辦理，列車上 DVR 將會透過 EMS 傳送斷線訊息，由 CMFT 接收後顯示於告警畫面中。 Follow the handling, when on train DVR disconnection that message will be sent through the EMS, and the alarm will received by the CMFT, and displayed in the alarm screen.
C5	一般 GEN	請將無線電系統設備派遣台伺服器、Perseus 閘道器及雙向放大器納入告警管制設備清單。 Please include the dispatcher server, Perseus gateway and bi-directional amplifier into the list of alarm control equipment.	數位無線電設備告警採用 SNMP 通訊方式傳送，SNMP 的內容由數位無線電子系統設定，派遣台伺服器、Perseus 閘道器及雙向放大器未列於 SNMP 告警清單內，故無法增列在 CMFT 告警項目內。 The alarm of TETRA equipment is transmitted by SNMP. The content of SNMP is set by the digital radio subsystem. The dispatcher server, Perseus gateway and bidirectional amplifier are not listed in the SNMP alarm list, so they can not be added in the CMFT alarm item.
C6	一般 GEN	請將未收到 ATS 訊息納入告警管制設備清單。 Please include not received the ATS message into the	遵照辦理，CMFT 伺服器程式將會新增監控 ATS 訊息封包功能，並於設定檔中設置逾時秒數設定，若逾時未收到 ATS 訊息，即新增告

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		alarm control equipment list.	警訊息。 Following the process, the CMFT server will add the function of monitoring the ATS packet and set the timeout in seconds in the configuration file. If no ATS message is received in time, a new alarm message will be added.
C7	一般 GEN	請將 NTP 功能失效納入告警管制設備清單。 Please include the NTP function failure into the alarm control equipment list.	NTP 伺服器無提供失效告警介面功能，且 NTP 功能為底層作業系統設定之服務功能，無法由程式偵測 NTP 提供者之服務是否失效。 The NTP server does not provide the failure alarm interface function, and the NTP function is the service function set by the underlying operating system that can not detect whether the service of the NTP provider fails by customized program.
C8	一般 GEN	請將 CTS400 設備告警納入管制設備清單。 Please include CTS400 equipment alarms in the list of regulated equipment.	CTS400 無提供告警功能，故無法將該設備納入管制設備清單中。 CTS400 does not provide alarm function, so the device can not be included in the control equipment list.

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B1	P.20, 圖 2-1 Page 20, Figure 2-1	終端伺服器介面『RS422』應與 P.22 內文一致，請修正為『EIA-422』。 The terminal server interface "RS422" should be consistent with P.22. Please correct it as "EIA-422"	已更改關於終端服務器接口與 EIA-422 通信的說明 Alter the dscription about the communication of terminal server interface to EIA-422
B2	P.29 Page 29	2.2.1『…系統運作有四種情況 …』章節內實際為六種，請修正。 2.2.1 『…, there are four scenarios will be described…』Actually, it is mentioned to six cases in the section, please amend the mistake.	章節內容已更正為六種情況。 The content of the section has been corrected to six cases.
B3	P.86 Page 86	2.4.2.3 告警訊息顯示與紀錄，請補充說明多筆『未確認之告警訊息』之堆疊顯示方式邏輯。 2.4.2.3 In "Alarm Message Display and Record", please add the description how to display multiple unconfirmed alarm messages on stack logic	於 2.4.2.1 與 2.4.2.3 中補充說明，修正告警音設定以及閃爍與告警聲音播放的邏輯，並且說明未確認之告警的顯示方式與功用。 Supplementary explanation in 2.4.2.1 and 2.4.2.3, to correct the content about alarm voices settings and flashing and audible sound display logic, and description of unconfirmed alarms display mode and function.
B4	一般 GEN	請提送操作畫面供審查。 Please submit the GUI Document for review.	將於附件十提交 GUI 文件 The GUI file will be submitted in Annex 10.
B5	一般 GEN	說明 LOG 紀錄之預估可儲存天數，匯出方式。	規劃儲存系統為 4T 容量提供 CMFT 使用，以目前最小行車距間

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		To descript how many days that log record can be stored and how to export the records.	距 90 秒 ATS 所提供的行車記錄、各項告警訊息記錄、操作記錄、直線電話記錄等相關資料，初步估算每 3 個月資料增長量約為 1.5T；而依據捷運公司資訊室要求，儲存系統至少預留一半儲存空間做為備援使用，故 CMFT 儲存系統可儲存資料天數安全容量約為 90 天。 Planning storage system for the 4T capacity to provide CMFT use, the current minimum distance from the distance of 90 seconds ATS provided by the traffic records, the alarm message records, operating records, direct telephone records and other relevant information, the initial estimate of data growth per 3 months For the 1.5T; and according to the requirements of the TRTC's information room, the storage system at least half of the storage space reserved for backup use, so the CMFT storage system can store the number of days the security capacity of 90 days.
B6	一般 GEN	說明資料庫修改步驟方式。 Explain how to modify the database by steps.	資料庫維護程序請參照未來送審文件 TC1-67106 訊多功能操作台 - 維修手冊章節 2.3 資料庫維護。 Database Maintenance please refer to TC1-67106 Communicaton Multi Function Terminal – Maintenance Manual, chapter 2.3 Database Maintenance.
B7	一般	說明與介面之通訊協定格式。 Describe the protocol for the interface.	通訊多功能操作台與其他子系統介面之通訊協定格式請參照圖 2-2: 行控中心 CMFT 伺服器軟體佈署圖。 各子系統詳記的通訊協定內容，將於 TC1-67106 通訊多功能操作台 - 維修手冊附件一提供。 CMFT and other subsystem interface protocol please refer

項次 No.	圖說/章節/項次 Drawing/ Chapter/ Item	審查意見 Review Comments	答覆 Reply Answer
			Figure 2 2: OCC CMFT SERVER Software Module Allocation. The contents of the communication protocol of each subsystem will be attached to the 1 of annex of the TC1-67106 – Communications Multi Function Terminal – Maintenance Manual.
B8	一般 GEN	說明接收 ATS 訊號之封包格式說明。 Describe the packet format from ATS signal.	說明如章節 2.6。 As described in Section 2.6.
B9	一般 GEN	增加 PI、車上火災…等之語音提醒功能。 Increase the sound reminder function for the PI/SI, the car fire ... and so on.	列車上的告警事件皆列為告警等級最高的告警設定。 The alarm events on the train are listed as the highest alarm setting.
B10	一般 GEN	說明 PA 語音增加及修改步驟之方式。 Describe how PA speech is added and modified.	1. CMFT 語音來源(音檔與清單)來自廣播主機，當語音清單有任何更新時，廣播主機將發送訊息至 CMFT 伺服器，CMFT 將進行語音檔清單同步流程。每組預錄語音(國、英、台、客)，都可以從 CMFT 主控台進行群組分類與提示內容修正，並且提供語音群組編輯的功能。 2. 語音檔錄製與匯入軟體的操作方法，請參考 TC1-6110 - 廣播系統 – 操作手冊 5.1 (5)。 1. The Voice source (sound file and list) of CMFT is placed on the PA Server. When the voice list has any updates, the PA Server will send a message to the CMFT server, CMFT will make a synchronization process to the voice list. Each group of pre-recorded voice (Chinese, English, Haka, Taiwanese) can be classificed into different group and be altered prompt content from the CMFT console. Also Operator can edit the voice

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			group table. 2. Please refer to TC1-61104 - Public Address System – Operation Manual 5.1 (5).
B11	一般 GEN	說明 PI 功能使用上之限制。 Explain the limitations of the PI function.	1. 列車上的無線電通訊功能，一台列車一次只能將三通 PI 進行混音，第四通以後的旅客緊急通訊會在 CMFT 主控台畫面顯示哪一台列車的哪一號，PI 要求通話若 PI 接通中，則 SI 亦無法與 OCC 建立語音通道，同樣在主控台顯示該通 SI 要求通話資訊。 2. 同一個基地台，最多可以容納 7 個無線電頻道，在沒有其他無線電通訊下，因為 PI 全雙工占據兩個頻道，至多可以接收 3 台車子的發布的緊急通話 3 trains x3 PI= 9 passengers)，SI 為半雙工至多可以接收 7 台車。已經接聽的 PI 混音, 掛斷後全掛,但該列車還未接聽的 PI 會回到等候佇列。 3. 通話時間依 TETRA 主機限制。來自列車上建立的語音通道，無論是否由多通 PI 混音，其通話時間由第一通接聽後開始計算，若為雙工通話(PI)無論是否發話中，目前系統預設值為 5 分鐘；若為半雙工模式(SI)下，若無人按下 ptt 按鈕進行發話，目前系統預設值為 30 秒。 4. 車子行駛中，車子移動到權限相同或更高且滿線的基地台區域，通訊將直接斷線。 1. For the Tetra function on the train, a train can only mix the three PI, the fourth pass after the emergency communication will be in the CMFT console screen which shows which one of the train, PI requirements If the PI is connected, the SI can not establish a voice channel with the OCC. In the same way,

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			the SI requires the call information. 2. One base station can accommodate up to seven radio channels. In the absence of other radio communication, because PI is full duplex to occupies two channels, a base station can accept up to three trains for Passenger Emergency Intercom's requests(3 trains x3 PI= 9 passengers), SI is half-duplex, up to 7 Service Intercom can accepted from the different 7 cars. Has been answered by the PI mix, hang up after the hook, but the train has not yet answered the PI will return to the waiting queue. 3. Talk time limits according to TETRA setting rule, the voice channel established from the train, whether or not by the multi-voice of PI mixing, the talk time timer would start after first call connection, for the duplex call (PI), The current system default default talk time is 5 minutes; for half-duplex mode (SI), if no one press the ptt button to speak, the current system default talk time limits is 30 seconds 4. When the car is driving and moves to next base station and communication has full connection caiblity with same authority or higher, authority, theb communication will be disconnected directly.
B12	一般 GEN	說明 CCTV 功能使用上之限制。 Explain the limitations of the CCTV function.	1. 由於主次碼流的比特率不一樣，無法以最大連線數去計算 CCTV 連線的極限數值，只能用剩餘可用碼流來算下次是否可以得到有效連線。 2. 影像輸出格式與頻寬請參照章節 2.2.2.7，由於每台攝影機的型號

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			不同實際計算的方式請參考 CCTV 的 FDR 文件。 3. OCC 只能收看列車上的即時影像，不能擷取列車上的錄影，若需要列車影像必須親自至列車上下載歷史影像檔。 4. CMFT 對測試軌和機廠的列車歸屬方是根據 ATS 訊號的列車位置來判定，若 ATS 訊號異常，則將連帶影響#13.#14 牆的選擇與輪播邏輯, 當列車進入測試軌或機廠時，CMFT 並未從 ATS 取得該資訊，則操作人員將無法於 CMFT 主控台上選擇該列車攝影機，意即無法將列車攝影機影片串流設定於#13.#14 牆。 5. 行控中心電視牆螢幕和 CMFT 監控螢幕尺寸規格皆為 22”，電視牆和 CMFT 監控螢幕的解析度需的要求為 1920 * 1080，螢幕比例為 4:3。 6. IP 攝影機影像壓縮效能可靠連線最大串流限制值合計 12Mbps (提供 6 個使用者)，計算如下： i. NVR 錄影(採用 MJPEG) 1 個使用者：計 2Mbps。 ii. PAO 雙螢幕即時影像(採用 H.264) 2 個使用者：計 4Mbps。 iii. OCC 即時影像(採用 H.264) 1 個使用者：計 2Mbps。 iv. 預留 2 個使用者(採用 H.264) ：計 4Mbps。 7. 在行控中心，每台電視牆螢幕將對應各自的螢幕控制器。每台螢幕控制器具有 8ch 影像解碼器及 8ch 影像編碼器。當要擴充電視牆時，既有螢幕控制器及影像分配器已無擴充埠，需再增加螢幕控制器及影像分配器。既有 L2 Switch 保留 port 25&26 為未來環狀第二/第

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			三階段擴充 L2 switch 堆疊串接所使用。既有 OCC NVR 錄影容量限制 32 路，未來環狀第二/第三階段尚餘 16ch 錄影容量可擴充，未來擴充可依架構容量需求再增加 NVR 即可。 1. Since the bit rate of the primary and secondary streams is not the same, the maximum number of connections can not be used to calculate the limit value of the CCTV connection. Only the remaining available stream can be used to check whether new connecting is accepted. 2. Image output format and bandwidth, please refer to chapter 2.2.2.7. About the actual calculation of each camera model, because multip type of cameras is different, Please refer to CCTV's FDR file. 3. OCC can only monitor the real-time video on the train, can not capture the historical video on the train.The historical vedio must be downloaded from the NVR on the train using the software. 4. For CMFT system, the train location determinationon is based on the ATS signal including to determine whether the location is on the test rail and the factory's area or not, if the ATS signal is abnormal, will be associated with # 13 # 14 wall selection and rotation logic abnormality, when the train into the test trail Or the factory, CMFT did not obtain the information from the ATS, the operator will not be able to select the train camera on the CMFT console, meaning that

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			the train camera video stream can not be set to # 13. # 14 wall. 5. OCC TV wall monitor and CMFT monitor screen sizes are all 22 ", resolution requirements of 1920 * 1080, the screen ratio of 4: 3. 6. IP camera video stream compression performance and reliable connection the maximum limit value sum 12Mbps (6 offers users) , calculated as follows: i. NVR video recorded (using MJPEG) 1 user: 2Mbps ii. PAO dual screen real-time image (using H.264) 2 users: 4Mbps iii. OCC real-time Image (using H.264) 1 user: 2Mbps iv. Reserved 2 users (using H.264): 4Mbps 7. In the OCC, each TV wall monitor will correspond to the respective monitor controller. Each monitor controller has an 8ch video decoder and an 8ch video encoder. When you want to expand the TV wall, both the monitor controller and video distributor has no expansion port, need to increase the monitor controller and video distributor. Existing L2 Switch reserved port 25 & 26 for second and third phase of circular line use. OCC NVR video size limit to 32, the second and third phase of circular line remaining 16ch video capacity can be expanded in the future to expand infrastructure capacity needs to follow to add NVR.
B13	第 2.4.3 節/P87 Section	通訊多功能操作台(CMFT)告警軟體管制的各通訊子系	各通訊子系統設備故障應由維護人員至現場判斷故障發生原因，並選

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	2.4.3/Page 87	統設備清單，所列設備項目亦常會傳送相關告警，請增加上述設備之『遠端排除故障功能』。 On the list of communication subsystems that are controlled by the alarm software of Communication Multiple Functional Terminal (CMFT), the listed equipment items will also send the relevant alarms. Please add the "remote troubleshooting function" of the above equipment.	擇適當的故障排除程序進行處理，故無法由通訊多功能操作台進行「遠端排除故障功能」；故障排除程序請參照各通訊子系統的維護手冊。 Each communication subsystem failure should be judged by the maintenance personnel to the scene to determine the cause of the failure, and select the appropriate troubleshooting procedures for processing, so it can not be "remote troubleshooting function" by CMFT; troubleshooting procedures, please refer to Each subsystem maintenance manual in the future.
B14	第 2.6.2 節/P97 Section 2.6.2/Page 97	通訊多功能操作台(CMFT)會收每個月台 20 分鐘內即將到站的列車訊息，但因夜間 23 時過後，列車為降低噪音量均會降速行駛，建議月台旅客資訊顯示器(DMD)之列車到離站顯示應能配合列車實際運轉速度，自動偵測後顯示於 DMD 以提供正確的列車到離站訊息與旅客觀看。 CMFT will receive train messages that the train will arrive within 20 minutes for each platform. However, after 23:00 pm, the train will slow down to reduce the noise level. It is recommended that the DMD should be able to match the actual running speed of the train, automatically detected the train datas to provide the correct train imformations	若是因為離峰時段等因素，該月台的下一班列車到站時間大於 20 分鐘，ATS 將會提供該月台目前最近將抵達的一台列車資訊，故 DMD 將依照 ATS 自動偵測與計算的結果顯示列車資訊。 If the next train arrives the station longer than 20 minutes due to factors such as the off-peak time period, ATS will provide the at least one information about recently arrived train. Therefore, the DMD will show the train information according ATS automatically detect and calculate the rules.

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		to the station message on DMD, Thus visitors can review from system.	
B15	第 2.2.1 節/P29 Section 2.2.1/Page 29	CMFT 主控台是否可查詢直線電話歷史通話訊息，請說明。 Whether the CMFT Console can inquire the history of a straight line call, please specify.	1. 可以透過係"操作紀錄"中查詢直線電話的相關歷史紀錄。包含來電時間，接聽時間與接聽方，以及三方通話等資訊。 2. 已更新第 2.2 節章節資料內容。 1. Through the "operation record" Page, the Console can query historical records for DLT. Including call time, answer time and the recipient, as well as three-party calls. 2. Updated data in Section 2.2.
B16	第 3.3.1 節/P126 Section 3.3.1/Page 126	預錄語音廣播是否可選擇播放次數，請說明。 Pre-recorded voice broadcast can choose to play the number of times, please specify.	已更新第 3.3.1/3.3.2/3.3.3 節章節資料內容，當進行即時口語或預錄語音廣播可以選擇播放次數為 1~99 次或無限次。 Updated data in Section 3.3.1 / 3.3.2 / 3.3.3, when the operator do a voice broadcasts can be set the times of playing for 1 to 99 times or unlimited times by the pre-record or oral voice.

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A1	一般 GEN	缺少 PBX CTS400，OCC 與 ROCC 之系統架構說明。 The system architecture of the PBX CTS400, OCC, and ROCC is missing.	CTS400 在系統架構中為個人來電助理又稱話務分配機，其功能就是為了達到值機員群響判斷的功能。可以看作是另一個 CTI 輔助。對 OCC 或 ROCC 來說屬於 DLT 內部系統，提供佇列電話提取時，判斷響鈴的對象的來電助理。可以參考 2.2.1.3 CTS400 對於等候佇列中的來電扮演的角色和行為。 CTS400 is a personal call assistant in the system architecture also known as traffic distribution machine, in order to achieve the group ringing function, as another CTI auxiliary. For OCC or ROCC, it belongs to the DLT internal system, and provide a queue telephone extraction and group ringing function. You can refer to 2.2.1.3.there describes the role of CTS400 in the waiting queue.
A2	一般 GEN	DMD 系統應增加 DMD 與 CMFT 間之運算控制伺服器，以達 PTS 規範內 CMFT 操作失效時，應有降級模式操作之設計機制需求。 DMD system should increase the DMD and CMFT between the control server to achieve the PTS specification CMFT operation failure, there should be downgrade mode operation of the design mechanism needs.	a. CMFT 伺服器失效時，因已無法從 ATS 接收任何列車訊息，因此無法進行列車到站資訊計算及播放。 b. 各車站 DCU 將持續播放設定好的排程訊息。 c. DU 在非排程時段將播放預設之政令宣導，以避免造成旅客恐慌。 d. CMFT 失效時無法操作 DMD 情況下，各車站營運將不受影響。 e. 有關於 CMFT 降級模式下

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			DMD 相關功能已補充於章節 2.9。 a. When the CMFT server operation fails, there is no way to get any train information from the ATS server, so it is not possible to calculate and play the information of the train arriving at the station. b. At each station, DCU will continue to play the scheduled message. c. DU in the non-scheduled period will play the default decrees to avoid causing panic. d. When the CMFT fails to operate that can't operate the DMD, train operation will not be affected. e. When the CMFT in degraded mode , DMD function please refer the Chapter 2.9.
A3	一般 GEN	DMD 操作內容應增加各設備健康狀態顯示。 DMD operation should increase the health status of each device.	依據 PTS 要求，各項設備健康狀態將顯示於 CMFT 系統告警功能列表之中。 According to the PTS requirements, the health status of the equipment will be displayed in the CMFT system alarm function list.
A4	一般 GEN	DMD 操作模式內容應增加大廳顯示器之運作模式。 DMD operation mode content should increase the operation mode of the DMD display at Station hall.	補充相關資料於章節 2.2.4.4 及 3.4.4。 Supplement the description at the Chapter 2.2.4.4 and 3.4.4.
A5	一般 GEN	系統運作時，應列出系統效能顯示。 When the CMFT system is operating, should display the system performance.	伺服器效能應統一於網路設備或伺服器監控來記錄效能及即時提出警告，CMFT 系統功能僅提供功能性操作，不具備設備效能顯示功能。 Server performance should be unified in the network equipment

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			or server monitoring to record performance and immediate warning, CMFT system functions only provide functional operation, do not have the equipment performance display.
A6	一般 GEN	資訊安全需求，系統資料應與公司帳號伺服器同步。 Base on information security requirements, CMFT user account data should be synchronized with the MRTC account server.	CMFT 使用者帳號僅提供環狀線使用者進行 CMFT 各項功能操作，且系統已規劃嚴格權限等級劃分，使用者密碼亦已符合捷運公司資訊安全規範，故不需與捷運公司帳號伺服器同步。 CMFT user account only provides TCL users to CMFT various functions, and the system has been planning strict privilege level division, user password has also been in line with MRTC information security regulations, so do not need to synchronize with the MRT account server.
A7	一般 GEN	請說明 OCC 與 ROCC，VCS 資料同步步驟及其操作設定方式。 Please explain OCC and ROCC, VCS data synchronization steps and their operation set the way.	在 OCC 的兩台 VCS 主機為同時運作且資料同步狀態，主機之間沒有切換問題 。CMFT 進行相關操作時會對兩台主機進行輪詢，若 A 主機不存在則詢問 B 主機，若 OCC 的主機都無法連線；ROCC VCS 主機僅做為備援，提供給 ROCC CMFT 主機同步使用。 In the OCC, two VCS hosts work and synchronizated for each other, there is no switching problem between the hosts. CMFT will connect the host by polling. If the A host does not exist, then ask the B host.Also. ROCC VCS host only as a backup, provided to the ROCC CMFT host synchronization use.
A8	一般 GEN	請說明 OCC 與 ROCC，VCS 資料切換轉移之完整步驟。 Please explain the complete steps of OCC and ROCC,	同上所述。 As mentioned above.

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		VCS data switchover.	
A9	一般 GEN	請說明接收 ATS 訊號之封包格式內容。 Please indicate the contents of the data packet format of the received ATS signal.	補充相關資料於章節 2.6。 Supplement the description at the Chapter 2.6.
A10	一般 GEN	請說明 OCC 與 ROCC，直線電話接聽轉接及加入通話之操作步驟。 Please explain the OCC and ROCC, the DLT transferring call and join the call operation steps.	補充相關資料於章節 2.2.1.5 及 2.2.1.6 與表格 3-5 與 3-6。 Supplement the description at the Chapter 2.2.1.5, Chapter 2.2.1.6, table 3-5 and table 3-6.
A11	一般 GEN	通訊多功能操作台資料儲存器，應採 RAID 10 架構。 CMFT storage server, should adopt RAID 10 architecture.	CMFT 伺服器及儲存器皆用 Raid 5 的架構，兼具 RAID 1 容錯及 RAID 0 速度之要求，已可滿足營運需求。 CMFT server and storage systems are used Raid 5 architecture, both RAID 1 fault tolerance and RAID 0 speed requirements, has been able to meet the operational needs.
A12	一般 GEN	通訊多功能操作台主控台，應採 RAID1 架構。 CMFT console computer, should adopt RAID 1 architecture.	CMFT 主控台僅連接伺服器進行系統功能操作，架構設計上並無儲存任何資料於主控台，故不需採用 RAID 架構來運作。 CMFT console only connected to the server for system function operation, the architecture design does not store any information on the console, so do not need to use RAID architecture to operate.
A13	P16 Page 16	圖 2-2：CMFT 伺服器軟體佈署圖中 CMFT 伺服器 A 與 B 之方塊圖並不相同，請說明營運主機切換至備援主機後，還有哪些功能？ Figure 2-2: CMFT server software layout diagram CMFT server A and B of the block diagram is not the same, please explain the operation of	f. 圖 2-2 中 OCC 設置之 A、B 主機均隨時提供線上服務，規劃採用微軟伺服器作業系統提供的叢集服務，達到風險及效能分散目的，在伺服器啟動時，預設規劃將 CMFT 系統各模組功能平均分散於兩台伺服器中，若其中一台伺服器失去功能時，叢集服務將自動移轉模組

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		the host switch to the standby host, what are the functions?	功能至另一台伺服器，以確保服務的高可用性。因此在啟動營運初始 A、B 兩台伺服器中之模組功能方塊並不相同。其中叢集容錯備援請參考章節 2.6.1。 g. 營運主機切換至備援主機後，CMFT 系統將提供與營運主機相同完整模組功能。請參考圖 2-3 : 備援行控中心 CMFT 伺服器軟體佈署圖。 a. Figure 2-2:The server A and B hosts are available online services at any time in the OCC, planning the use of Microsoft server operating system to provide the cluster service, to achieve the purpose of risk and performance, the server starts, the default planning CMFT system Module functions are evenly distributed across two servers. If one of the servers loses functionality, the cluster service automatically moves the module to another server to ensure high availability of the service. So the start of the operation of the initial A, B two modules in the module function block is not the same.Please refer to Section 2.6.1 for cluster redundancy. b. After the operating host switches to the standby host, the CMFT system will provide the same full module functionality as the operating host. Please refer to Figure 2-3:ROCC CMFT SERVER Software Module Allocation.
A14	2.2.4/P28 Section	牆上監視器順序掃描更新失敗異常障礙排除畫面內容為何？	當 CMFT 伺服器操作失敗時，降級模式將會自動啟動，此時牆上

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	2.2.4/Page 28	請說明。 The camera screen installed on the wall, in accordance with the order of the monitor monitor failure or abnormal, how to remove the obstacles? Please explain.	監視器#1 至#14 號電視將依照原設定順序播放各車站內攝影機之即時影像，#15 及#16 號電視將順序播放通電中的列車攝影機之即時影像；請參閱章節 2.8 說明。 When the CMFT server fails to operate, the degraded mode will be auto enabled, in this time screen number 1 to 14 on the wall, will be in accordance with the original order to display the station camera's real-time images, screen number 15 and 16 on the wall, will follow order to display all on the active train camera's real-time images, please refer the Chapter 2.8.
A15	3.3/P104 Section 3.3/Page 104	操作員進行 CMFT 廣播播放時，是否可於行控中心同步聽到語音播放？請說明。 When the operator is playing CMFT broadcast, can I hear the voice playback at the control center? Please explain.	操作員可於主控台喇叭同步聽到語音播放內容。 The operator can hear the voice playback content synchronously at the console speaker.
A16	3.4.3/P111 Section 3.4.3/Page 111	點矩陣顯示器-訊息排程編輯內容文字是否可選用不同字體，另字體是否可選擇不同大小顯示，請說明。 DMD - Can choose different fonts in scheduling editor? And font can choose different display size? Please explain.	CMFT 主控台可進行訊息排程字體選擇，系統提供三種字型為「標楷體」、「細明體」及「正黑體」；字體大小將會隨 DMD 播放時單行或兩行自動調整字體大小。 CMFT console can be selected for message scheduling font, the system provides three kinds of fonts for the "DFKai-SB", "MingLiU" and "Microsoft JhengHei", font size will be played with the DMD single or two lines automatically adjust the font size.
A17	3.6/P117 Section 3.6/Page 117	數位無線電派遣台若有手機持續佔用頻道，是否可進行佔用頻道之手機強制移除功能，請說明。 When there is a handheld	a. 數位無線電派遣台無強制移除功能。 b. 對於無線電頻道資源搶佔及優先順序，請參閱 TC1-6B301-數位無線電系統－最終設計

項次 No.	圖說/章節/項次 Drawing/ Chapter/ Item	審查意見 Review Comments	答覆 Reply Answer
		radio that continues to occupy the channel, Dispatcher system is there a mandatory removal function? Please explain.	3.3 輔助服務。 a. The Dispatcher System has no mandatory removal function. b. About radio resource and priority level set, Please refer to TC1-6B301 DIGITAL RADIO SYSTEM - FINAL DESIGN 3.3 Supplymentary Service.
A18	5.1/P127 Section 5.1/Page 127	CMFT 伺服器位於 ROCC 僅有一套設備，若切換至 ROCC 設備異常時，是否有備援措施？另儲存系統僅有一套設備，設備異常時資料儲存方式為何？請說明。 The CMFT server is located in the ROCC with only one set of equipment. Is there a backup if the ROCC device is switched off? And storage system only a set of equipment, When the equipment abnormal, system data storage when the way? Please explain.	a. CMFT 伺服器在 OCC 已使用高可用性(HA)架構，平時運作已採用兩台伺服器，ROCC 在 OCC 故障時才需進行移轉，所提供之服務亦為緊急運作，其已為備援措施，故規劃中無備援措施的備援措施。 b. 資料寫入於 OCC 時，規劃擬採用合併式複寫(MergeReplaction)方式同步寫入 ROCC 伺服器，故可提供高可用性及容錯的資料儲存服務。 a. The CMFT server has been using the High Availability (HA) architecture in the OCC, and two servers have been used for normal operation. The ROCC needs to be moved when the OCC fails. The services provided are also operational for emergency operations, Therefore, there are no alternative measures in the planning. b. When the data is written in the OCC, it is planned to write the ROCC server synchronously to the MergeReplaction mode, so it can provide high availability and fault-tolerant data storage service.

項次 No.	圖說/章節/項次 Drawing/ Chapter/ Item	審查意見 Review Comments	答覆 Reply Answer
A19	一般 GEN	CMFT 伺服器電源供應器是否有雙備援機制？若無雙電源設計，CMFT 伺服器 A 切換至 B 之切換時間？請說明。 Does the CMFT server have two power supplies as a backup mechanism? If not, how long does it take to move between A server and B server? Please explain.	CMFT 伺服器採用 Lenovo System x3650 M5，採用雙電源供應器設計；請參閱附件一、通訊多功能操作台伺服器 System spectifications 第 9 頁 Power supply。 CMFT server with Lenovo System x3650 M5, dual power supply design. Please refer to Appendix 1 CMFT Server System spectifications, Page 9 Power supply.
A20	一般 GEN	CMFT 伺服器資料庫是否需定期備份及重整？請說明。 Does the CMFT database need to perform regular backups or reorganizations? Please explain.	a. CMFT 伺服器資料庫除了在資料寫入時，同步和 ROCC 的主機進行資料備份外，於非營運時間時，亦將資料備份於指定硬碟空間，設計上以一個星期為基準，例如：每個星期日進行全備份，星期一至六進行增量備份，每次進行完整備份後將刪除前七天的備份檔，含一份完整備份與六個增量備份的檔案。 b. 由於資料庫重整的行為，將會影響線上資料庫存取效能，將設計每日末車班車後，自動檢查資料庫中索引碎裂程度與頁面飽和度的數據，若該數值超出理想值，將以告警方式在 CMFT 軟體上警示。再經由相關維護人員根據數據對 CMFT 資料庫進行重新組織索引或重建索引作業。一般建議在非營運時段進行以避免對線上作業造成影響。 a. In addition to synchronization in ROCC by merge transcation, the non-operating time, the database will be backed up in the specified hard disk space and designed to a week as a benchmark. For example, A

項次 No.	圖說/章節/項次 Drawing/ Chapter/ Item	審查意見 Review Comments	答覆 Reply Answer
			Full Backup is made on Sunday, and then an Incremental Backup is made during Monday to Saturday. After a Full Backup is done, the backup files before the day will be deleted, including the last full backup file and last six incremental backup files. b. Because the reorganization of the database will affect the database access performance online, CMFT system will check the Index Fragmentation and the Page Space Used data in the database after daily last train. If the values exceed the ideal value, a alarm message will be informed at CMFT Software. And then the relevant maintenance personnel reorganize or rebuild the indexs of CMFT database according alarm infromation.It is generally advisable to make the reconstructionduring non-operation to avoid any impacts on online.
A21	一般 GEN	請廠商將通訊多功能操作台(CMFT)伺服器主機與各工作站等磁碟設置為 RAID1 磁碟陣列模式，以利日後營運時系統易於維修、備份及還原，且可符合軟體資料異地 3 處儲放原則。 Please set the CMFT server and the workstation's disk as RAID1 disk array operation mode, in order to facilitate the future maintenance, backup and restore at the time of operation, and can meet the rules of software data storage	CMFT 資料儲存已有 OCC 及 ROCC 兩處，依據定期備份資料儲存方式，規劃將於 AD 伺服器開放空間儲存資料庫備份檔案，以符合軟體資料異地 3 處儲放原則。 CMFT data storage has two places OCC and ROCC, according to the regular backup data storage, planning will be open space in the AD server to save the database backup file the rules of software data storage in three locations.

項次 No.	圖說/章節/項次 Drawing/ Chapter/ Item	審查意見 Review Comments	答覆 Reply Answer
		in three locations.	

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1 範圍 SCOPE

1.1 目的 PURPOSE

本文件之目的係依第 01704 章捷運機電系統一般規畫第 1.7.6C 最終設計審查所述要求，確認通訊多功能操作台業已完成最終設計階段各項事項。

範圍包括了行控中心/備援行控中心 CMFT 伺服器、CMFT 主控台。主要目的乃提供各通訊子系統之整合，包括有直線電話系統、閉路電視系統廣播系統、點矩陣顯示器系統、數位無線電系統及列車通訊設備。

Based on Section 1.7.6C Finally Design Report request of Chapter 01704 MRT E&M system General Specification, purpose of this document is to illustrate Communications Multi Function Terminalthat have finished design in DDR phase

The scope includes the OCC/ROCC CMFT server and CMFT consoles. The main purpose is to provide the integration of each communication subsystems, includes DLT, CCTV, PA, DMD, TETRA and OTC.

1.2 適用性 APPLICABILITY

本文件提供臺北環狀線（第一階段）專案通訊多功能操作台系統最終設計。

This document provides the Final Design of the Communications Multi Function Terminalfor the Taipei Circular Line (Phase I) project

1.3 參考文件 REFERENCE DOCUMENTS

下列專案文件是此文件所參考的。任何下列參照之法規與標準規範將會依據一般規範 1.5.1 (4)提送。

The following are project documents which serve as references for this document. Any regulations and standards listed below shall be submitted according to GS 1.5.1 (4)

(1) 臺北捷運機電系統一般規範 01704 1.7.6C
TRTS E&M GS 01704 1.7.6 C

(2) CF610 機電系統標特別技術規範 16004 §2.4.7
CF610 E&M System PTS 16004 §2.4.7

1.4 名詞、略語、縮寫 TERMS, ACRONYMS AND ABBREVIATIONS

API	介面應用程式 Application Interface
AT	自動電話 Automatic Telephone
ATS	自動列車控制 Automatic Train System
ROCC	備援行控中心 Redundant Operation Control Center
BSS	主變電站 Bulk Supply Substation
BS	基地台 Base Station
CCTV	閉路電視 Closed Circuit Television
CDU	大廳點矩陣顯示器 Concourse Dot Matrix Display Unit

CER	通訊設備房 Communication Equipment Room
CMFT	通訊多功能操作台 Communications Multi-Function Terminal
CRS	控制室伺服器 Control Room Server
CTI	電腦電話整合 Computer Telephony Integration
DCU	點矩陣顯示器控制單元 DMD Control Unit
DLT	直線電話 Direct Line Telephone
DMD	點矩陣顯示 Dot Matrix Display
EMC	電磁相容性測試 Electromagnetic Compatibility
EMI	電磁干擾 Electromagnetic Disturbance
EPABX	電子數位用戶交換機 Electronic Private Automatic Branch eXchange
GE	超高速乙太網路 Gigabit Ethernet Network
GUI	圖形使用者介面 Graphic User Interface
HA	高可用度 High Availability
HMI	人機界面 Human-Machine Interface
IP	網路協定 Internet Protocol
LAN	區域網路 Local Area Network
MCU	主要控制單元 Main Control Unit
NVR	網路影像錄放影機 Network Video Recorder
OCC	行控中心 Operation Control Center
PA	廣播系統 Public Address
PAO	旅客詢問處 Passenger Advisory Office
PGIS	旅客導引資訊 Passenger Guide Information System
PDIS	旅客資訊顯示系統 Passenger Information Display System
PI	旅客對講機 Passenger Intercom.
SCADA	監控資料蒐集系統 Supervisory Control And Data Acquisition
SCN	控制交換中心 Switching Control Node
SDH	同步數位階層 Synchronous Digital Hierarchy
SI	服務對講機 Service Intercom.
SNMP	簡單網路管理協定 Simple Network Management Protocol
TAPI	電話存取協定介面 Telephone Access Protocol Interface
TETRA	陸地中繼無線電系統 Terrestrial Trunk Radio System
VCS	影像控制伺服器 Video Control Server

1.5 自前版次變更說明 DESCRIPTION OF CHANGES FROM PREVIOUS REVISION

■首次發行無內容 Not applicable for the first issue.

□已納入下列修訂 The following modifications have been introduced:

說明 **Description**	修訂段落 / 頁面 **Modified paragraph / page**
依業主審查意見更新 Revised in response to client’ s comments (YM-106T-12100-00)	新增章節 2.7。 修訂章節 2.2.2、2.3.4、2.6、3.2.5、附件 10 章節 4.5.1。 新增章節 7 Added section 2.7. Revise section 2.2.2, 2.3.4, 2.6, 3.2.5, and Annex 10, section 4.5.1. Added section 7

2 系統概述 SYSTEM DESCRIPTION

行控中心是環狀線所有通訊子系統的核心。行控中心系統整合涵蓋直線電話系統、點矩陣顯示器系統、閉路電視系統、廣播系統、時鐘系統、無線電通訊系統和列車通訊控制子系統，讓操作員能控制、管理和監看在行控中心、機廠、車站、和列車上各子系統狀態。

Operation Control Center is the “brain” of all communication subsystems along the Circular Line. OCC involves integration on DLT, DMD, CCTV, PA, Clock, TETRA and OTC subsystems, which let operator to control, manage and monitor the subsystems equipment in OCC, Depots, stations and on-train.

2.1 系統架構 SYSTEMARCHITECTURE

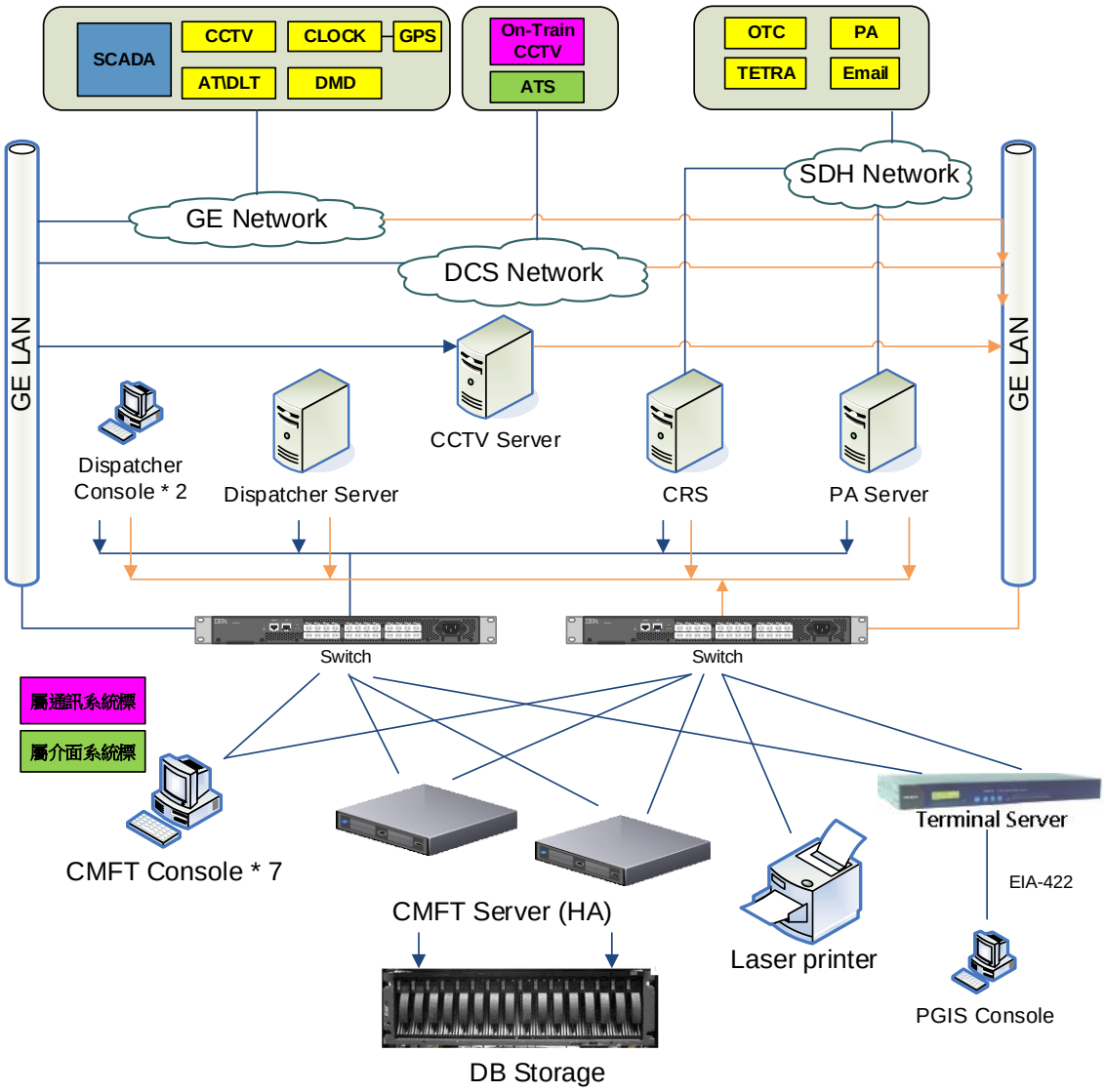

圖 2-1: 行控中心 CMFT 硬體與網路架構圖。

Figure 2-1: OCC CMFT Hardware & Network Architecture

2.1.1 系統架構說明 SYSTEM ARCHITECTUREDESCRIPTION

通訊多功能操作台架構是由以下部份組成：

The CMFT architecture at OCC and ROCC is composed by following parts：

(1) 通訊多功能操作台伺服器 CMFT Server

通訊多功能操作台伺服器將安裝在行控中心與備援行控中心通訊設備房。其中在行控中心的通訊多功能操作台伺服器設有熱備援機制，以提高系統可用性。通訊多功能操作台伺服器將安裝軟體如下：

The CMFT Server will be installed at OCC and ROCC CER room. The CMFT Servers are designed with hot-standby mechanism at OCC to improve system availability.The following software will be installedin the CMFT Server:

- MS SQL
- 通訊多功能操作台系統整合服務軟體 CMFT system integrated service software

(2) 儲存系統 Storage System

儲存系統是一個外接的磁碟陣列，通訊多功能操作台系統的資料庫資料將儲存於此。行控中心的兩台 CMFT 伺服器將會共同分享此儲存空間。

The Storage System is an external disk storage, the data of the CMFT system's database will be stored in here. The two CMFT servers at OCC will share the storage of this storage system.

(3) 通訊多功能操作主控台 CMFT Console

多部通訊多功能操作主控台將安裝在以下位置：

- 行控中心 5 部
- 備援行控中心 3 部
- 通訊設備房 1 部
- 測試軌控制室 1 部

CMFT Console will be installed in following places:

- OCC Room 5 sets
- ROCC Room 3 sets
- Maintenance Room 1 set
- Test Track Control Room 1 set

提供圖形的操作介面，讓使用者得以整合操作各通訊設備。通訊多功能操作主控台將安裝軟體如下：

Multiple CMFT Consoles will be installed in OCC and ROCC which provide graphical user interface that allows users to integrate operations of the communications equipment. The following software will be installed in the CMFT Console:

- 通訊多功能操作台系統整合操作軟體 CMFT system integrated operating software

(4) 終端伺服器 Terminal Server

終端伺服器將安裝在行控中心通訊設備房。終端伺服器透過 EIA-422 介面與位於行控中心的旅客導覽資訊系統控制台連接；CMFT 與旅客導覽資訊系統控制台間之通訊方式為單向通訊。

The Terminal Server will be installed at OCC CER room. The Terminal will use EIA-422 interface to connect to PGIS Console at OCC. The communication between CMFT and PGIS Console is a one way communication.

(5) 網路印表機 Network Printer

網路印表機將安裝在行控中心與備援行控中心，以滿足報表列印之需求。

The Network Printer will be installed at OCC and ROCC to meet the requirement for report printing.

(6) 網路交換器 Network Switch

網路交換器將安裝在行控中心與備援行控中心通訊設備房連接到 GE 交換器。其中在行控中心設有兩部網路交換器互為備援，以防止單一交換器故障導致系統無法運作。

The Network Switch will be installed at OCC and ROCC CER room which are connecting to GE switches. At OCC, there are two redundant Network Switches to prevent a single switch failure resulting system does not work.

2.1.2 軟體架構 SOFTWARE ARCHITECTURE

本節將說明通訊多功能操作台系統的系統平台、軟體工具以及軟體功能。

This section will describe the system platform, software tools and software functions in the CMFT.

2.1.2.1 系統平台 SYSTEM PLATFORM

(1) CMFT 伺服器 CMFT Server

作業系統 OS： Microsoft Windows Server 2012 R2

資料庫 Database： Microsoft SQL Server 2016

分析設計方式 Method of Analysis and Design：UML 2.0

軟體開發平台 Software Development Platform: Visual Studio.Net 2015
程式撰寫語言 Programming Language：C# 4.0, C/C++

(2) CMFT 主控台 CMFT Console
作業系統 OS：Microsoft Windows 10
軟體開發平台 Software Development Platform: Visual Studio.Net 2015
程式撰寫語言 Programming Language：C# 4.0, C/C++

2.1.2.2 軟體功能 SOFTWARE FUNCTIONS

通訊多功能操作台軟體功能如下表：
CMFT software functions are as below.

表 2-1:系統軟體功能
Table 2-1:System Software Functions

項次 Item	軟體模組 Software Module	軟體功能描述 Software Functions Description
1	直線電話軟體 DLT S/W	◆ 顯示由行控中心播出直線電話的狀態 Display the status of dialed call from OCC ◆ 顯示行控中心接聽直線電話的狀態 Display the status of receiving call at OCC ◆ 顯示播打至行控中心但為等候中的直線電話資料 Display the information of the coming call to OCC in the waiting quenue. ◆ 顯示所有直線電話通訊紀錄 Display all record for the process between OCC and extern DLT.
2	閉路電視軟體 CCTV S/W	◆ 選擇顯示牆上監視器 Select Wall-mounted Monitor to Display ◆ 變更牆上監視器輪播清單 Change the default carousel list for Video Image on Wall-mounted ◆ 預設牆上監視器輪播清單 Configure the default carousel list for Video Image on Wall-mounted

項次 Item	軟體模組 Software Module	軟體功能描述 Software Functions Description
		Monitor ◆ 歷史影像調閱 Historical Images Access ◆ 歷史影像下載 Historical Images Download ◆ 列車連動監看 On-Train interlocking monitor ◆ 車站連動監看 On-Station interlocking monitor ◆ PTZ 操作 Speed Dome Camera Operation ◆ EMAP 操作 EMap Operation ◆ 消防主機告警連動監看 Linked Alarm message from Fire host to interlocking monitor
3	廣播軟體 PA S/W	◆ 預錄語音廣播設定 Pre-recorded Broadcast(PA) Setting ◆ 即時語音廣播 Live Broadcast(PA) ◆ 廣播排程編輯 Broadcast(PA) Schedule Edit ◆ 自動廣播 Automatic Broadcast(PA) ◆ 排程廣播設備設定 Scheduled Broadcast(PA) Equipment Assigned. ◆ 廣播時段調整 Broadcast(PA) Daily Partition Adjustment
4	點矩陣顯示及旅客導覽資訊軟體 DMD&PGI S/W	◆ 列車到站資訊顯示 Train Information Display ◆ 預錄訊息顯示 Pre-recorded Message Display ◆ 即時訊息顯示 Real-time Message Display ◆ 訊息排程編輯與下載 Message Schedule Edit and Download ◆ 車站顯示器顯示模式設定 Mode Setting of Display Unit on Station ◆ 車站顯示器節能設定 Energy Saving Setting of Display Unit on Station

項次 Item	軟體模組 Software Module	軟體功能描述 Software Functions Description
5	OTC 軟體 OTC S/W	◆ 車上預錄語音廣播 Pre-recorded audio Broadcast On-Train ◆ 車上即時語音廣播 Live Oral Broadcast On-Train ◆ 服務對講機通訊 Service Intercom ◆ 旅客緊急通訊 Passenger Emergency Intercom ◆ 動態啟動旅客緊急通訊 Dynamic Activated Passenger Emergency Intercom ◆ 車載旅客資訊訊息廣播 Onboard PID Message Broadcast
6	數位無線電派遣台軟體 TETRA Dispatcher S/W	◆ 個別呼叫 Individual Call ◆ 群組呼叫 Group Call ◆ 短訊 SDS
7	ATS 介面軟體 ATS Interface S/W	◆ 接收列車到站資訊 Receive Train Arrival Information ◆ 接收營運列車資訊 Receive Train Operation Information ◆ 接收月台狀態資訊 Receive platform status Information ◆ 接收列車告警事件資訊 Receive alarm event on the train Information
8	操作軟體 HMI S/W	◆ 操作記錄 Operation Logging ◆ 操作報表輸出 Operation Process Report Exporting ◆ 告警報表輸出 Alarm Report Exporting ◆ 版本更新 Version Updating
9	告警監視軟體 Alarm Monitor S/W	◆ 設備告警等級設定 Level Setting for Equipment Alarm ◆ 告警顯示與記錄 Alarm Display and Logging

項次 Item	軟體模組 Software Module	軟體功能描述 Software Functions Description
		◆ 與 SCADA 系統資料交換 Data Exchange with SCADA system
10	對時軟體 Time Synchronization S/W	◆ 向母鐘對時 Time Synchronized from Master Clock ◆ 對時服務 Time Synchronization Service
11	使用者管理軟體 User Management S/W	◆ 使用者帳號控管 Account Management ◆ 登入/登出 Login/Logout ◆ 權限管理 Permission Management
12	程式管理軟體 Application Management S/W	◆ 程式監控 Application monitoring ◆ 系統權限設定 System authority Setting ◆ 系統快捷群組設定 System Group Setting for shortcut operation ◆ 不雅字防範設定 Prevent Indecent words Setting

2.1.3 軟體佈署圖 SOFTWARE MODULE ALLOCATION

本章說明 CMFT 系統軟體模組在 CMFT 設備上的配置及模組關係。

This chapter describes the allocation of CMFT system software module and CMFT equipments, and software module relationship.

(1) 下圖說明行控中心容錯移轉叢集伺服器與主控台的配置：

This diagram describes the configuration of cluster OCC CMFT server and CMFT console:

1. 軟體模組配置 Software module configuratio
2. 容錯移轉服務網址配置 Failover service IP configuration
3. 伺服器網址配置 CMFT Server IP configuration
4. 主控台網址配置 CMFT Console IP configuration
5. 連接埠配置 Port configuration

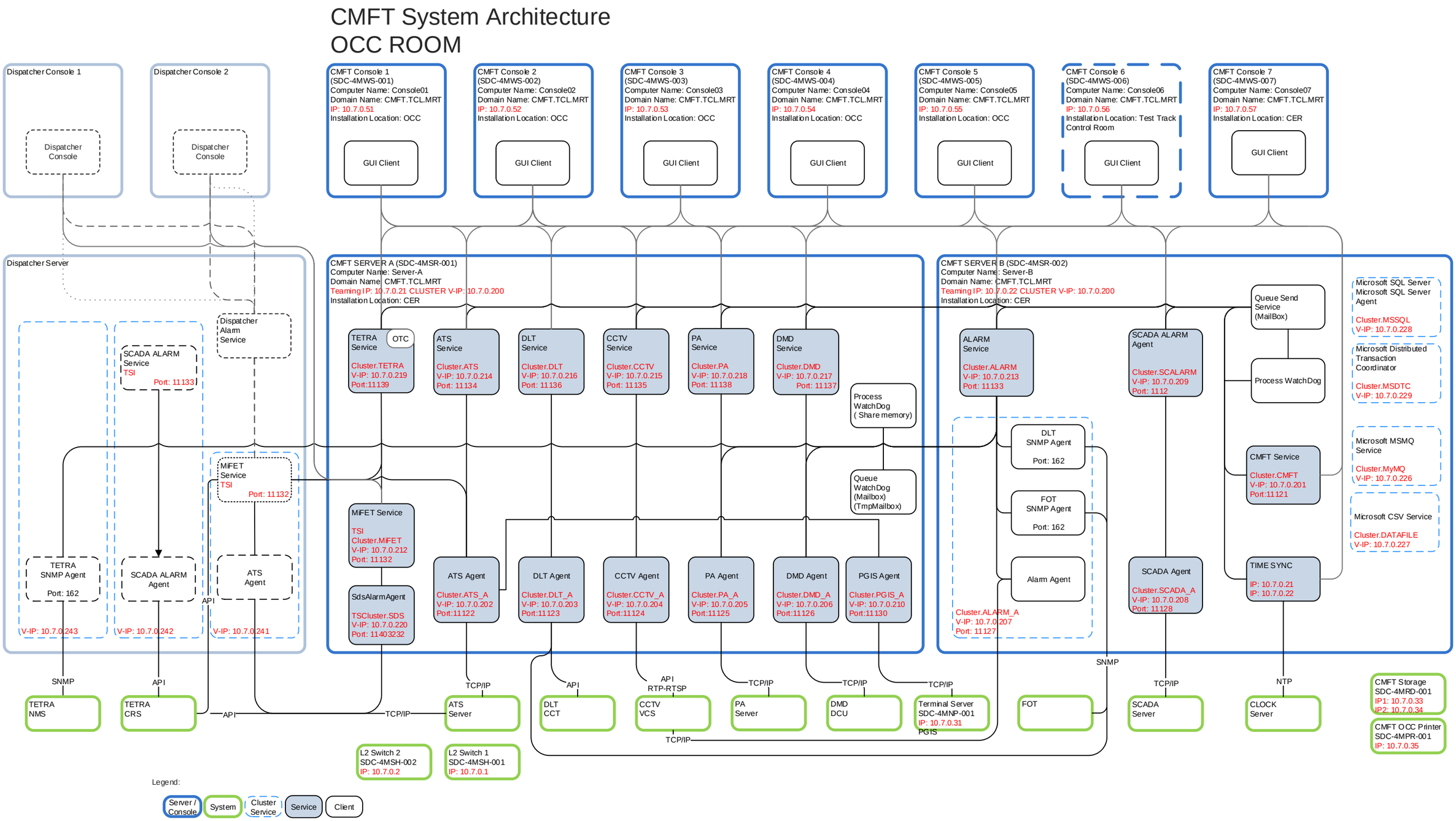

圖 2-2: 行控中心 CMFT 伺服器軟體佈署圖

Figure 2-2: OCC CMFT SERVER Software Module Allocation

(2) 備援行控中心 CMFT 伺服器 ROCC CMFT Server

下圖說明備援行控中心伺服器與主控台的配置：

The diagram below describes the configuration of ROCC CMFT server and CMFT console:

1. 軟體模組配置 Software module configuration、
2. 伺服器網址配置 CMFT server configuration、
3. 主控台網址配置 CMFT console configuration、
4. 連接埠配置 Port configuration。

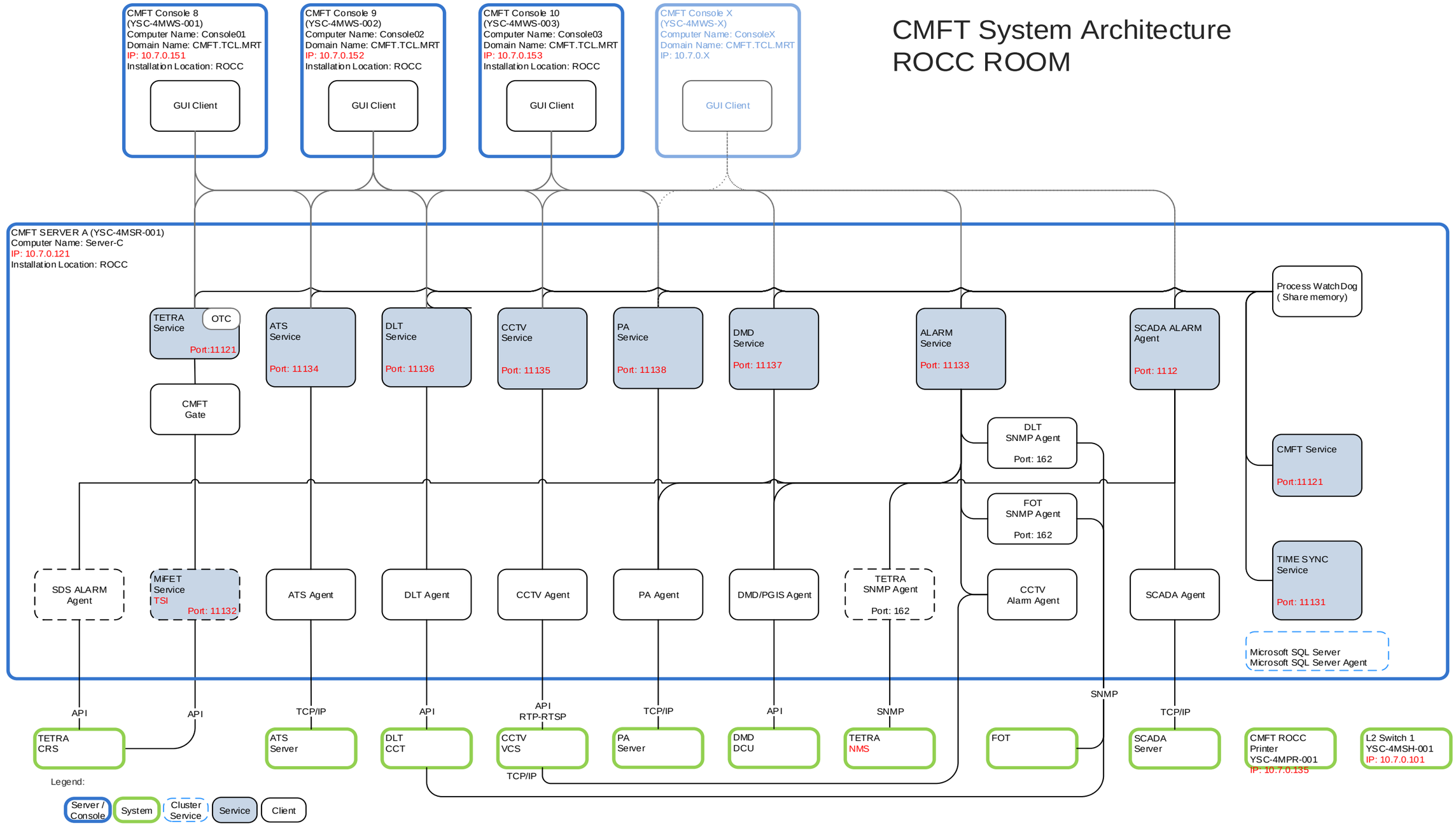

圖 2-3: 備援行控中心 CMFT 伺服器軟體佈署圖

Figure 2-3: ROCC CMFT SERVER Software Module Allocation

2.1.4 CMFT IP 位址規劃 CMFT IP PLANNING

CMFT IP 位址規劃依據 TC1-68208 通訊光纖傳輸系統 - IP 位址規劃，使用網段與位址規劃如下:

CMFT IP address plan is based on TC1-68208 Communication Fiber Optic Transmission System - IP Address Plan, CMFT network segment and IP planning table as below:

10 . 7 . 0 . <IP Plan>

通訊多功能操作台 CMFT
OCC/ROCC

表 2-1: 末端網路位址計劃表

Table 2-1: IP Planning Table

IP 位址	Equipment Type	設備類型
1~99	OCC	行控中心
1~9	Switch/Net	網路設備
10~19	Spare	備用
20~29	Server	伺服器
30~49	Equipment	設備
50~69	Console	主控台
70~99	Spare	備用
100~199	ROCC	備援行控中心
101~199	Same as OCC	規劃如行控中心
200~249	Service/Virtual-IP	服務/虛擬 IP

(1) 設備網路位址 Equipments IP

表 2-2: 設備網路位址

Table 2-2: Equipments IP

編號 No	網路位址 IP	設備 Equipment	安裝位置 Installation Location
1	10.7.0.1	(SDC-4MSH-001) L2 Switch 1	OCC CER
2	10.7.0.2	(SDC-4MSH-002) L2 Switch 2	OCC CER
3	10.7.0.21	(SDC-4MSR-001) CMFT SERVER A	OCC CER
4	10.7.0.22	(SDC-4MSR-002) CMFT SERVER B	OCC CER
5	10.7.0.31	(SDC-4MNP-001) Terminal Server	OCC CER
6	10.7.0.35	(SDC-4MPR-001) CMFT OCC Printer	OCC ROOM
7	10.7.0.51	(SDC-4MWS-001) CMFT Console 1	OCC ROOM
8	10.7.0.52	(SDC-4MWS-002) CMFT Console 2	OCC ROOM

編號 **No**	網路位址 **IP**	設備 **Equipment**	安裝位置 **Installation Location**
9	10.7.0.53	(SDC-4MWS-003) CMFT Console 3	OCC ROOM
10	10.7.0.54	(SDC-4MWS-004) CMFT Console 4	OCC ROOM
11	10.7.0.55	(SDC-4MWS-005) CMFT Console 5	OCC ROOM
12	10.7.0.56	(SDC-4MWS-006) CMFT Console 6	OCC ROOM
13	10.7.0.57	(SDC-4MWS-007) CMFT Console 7	OCC ROOM
14	10.7.0.101	(YSC-4MWS-001) L2 Switch	ROCC CER
15	10.7.0.121	(YSC-4MSR-001) CMFT SERVER C	ROCC CER
16	10.7.0.135	(YSC-4MPR-001) CMFT OCC Printer	ROCC ROOM
17	10.7.0.151	(YSC-4MWS-001) CMFT Console 8	ROCC ROOM
18	10.7.0.152	(YSC-4MWS-002) CMFT Console 9	ROCC ROOM
19	10.7.0.153	(YSC-4MWS-003) CMFT Console 10	ROCC ROOM

服務/虛擬網路位址 Service/Virtual-IP

表 2-3: 服務/虛擬網路位址

Table 2-3: Service/Virtual-IP

編 號 No	網址 IP	描述 Description
1	10.7.0.200	CMFT CLUSTER Service
2	10.7.0.201	CLuster. CMFT Services
3	10.7.0.202	CLuster. ATS Agent
4	10.7.0.203	CLuster. DLT Agent
5	10.7.0.204	CLuster. CCTV Agent
6	10.7.0.205	CLuster. PA Agent
7	10.7.0.206	CLuster. DMD Agent
8	10.7.0.207	CLuster. ALARM Agent
9	10.7.0.208	CLuster. SCADA Agent
10	10.7.0.209	CLuster. SDS ALARM Agent
11	10.7.0.210	CLuster. PGIS Agent
12	10.7.0.211	CLuster. CREATESHMAILBOX
13	10.7.0.212	CLuster. MiFET Services
14	10.7.0.213	CLuster. ALARM Service
15	10.7.0.214	CLuster. ATS Service
16	10.7.0.215	CLuster. CCTV Service
17	10.7.0.216	CLuster. DLT Service
18	10.7.0.217	CLuster. DMD Service
19	10.7.0.218	CLuster. PA Service
20	10.7.0.219	CLuster. TETRAOTC Service
21	10.7.0.226	CLuster. MSEEAGE Q
22	10.7.0.227	CLuster. DATAFILE
23	10.7.0.228	CLuster. MSSSQL
24	10.7.0.229	CLuster. MSDTC

2.2 介接資料結構說明 INTRODUCTION TO THE DESCRIPTION OF THE DATA STRUCTURE

CMFT 的大部分軟體模組的資料流架構隱含在 CMFT 主控台的操作中，本文主要將逐一分析與設計這些操作功能的系統資料流與傳輸規則，依此說明 CMFT 主要的系統架構。The data flow architecture forthe mostsoftware modules in CMFT areinvolved in the CMFT console operation, so the mainly described in this section will analyses and designs the system data flow and transfercation rules

for these operational functions to construct the framework for the system architecture.

2.2.1 直線電話 DIRECT LINE TELEPHONE

通訊多功能操作台整合直線電話的系統運作有六種情況將在本文中描述：

The system flow of CMFT integrates DLT, there are six scenarios will be described in this section

(1) 由行控中心撥出去電 Dial Call From OCC

(2) 由行控中心接聽來電 Receive Call at OCC

(3) 忙線時來電 Receive Call When Busy

(4) 掛線 For Call Termination

(5) 行控中心電話轉接出去 Transfer From OCC

(6) 多方通話 Confrence Call

這些是直線電話系統所提供之功能。操作員不能由 CMFT 主控台操作介面來進行直線電話的撥出或接聽動作。

These are the functions of DLT system. The operator cannot dial out or pick up a call from the CMFT console application.

可以透過”操作紀錄”中查詢直線電話的相關歷史紀錄。包含來電時間，接聽時間與接聽方，以及三方通話等資訊。亦提供將記錄匯出成 excel 檔的功能。

Through the "operation record" Page, the Console can query historical records for DLT. Including call time, answer time and the recipient, as well as three-party calls. Also provides the ability to export records into excel files

2.2.1.1 由行控中心撥出去電 話 DIAL CALL FROM OCC

由行控中心播出去電話資料流程圖如圖 2-4。

Dial call from OCC, the data flow diagram is shown in Figure 2-4

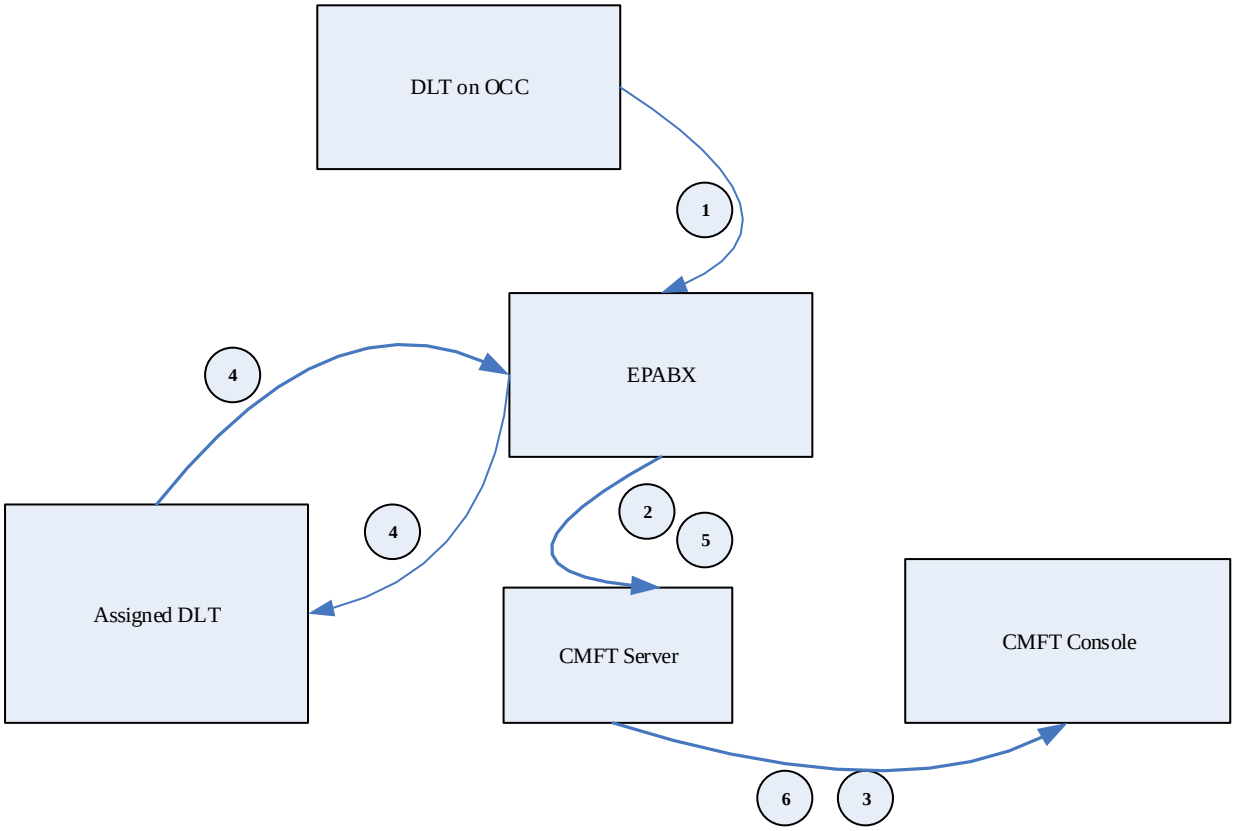

圖 2-4: 行控中心撥出去電資料流

Figure 2-4: Data Flow Diagram of Dial Call From OCC

直線電話- 行控中心撥出去電話流程說明

DLT – Dial call from OCC flow description

1. 操作員拿起 CMFT 主控台(CMFT Console)旁的直線電話(DLT)機聽筒，撥一個在車站或路邊 DLT 號碼。這通話需求便會傳送到電子數位用戶交換機系統(EPABX)。跟著建立通話需求從電腦電話整合電腦(CTI)與資料庫(D/B)中擷取部份狀態。
2. 通話需求中包含了使用狀態、發話端及收話端 ID 等資訊也將以 SDK 方式傳送給 CMFT 伺服器並記錄這些狀態的改變。
3. CMFT 伺服器將分派通話狀態和發話端 ID 給每個 CMFT Console，CMFT Console 的操作畫面隨即更新 DLT 來電清單。
4. 當電話接通後，EPABX 會傳送一個更改的通話狀態給 CMFT 伺服器。CMFT 伺服器將會記錄這些狀態的改變。
5. CMFT 伺服器將分派通話狀態和發話端 ID 給每個 CMFT Console，CMFT Console 的操作畫面隨即更新 DLT 來電清單。
6. 當 DLT 話機聽筒被拿起，EPABX 將傳送更新的通話狀態給 CMFT 伺服器。CMFT 伺服器將會記錄這些狀態的改變並且分派來電訊息和發話端 ID 給每個 CMFT Console，CMFT Console 的操作畫面隨即更新 DLT 來電清單。

1. A user pick up the DLT telephone set at CMFT Console and dial a caller ID of the DLT telephone set in station or wayside. Call request will be sent to the EPABX.A call establishment request will be sent to the CTI & TAPI and derive extension information from D/B.
2. CTI & TAPI will send CMFT Server with change of the call status by SDK message. Caller ID (both called and calling parties) will be included in the message also. CMFT Server will log the change of status.
3. CMFT Server will distribute the call status information, caller description and caller ID to the CMFT Consoles. CMFT Consoles will update the DLT status on the application.
4. Once the call channel is established, EPABX will send CMFT Server with change of the call status. CMFT Server will log the change of status.
5. CMFT Server will distribute the call status information to the CMFT Consoles. CMFT Consoles will update the DLT status on the application.
6. When the DLT telephone is picked up, EPABX will send CMFT Server with change of call status. CMFT Server will log the change of status and distribute the call status information to the CMFT Consoles. CMFT Consoles will update the DLT status on the application.

2.2.1.2 由行控中心接聽來電 RECEIVE CALL AT OCC

行控中心直線電話來電分為兩種。一種不經由話務分配機，透過實體號碼鍵對行控中心電話進行撥號，則直接由交換機通知指定的話機在非佔線中進行響鈴作業；以及經由話務分配機進行一對一指定號碼的通訊方式，該通來電將先進入電子數位用戶交換機系統(EPABX)中建立的等候佇列中，透過先進先出的提取，再確認是否直接對指定的號碼發出響鈴要求，或者進行群響。

There are two types of telephone calls in OCC, one by dialing the control center telephone through the physical number key without passing through the traffic distribution machine, and the switch is notified directly to the designated telephone (non-busy) to make a ring tone. By one-to-one designated communication via the traffic dispenser, the incoming call will first enter the waiting queue established in EPABX, and then use the first-in first-out extraction to confirm a specified number phone or non-busy group ring..

由行控中心接聽來電資料流程圖如圖 2-5。

Receive call from OCC, the data flow diagram is shown in Figure 2-4

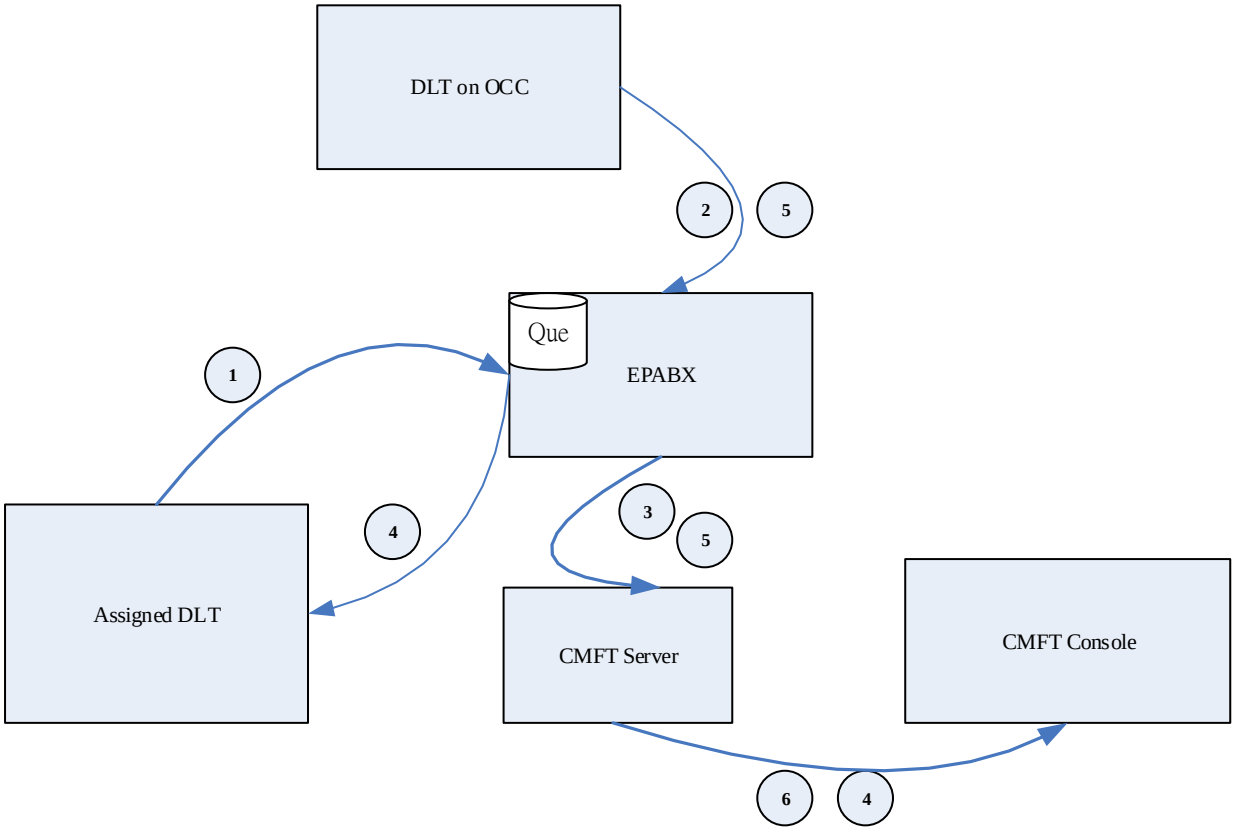

圖 2-5: 接聽來電資料流程圖

Figure 2-5: Data Flow Diagram of Receive Call At OCC

直線電話 - 行控中心接聽來電流程說明

DLT – Receive call at OCC flow description

1. 使用者拿起車站或路旁的直線電話(DLT)機聽筒。電子數位用戶交換機系統(EPABX)便會發起一個通話需求或者傳送至等候佇列後再進行提取判斷後響鈴。
2. EPABX 會傳送 ring tone 給在 CMFT 主控台(Console)旁的 DLT 電話機。
3. 跟著建立通話需求從電腦電話整合電腦(CTI)與資料庫(D/B)中擷取部份狀態。通話需求中包含了使用狀態、發話端及收話端 ID 等資訊也將以 SDK 方式傳送給 CMFT 伺服器並記錄這些狀態的改變。
4. CMFT 伺服器將分派通話狀態、來電內容和發話端 ID 給每個 CMFT console，CMFT Console 的操作畫面隨即更新 DLT 來電清單。
5. 當任一個 DLT 話機被操作員拿起接聽來電，EPABX 將傳送更新的通話狀態給 CMFT 伺服器。CMFT 伺服器將會記錄這些狀態的改變。
6. CMFT 伺服器將分派通話狀態給每個 CMFT Console，CMFT Console 的操作畫面隨即更新 DLT 來電清單。

1. A user pick up the DLT telephone set in station or wayside. The EPABX will initiate a call request or is sent to the waiting queue for extraction then ring.
2. EPABX will ring the DLT telephone sets in CMFT Console.
3. A call establishment request will be sent to the CTI & TAPI and derive extension information from D/B.
4. CTI & TAPI will send CMFT Server with change of the call status by SDK message. Caller ID (both called and calling parties) will be included in the message also. CMFT Server will log the change of status.
5. CMFT Server will distribute the call status information, caller description and caller ID to the CMFT Consoles. CMFT Consoles will update the DLT status on the application.
6. When the operator picks up the call at any of the DLT telephone sets, EPABX will send the updated call status to the CMFT Server. CMFT Server will log the change of status.
7. CMFT Server will distribute the call status information to the CMFT Consoles. CMFT Consoles will update the DLT status on the application.

2.2.1.3 忙線時來電 RECEIVE CALL WHEN BUSY

由 CMFT 主控台忙線時接聽來電的資料流程(假設所有 DLT 話機都通話中，在電子數位用戶交換機系統(EPABX)中會建立一個先進先出的等候佇列，一旦有可使用的 DLT 話機，便依等候佇列的先進先出原則進行分派)。當等候佇列大於 20 通時，其他的來電將會直接出項掛斷音，來電未接通狀態會被記錄下來。

When all the CMFT Console DLT Telephone sets are busy, a FIFO queue will be set up in the EPABX such that the call can be distributed once there is an available DLT telephone set.When the waiting call's amount more than 20 tones, a new call will be rejected and recored to log.

直線電話 - 行控中心忙線時來電流程說明

DLT – Receive call when all lines are busy at OCCflow description

1. 使用者拿起車站或路旁的直線電話(DLT)機聽筒。電子數位用戶交換機系統(EPABX)便會發起一個通話需求，若是該通電話為指派分機號碼則通電話會先與話務分配機偵(CTS400)建立通訊後，進入等候佇列。若來電方式為直接撥號至行控中心話機號碼而非話務分配機配對的分機號碼，則因不透過話務分配機將永不進入佇列，若同時僅由兩個直線電話進入佇列等候，目前會發生同時提取，導致一通被掛斷電話。
2. 跟著建立通話需求從電腦電話整合電腦(CTI)與資料庫(D/B)中擷取部份狀態。
3. 通話需求中包含了使用狀態、發話端及收話端 ID 等資訊也將以 SDK 方式傳送給 CMFT 伺服器並記錄這些狀態的改變
4. 行控中心中所有的 DLT 話機都佔線時，DLT 來電將依照先進先出原則按排放在等候佇列中若等候佇列中的電話大於 20 通則該通電話會直接進入 Busy Tone。

5. CMFT 主控台必須先結束目前的通話才能接起另一通來話。當席位連線中的電話掛電後，話務分配機偵(CTS400)測到此狀態，將會從等候佇列中提取電話，對目前所有未通話中的電話進行群響。
6. 群響狀態下，任何一個席位都可以接聽該電話，當電話被接通，群響將結束進入 2.2.1.2 的步驟 3 流程。CMFT 服器將會記錄這些狀態的改變。
7. CMFT 服器將分派通話狀態給每個 CMFT Console，CMFT Console 的操作畫面隨即更新 DLT 來電清單。
8. 當可用的 DLT 話機被操作員拿起接聽來電，EPABX 將傳送更新的通話狀態給 CMFT 伺服器。CMFT 伺服器將會記錄這些狀態的改變。
9. CMFT 伺服器將分派通話狀態給每個 CMFT Console，CMFT Console 的操作畫面隨即更新 DLT 來電清單。

1. A user pick up the DLT telephone set in station or wayside. The EPABX will initiate a call request. If the call is assigned an extension number, the phone will first establish a communication with the traffic dispatcher (CTS400) and enter the waiting queue. If the call is directly dialed to the control center telephone number instead of the extension number assigned to the traffic dispenser, it will never enter the queue because it will not enter the queue. If only two straight telephones are queued at the same time, resulting in a pass was hung up the phone after the the queue extracted.
2. A call establishment request will be sent to the CTI & TAPI and derive extension information from D/B.
3. CTI & TAPI will send CMFT Server with change of the call status by SDK message. Caller ID (both called and calling parties) will be included in the message also. CMFT Server will log the change of status.
4. Since all CMFT Console DLT telephone sets were occupied, the DLT telephone call will be queued in FIFO criteria or get the busy tone as 20 calls in queue.
5. CMFT console must hang up the current call in order to to pick up another call. When the CTS400 detects there are any idle status of the phone in the seat, it will retrieve the first call from the waiting queue, and do a group ring for all idel phone.
6. When TRAFFIC DISPENSER does a group ring for all idel phones, any idel phones can pick up to answer. After the phone is connected, the group ring will end. The connecting can refer to chapter 2.2.1.2's step 3 process. The CMFT server will record changes to these states..
7. CMFT Server will distribute the call status information, caller description and caller ID to the CMFT Consoles. CMFT Consoles will update the DLT status on the application.
8. When the operator picks up the call at the available DLT telephone sets, EPABX will send the updated call status to the CMFT Server. CMFT Server will log the change of status.
9. CMFT Server will distribute the call status information to the CMFT Consoles. CMFT Consoles will update the DLT status on the application.

2.2.1.4 掛線 FOR CALL TERMINATION

直線電話 - 掛線流程說明

DLT – Call termination flow description

1. 操作員掛上直線電話機聽筒，讓話機回復到待接狀態。傳送結束通話的訊號給電子數位用戶交換機系統(EPABX)。
2. 當 EPABX 接收到一個結束通話的訊號時，通話隨即結束。
3. EPABX 將傳送更新的通話狀態給 CMFT 伺服器。CMFT 伺服器將會記錄這些狀態的改變。
4. CMFT 伺服器將分派通話狀態給每個 CMFT Console，CMFT Console 的操作畫面隨即更新 DLT 來電清單。

1. Operator places the handset of the DLT telephone set back to its original position. A terminate call signal will be sent to the EPABX.
2. Call will be terminated when EPABX receiving a terminate call signal.
3. EPABX will send the updated call status to the CMFT Server. CMFT Server will log the change of status.
4. CMFT Server will distribute the call status to the CMFT Consoles to update the DLT list in the application.

2.2.1.5 由行控中心轉接電話 TRANSFER FROM OCC

直線電話- 行控中心轉接電話流程說明

DLT –Transfer call from OCC flow description

1. 操作員於電話中，按下轉接按鈕，該命令將至用戶交換機系統(EPABX)中，保留此通電話。
2. 行控中心操作員接著按下需要轉接的對象的電話號碼。
3. 聽到對方響鈴聲後，再按下連線按鈕。
4. 交換機系統將連接該通電話與保留中電話的新通話連線。
5. cmft 從電腦電話整合電腦(CTI)與資料庫(D/B)中擷取部份狀態。在紀錄裡寫入該轉接時間與相關資料

1. The operator on the phone, press the transfer button, the command will be to the user switch system (EPABX), keep the phone on hold state.
2. The operator dialed the transferred telephone number
3. After ring tone, press the connection button again.
4. The switch system will connect the incoming call and reserved phone to a new connecting.

5. CMFT server will log the process from CTI. Write the transfer time and related data in the record

2.2.1.6 由行控中心進行多方會談 CONFRENCE FROM OCC

直線電話- 行控中心多方會談流程說明

DLT –Confrence call from OCC flow description

1. 操作員於電話中，按下會議按鈕，該命令將至用戶交換機系統(EPABX)中，保留此通電話。
2. 行控中心操作員接著按下需要加入會議對象的電話號碼。
3. 聽到對方響鈴聲後，再按下連線按鈕。
4. 交換機系統將保留中電話加入本連接線中，進行多方會談。

1. The operator on the phone, press the conference button, the command will be to the user switch system (EPABX), keep the phone on hold state.
2. The operator dialed the transferred telephone number
3. After ring tone, press the connection button again.
4. The switch system will join reserved phones to this connecting line.

2.2.2 閉路電視 CLOSED CIRCUIT TELEVISION

車站、機廠及列車傳送至行控中心的即時影像串流採用 H.264 格式，經由 GE 網路或 DCS 網路以及閉路電視網路傳送至行控中心的螢幕控制器。

Real-time video stream of stations, depot and On-train encoded by H.264 format and transmit to OCC monitor controller via GE network / DCS network and CCTV network.

在行控中心，每台電視牆螢幕將對應各自的螢幕控制器。螢幕控制器將提供相關的 API/SDK 給通訊多功能操控台，以使通訊多功能操控台能經由 API/SDK 來控制螢幕控制器呼叫 1 或 4 路影像串流，並將所呼叫之單一或 4 路影像串流做 D/A 轉換，以輸出單一畫面的類比影像訊號給影像分配放大器，此轉換後之類比影像訊號並同時完成 H.264 及 MJPEG 格式編碼之 A/D 轉換，此轉換後之影像串流將提供通訊多功能操控台呼叫以顯示在通訊多功能操控台的 CCTV 專用監視器（H.264 格式編碼）以及提供行控中心 NVR 錄影使用（MJPEG 格式編碼）。

In OCC, each TV wall monitor corresponding to its exclusive monitor controller. Monitor controller will be provide the API / SDK to CMFT (communication multifunction terminal), so CMFT can control monitor controller to call single or four way video stream back via API / SDK, the monitor controller to D/A transfer and output an analog video signal to video distribution amplifier, and to convert this analog video signal to H.264 and MJPEG format simultaneously. This video

streaming is ready for CMFT console callback and display on CCTV monitor of CMFT console and to provide to NVR for record (MJPEG encoding format).

影像分配放大器將由螢幕控制器傳來的類比影像訊號輸出給閉路電視電視牆以及大型投影顯示器使用。

Video distribution amplifier will be distributing and providing the analog video signal to CCTV TV wall and LPD (Large Projecter Displayer).

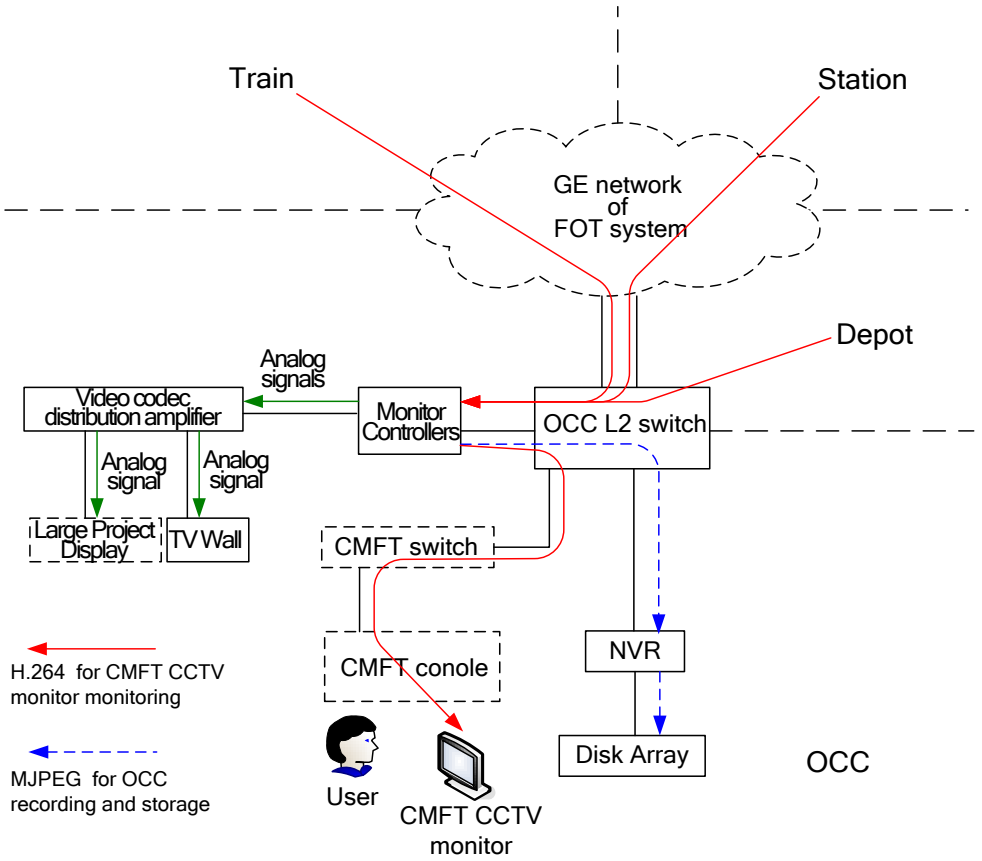

圖 2-6: 行控中心影像串流示意圖

Figure 2-6: Video stream schematic for OCC

通訊多功能操作台系統整合閉路電視的系統運作有下列情況將在本文中描述：

For the system flow of CMFT integrates CCTV, the following scenarios will be described in this section:

(1) 牆上監視器循序地影像掃瞄(圖 **2-7**)

Sequential Video Scanning On The Wall-mounted Monitors (Figure **2-7**)

(2) 監看牆上監視器(圖 **2-8**)

Monitoring Of Wall-mounted Monitor (Figure **2-8**)

(3) 更改牆上監視器影像(圖 **2-9**)

Change Video Images On Wall-mounted Monitor (Figure **2-9**)

(4) 更新備援列表設定(圖 **2-10**)

Update Scanning Sequence Configuration As Backup (Figure **2-10**)

(5) 列車連動監看(圖 **2-11**)

On-train Interlocking Monitor (Figure2-11)

(6) 影像串流與頻寬對照表(圖 **2-11**)

On-train Interlocking Monitor (Figure2-11)

2.2.2.1 牆上監視器循序地影像掃瞄 SEQUENTIAL VIDEO SCANNING ON THE WALL-MOUNTED MONITORS

由螢幕控制器向影像伺服器發出調出影像需求，伺服器端受理後回傳影像資料給螢幕控制器，顯示在牆上監視器上。圖 **2-7** 說明牆上監視器循序地影像掃瞄時的資料流向。

Monitor controller request video server for displaying the video image. After video server accepted the request, the video stream will send back to the monitor controller, and display on the wall-mounted monitor. For the sequential video scanning on the wall-mounted monitors, the data flow diagram is shown in Figure **2-7**.

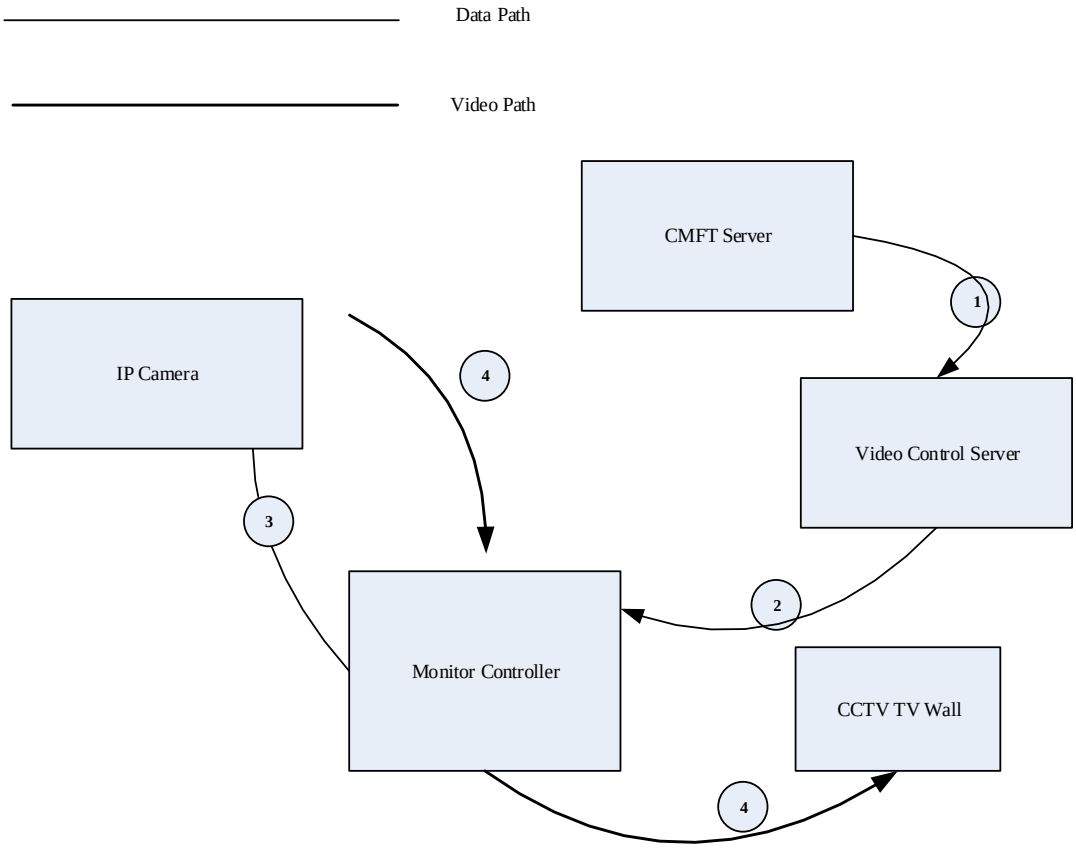

圖 2-7: 閉路電視 - 顯示牆上監視器影像資料流程圖

Figure 2-7:CCTV -Display wall-mounted monitor video image Data Flow Diagram

顯示牆上監視器影像流程說明

Display wall-mounted monitor video image flow description

1. CMFT 伺服器根據設定的輪播清單或事件，對影像控制伺服器(VCS)下達取的影像並投放在牆上監視器螢幕的指令。
2. 螢幕控制器(上牆器)接收到由影像控制伺服器(VCS)，依照倒推方式取得 VCS，傳來影像來源 URL。
3. 螢幕控制器發出要求給從 VCS 提供目前的牆上監視器的影像來源 URL 的影像資料。
4. 影像伺服器傳回指定攝影機影像給螢幕控制器並顯示在牆上監視器螢幕上。

1. The CMFT server sends the orders to VCS, that orders indicate which camera video to display on the the wall monitor screen according to rotation list or event list
2. Monitor Controller receives video source URL from VCS according to the countdown of the VCS.
3. Monitor Controller requests the video signal from the video server by using the video source URL.
4. Video server sends the video signal of the requested camera back to the Monitor Controller and displays on the wall-mounted monitor.

2.2.2.2 監看牆上監視器 MONITORING OF WALL-MOUNTED MONITOR

由通訊多功能操作台向影像伺服器發出調出影像需求，伺服器端受理後回傳影像資料給工作站，顯示在工作站的 CCTV 監視螢幕上。圖 **2-8** 說明監看牆上監視器的資料流向。

CMFT console request for display the video image of the selected wall-mounted monitor. After video server accepted the request, the video stream will send back to workstation and display on the CCTV monitor ofworkstation. For monitoring of the wall-mounted monitors, the data flow diagram is shown in Figure **2-8**

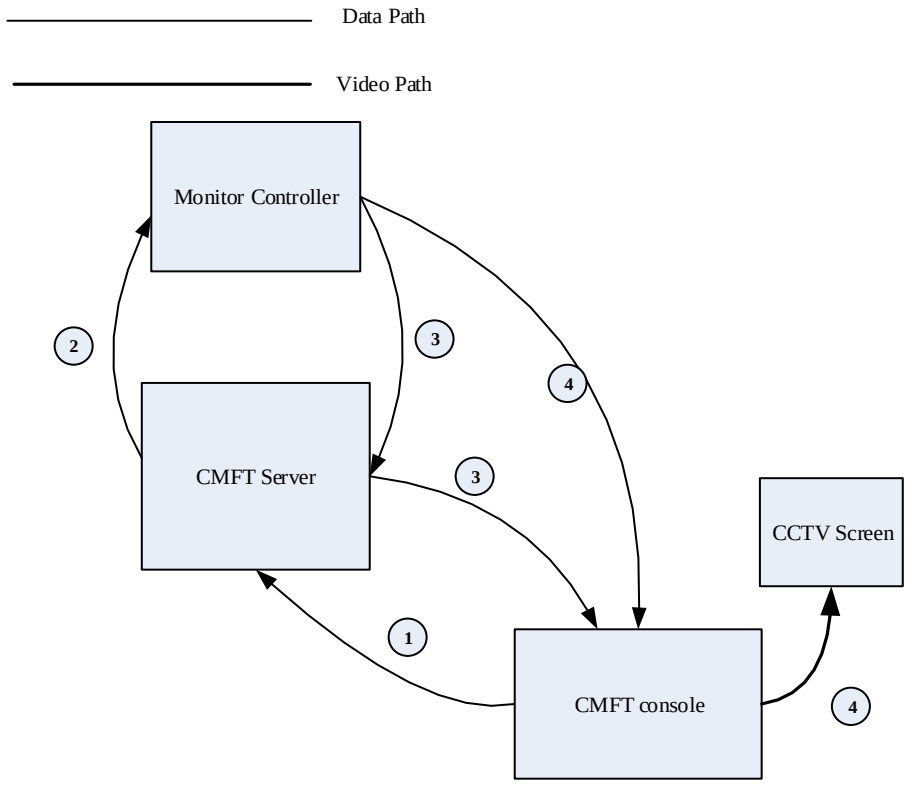

圖 2-8: 閉路電視 - 監看牆上監視器影像資料流程圖

Figure2-8: CCTV - Monitoring of wall-mounted monitor video image Data Flow Diagram

監看牆上監視器影像流程說明

Monitoring of wall-mounted monitor video image flow description

1. 操作員用 CMFT console 之應用程式選取某一個牆上監視螢幕，啟始牆上監視螢幕監看狀態。CMFT console 發出要求給通訊多功能操作台伺服器提供選擇的牆上監視螢幕編號。
2. 通訊多功能操作台伺服器發出要求給螢幕控制器(上牆器)提供選擇的牆上監視螢幕編號。通訊多功能操作台伺服器會記錄事件發生和狀態的改變。
3. 螢幕控制器(上牆器)通知通訊多功能操作台伺服器，且通訊多功能操作台伺服器傳送該需求的回覆給通訊多功能操作台。若提出的要求無效，失敗回覆就會發生。通訊多功能操作台伺服器會記錄事件發生和狀態的改變。
4. 螢幕控制器對同步選擇的牆上監視器影像串流至 CMFT 主控台，由主控台投射到第二螢幕上(CCTV 監控螢幕)。

1. An operator initiates the CCTV monitoring at the CMFT console by choosing a monitor among the wall-mounted monitors. CMFT console sendthe request to the CMFT server provided with the ID of the chosen wall-mounted monitor.

2. CMFT serversend the request to the VCS provided with the ID of the chosen wall-mounted monitor. CMFT server will log the event and change of status.
3. VCS sends acknowledgement to CMFT server, and CMFT server sends acknowledgement to CMFT console to notify the response to the request. Failure response may occur if the request is not valid. CMFT server will log the event and change of status.
4. Monitor Controller synchronizes the chosen monitor video signal on the wall-mounted monitors to CMFT Console, then CMFT Console will display the video on the second screen (CCTV screen).

2.2.2.3 變更牆上監視器影像 CHANGE VIDEO IMAGE ON WALL-MOUNTED MONITOR

由通訊多功能操作台向影像伺服器發出調出影像需求，伺服器端受理後回傳影像資料給工作站，顯示在牆上監視器螢幕上。圖 **2-8** 說明變更牆上監視器的資料流向。

CMFT console request for switching the video image on the selected wall-mounted monitor. After video server accepted the request, the video stream will send back to workstation and display on wall-mounted monitor. For changing the list of the wall-mounted monitors, the data flow diagram is shown in Figure **2-8**

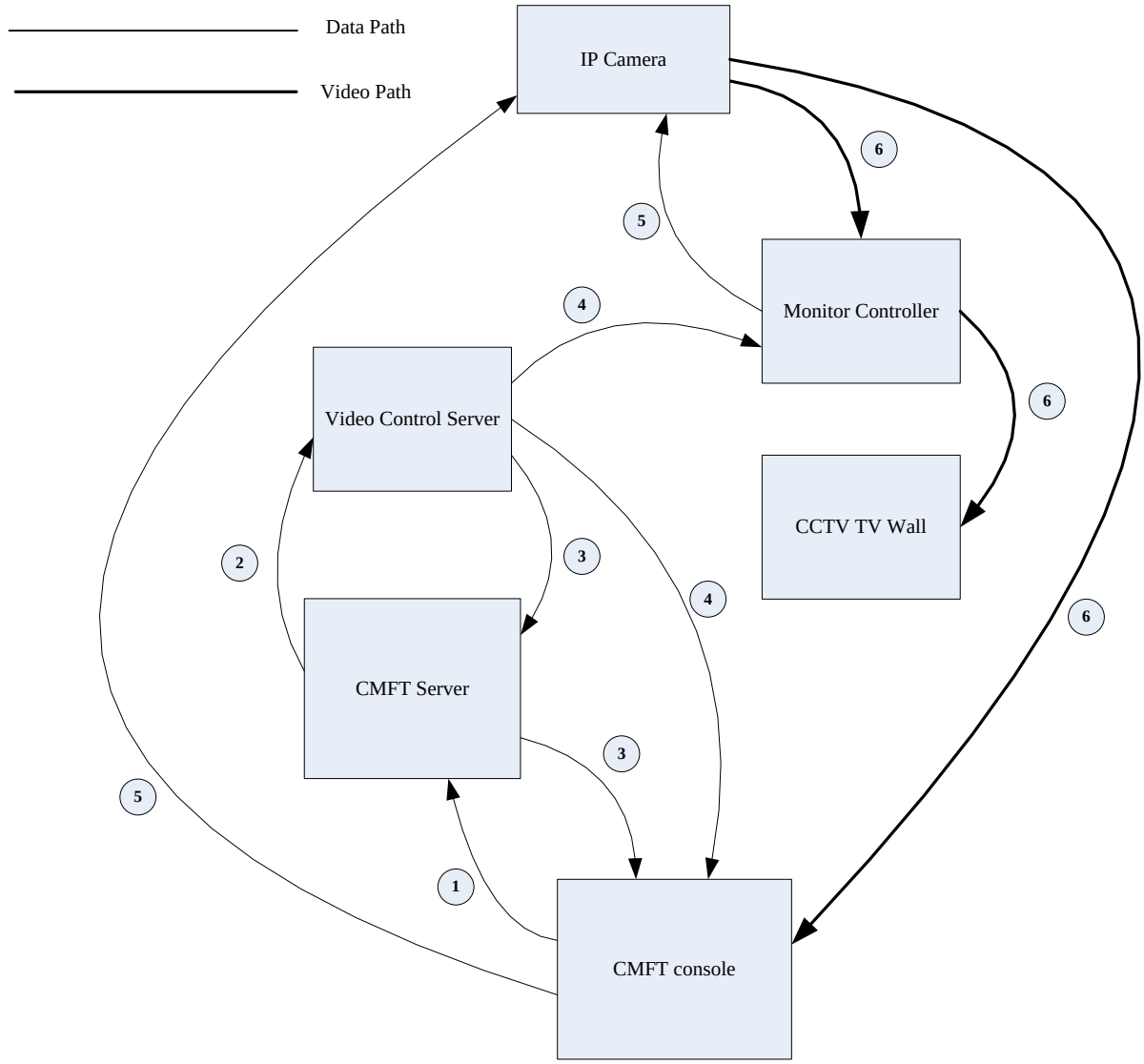

圖 2-9: 閉路電視 - 變更牆上監視器影像資料流程圖

Figure 2-9: CCTV -Change Video Image on Wall-mounted Monitor Data Flow Diagram

變更牆上監視器影像流程說明

Change video image on Wall-mounted monitor flow description

1. 操作員用 CMFT console 之應用程式選取某一個牆上監視螢幕，並試圖切換該牆上監視螢幕的影像。CMFT console 發出要求給 CMFT Server。
2. CMFT Server 發出要求給 VCS。CMFT Server 會記錄事件發生和狀態的改變。
3. VCS 通知 CMFT Server，且 CMFT Server 傳送該需求的回覆給 CMFT console。若提出的要求無效，失敗回覆就會發生。CMFT Server 會記錄事件發生和狀態的改變。

4. VCS 傳送影像來源 URL 給螢幕控制器，並要求相符的螢幕控制器管理這個需求處理。
5. 螢幕控制器對 IP Camera 發出要求傳送影像訊號。
6. IP Camera 傳送影像訊號至螢幕控制器並顯示在牆上監視器螢幕上。

1. An operator tries to switch the video image on a wall-mounted monitor by choosing a monitor among the wall-mounted monitors on the CMFT console application. CMFT console requests the CMFT server on the manual selection of the selected monitor.
2. CMFT server requests VCS on the manual selection of the selected monitor. CMFT server will log the event and change of status.
3. VCS sends acknowledgement to CMFT server, and CMFT server sends acknowledgement to CMFT console to notify the response to the request. Failure response may occur if the request is not valid. CMFT server will log the event and change of status.
4. VCS sends the video source URL to the Monitor Controller and requests the corresponding Monitor Controller to handle the request.
5. Monitor Controller requests for the video signal from IP Camera.
6. IP Camerawill send the video signal to the Monitor Controller and display on the wall-mounted monitor.

2.2.2.4 更新輪播列表設定 UPDATE SCANNING SEQUENCE CONFIGURATION AS BACKUP

由通訊多功能操作台向影像伺服器(VCS)發出掃瞄順序改變的需求。VCS 主機將在備援偵測下循序對螢幕控制器進行影像循序播放指令。

CMFT console request for changing the scanning sequence configuration on the VCS. The VCS host will take over the fuction for ordering the rotation list to Monitor Controller on backup situation.

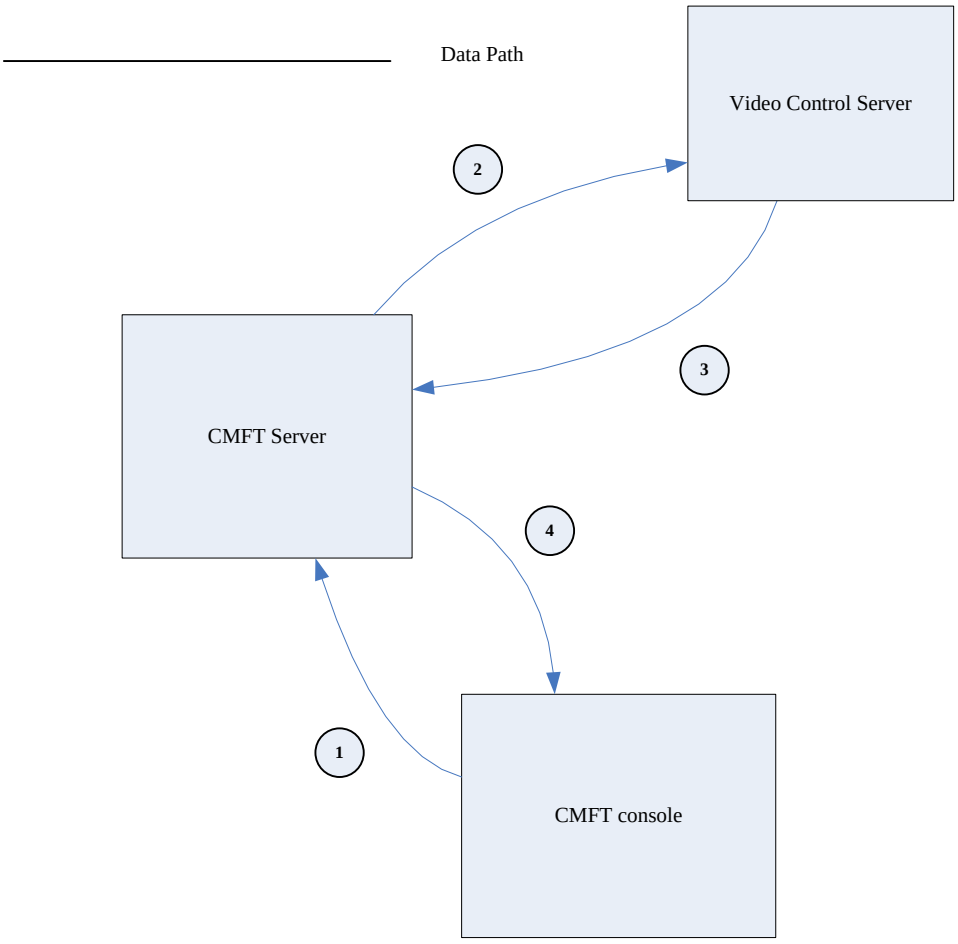

圖 2-10: 閉路電視 - 牆上監視器掃瞄順序的設定資料流程圖

Figure 2-10: CCTV - Wall-mounted monitor scanning sequence configuration Data Flow Diagram

牆上監視器掃瞄順序的設定流程說明

Wall-mounted monitor scanning sequence configuration change flow description

1. 操作員試圖重新設定掃瞄順序。CMFT console 將會傳送更新後資訊給 CMFT Server。

2. 若沒有違反系統設定，CMFT Server 將會為 VCS 更新本機的設定資料，並傳送資料給 VCS。CMFT Server 會記錄事件發生和狀態的改變。
3. 若是更新失敗，將顯示錯誤訊息。

1. An operator tries to re-configure the scanning sequence. CMFT console will send the updated information to the CMFT server.
2. If there is no violation on the configuration, CMFT server will update the local configuration data for the VCS and send the data to the VCS. CMFT server will log the event and change of status.
3. An acknowledgement will be sent to the CMFT console to notify the success / failure of the update.

2.2.2.5 機廠與測試軌監看 CAMERA ON DEPOT AND TEST TRACK MONITOR

當#13.#14 未手動建立固定的輪播清單時，CMFT 將自動將機廠與測試軌區間攝影機，包含進入該區域列車上的攝影機進行輪播 。

When # 13 # 14 does not manually establish a rotoational list, CMFT will automatically set the rotoational list to monitor the all camera image at Depot and test trail including the train.

2.2.2.6 列車連動監看 ON-TRAIN INTERLOCKING MONITOR

當發生下列情況時，列車閉路電視系統的連動功能將被觸發。

1. 站間停車
2. 列車偵煙器作動
3. 拉下緊急疏散裝置
4. 異常車門開啟
5. 車載控制器連結失敗
6. 車門內部把手被拉下
7. 車門功能障礙
8. 障礙物偵測異常
9. 脫軌檢測器偵測異常
10. 乘客按下緊急對講機
11. 司機員按下與行控通訊功能
12. 車廂 PI 動態啟動

若有第二部或更多列車觸發連動監看，閉路電視系統將輪播這些列車的影像。

(1) 顯示：

在列車觸發連動監看時，原則上列車對講機事件(1~9 項)影像顯示於 15 號牆上監視器，來自 ATS 列車事件(10~12 項)影像顯示於 16 號牆上監視器。若該電視牆有四個以上的列車事件將以輪播方式顯示。

(2) 操作：

操作員可以開啟列車觸發事件畫面或從#15.#16 牆，選擇事件來固定攝影機影像，或解除鎖定狀態。

(3) 解除：

操作員可以透過解除按鈕，將事件從連動監看中解除。且同時告警部分將自動執行回應流程(可關閉閃爍與音效)，回應人員為按下解除按鈕的操作員。當該電視牆沒有任何事件存在時，將回復手動或預設的輪播清單。

On-train CCTV system interlocking function will be triggered when below mentioned event.

1. Train speed = 0 and train is in between two stations
2. Smoke detector activated
3. EED pulled
4. Abnormal door opening
5. CC connection lost
6. DIH/DEH Pulled
7. Vehicle Door Obstructed
8. Obstacle Detetctor Activated
9. Derailment Detector Activated
10. Emergency Intercom used by passengers
11. Driver push the communication button with OCC
12. Actived PI to monitor the voice from train

If there are two or more train triggered interlocking function. CCTV will be carousel display these images.

(1) Display:

The vedio related the event from train's intercom (10~12 items) triggerd will display on #15. Above 1~9 items, the data from ATS, the the vedio related the events will display on #16. If there are more than four train triggered interlocking function. CCTV will be carousel display these images.

(2) Operate:

Operator can open on-train interlocking event screen or Instant image monitoring for #15.#16 screen to fixed selected camera image or release the fixed status.

(3) Dismiss:

Operator can click the dismiss button to remove the selected camera from carousel list. And at the same time alarm will do a ack-flow (Close the flash and alarm sound) by the operator who push the Dismiss button.

When there is no event in the video wall, a manual or dufault carousel list will be returned.

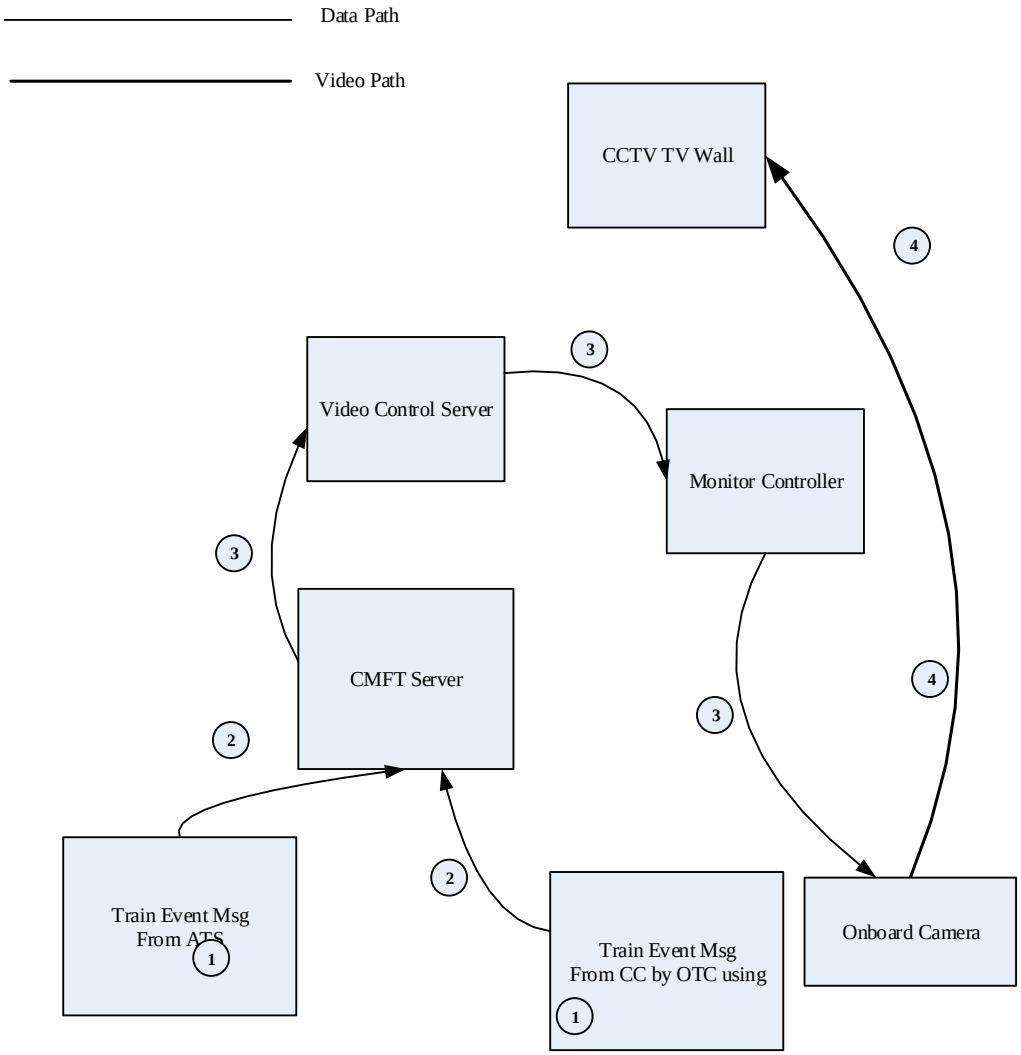

圖 2-11: 閉路電視–列車連動監看資料流程圖

Figure2-11: CCTV –On-train Interlocking Monitor Data Flow Diagram

列車連動監看流程說明

Change video image on Wall-mounted monitor flow description

1. 列車發生 PI/SI 呼叫或其他如緊急把手或火災預警設備啟動等事件。
2. PI/SI 呼叫將透過 TETRA 系統傳送至 CMFT Server，其他緊急事件由 ATS 傳送相關訊息至至 CMFT Server。

3. CMFT 伺服器，依照#15.16 牆設定規則計算相關車組，其中每個告警至少涵蓋 1 個攝影機至多 12 個，再將車組指定的攝影機影像來源的 URL，採用四分割設置發給 VCS 再轉發至負責的螢幕控制器上。
4. 螢幕控制器依據影像伺服器提供影像來源 URL 對 IP Camera 發出取得該車影像訊號要求。

1. Train occurs PI / SI call or other events such as emergency handle or fire alarm equipment.
2. The PI / SI call will be sent to the CMFT Server via the TETRA system. Other emergencies will be sent by the ATS to the CMFT Server.
3. CMFT server calculate the relevant vehicle group according to the # 15.16 wall setting rules , each of which covers at least 1 cameras up to 12, and then CMFT tramsmit the camera image source URL to screen controller, using four split.
4. Monitor Controller requests for the video signals for the trainby providing the video source URLswhich are provided by the Video Server.

2.2.2.7 影像串流種類與頻寬對照 DESCRIPTION OF VIDEO STREAM TYPES AND BANDWIDTH COMPARISON

系統將於頻寬限制內提供優於原規範之解析度，其各攝影機之設定為 720x480 之解析度。

The resolution will higher than original which was defined in PTS under the limit of bandwidth. The resolution of Camera and display will be 720 x 480.

閉路電視系統之 IP 網路攝影機支援 H.264 以及 MJPEG 兩種串流輸出，這兩種串流依據輸出需求可個別估算出其使用頻寬，說明如下：

IP camera of CCTV system support two kinds of streaming H.264 and MJPEG output, the bandwidth of these two streams based on output requirement can be calculated and described as below:

表 2-2: IP 網路攝影機影像串流頻寬對照表
Table 2-2: IP camera video stream bandwidth comparison table

網路攝影機編碼格式 IP camera encode format	輸出需求 Output requirement	頻寬估算 Bandwidth calculate	說明 Description
H.264	640*480 10 fps	800kbps	列車即時影像傳輸至行控中心監控需求 Bandwidth requirement of one of on-train

網路攝影機編碼格式 IP camera encode format	輸出需求 Output requirement	頻寬估算 Bandwidth calculate	說明 Description
			real-time video stream transmit to OCC for surveillance.
	640*480 30 fps	2 Mbps	每一支被本地端監控工作站及遠端監控之行控中心(備援行控中心)所選取之車站、機廠之網路攝影機即時影像傳送頻寬需求 Bandwidth requirement of one of station and Depot real-time video stream selected and transmit by local surveillance workstation and OCC.
MJPEG	640*480 5 fps	2Mbps	每一支列車網路攝影機傳送給列車 DVR 錄影之影像頻寬需求 The bandwidth requirement of each On-Train camera transmits to On-Train DVR for recording.
	640*480 10 fps	2Mbps	每一支車站、機廠之網路攝影機傳送給本地端車站、機廠 NVR 錄影之影像頻寬需求 The bandwidth requirement of one of station and Depot camera video stream transmits to local NVR for recording.

(1) 假設行控中心電視牆監視車站之 12 台螢幕(編號 1 到 12)，全部使用 4 分割畫面且同時即時監控同一車站，此車站網路攝影機經 L2 switch 再經 FOT 系統之 GE 網路所傳送至行控中心之 L2 switch 總即時監控影像串流頻寬為 96 Mbps

Suppose to the 12 sets monitors of OCC TV wall (No: 1 to 12) all use 4 split screen to monitor the same station, the total bandwidth of real-time video stream transmitted to OCC from station cameras through L2 switch via GE network of FOT system is 96 Mbps.

12 螢幕 * 4 分割 * 2Mbps = 96 Mbps

12 monitors* 4 split * 2 Mbps = 96 Mbps

(2) 行控中心電視牆監視機廠之 2 台螢幕(編號 13 及 14)全部使用 4 分割畫面即時監控機廠(含測試軌上與軌上列車)，此機廠傳送至行控中心 L2 switch 即時監控影像串流頻寬為最大為 16 Mbps。

Suppose to the 2 sets monitors of OCC TV wall (No:13 and 14) all use 4 split screen to monitor Depot (including Test Track and the Trains on the Test Track)

the status, the most bandwidth of real-time video stream transmitted to OCC CCTV L2 switch from Depot NVR is 16 Mbps.

2 螢幕 * 4 分割 * 2Mbps = 16 Mbps

2 monitors * 4 split * 2 Mbps = 16 Mbps

(3) 行控中心電視牆監視列車之 2 台螢幕(編號 15 及 16)依據需求全部使用 4 分割畫面即時監控列車，此列車傳送至行控中心 L2 switch 即時監控影像串流頻寬為 6.4 Mbps。

Suppose to the 2 sets monitors of OCC TV wall (No:15 and 16) all use 4 split screen to monitor Train, the total bandwidth of real-time video stream transmitted to OCC CCTV L2 switch from On-Train DVRs is 6.4 Mbps

2 螢幕 * 4 分割 * 800kbps = 6.4 Mbps

2 monitors * 4 split * 800kbps = 6.4 Mbps

(4) 備援行控中心的 CMFT CCTV 監視器的即時影像串流，是由 CMFT 操控台控制螢幕控制器呼叫攝影機的影像串流而來。同時間最多有 3 台 CMFT 操控台可提供操作。CMFT 操控台在完成螢幕控制器呼叫攝影機的影像串流的指令之後，CMFT 操控台將呼叫該攝影機的影像串流並在 CCTV 監視器顯示，螢幕控制器將同時提供所呼叫攝影機的影像串流之類比影像訊號給大型投影顯示器（LPD）

Real-time video stream of ROCC CMFT CCTV monitor is coming from of IP camera that called by monitor controller and the monitor controller that controlled by CMFT console. There are 3 seats CMFT console can operating at the same time.

(5) 車站及機廠（不含測試軌，測試軌影像不需回傳行控中心）每路即時影像串流為 2 Mbps（640*480/30fps）

Each bandwidth of station and Depot (not include test track, video stream of test track no need to transmit to OCC) video stream is 2 Mbps (640*480/30fps).

(6) 列車每路即時影像串流為 800 kbps（640*480/10fps）。列車即時影像由於備援行控中心並無專屬的兩個列車螢幕可同時顯示共 8 支攝影機的即時影像，因此在備援行控中心的 CMFT 操控台 CCTV 監視器僅能顯示列車其中一台 DVR 所提供的 4 分割影像。

Each bandwidth of Train video stream is 800 kbps (640*480/10fps). According to ROCC do not have two exclusive monitors of train to display a total of eight cameras real-time video streams, the ROCC CCTV monitor of CMFT console can only display the 4-split video stream from one DVR of the train.

每台列車有兩台 DVR 分別安裝於 A 車節及 B 車節，A 車節 DVR 負責收容每車節前方之攝影機共 4 支，B 車節 DVR 負責收容每車節後方之攝影機共 4 支。

Each Train have two DVR installed at head and tail car, A car DVR is responsible for hosting totally 4 cameras that each camera is located in front of each car, B car DVR is responsible for hosting totally 4 cameras that each camera is located in rear of each car.

2.2.3 廣播(車站) PUBLIC ADDRESS(STATION)

通訊多功能操作台系統整合廣播系統的系統運作有下列情況將在本文中描述：

For the system flow of CMFT integrates PA, the following scenarios will be described in this section:

(1)預錄語音廣播 Pre-recorded Broadcast

(2)即時語音廣播 Live Broadcast

(3)廣播時段設定 Broadcast Partition Setting

(4)排程廣播 Scheduled Broadcast

(5)自動廣播 Automatic Broadcast

2.2.3.1 預錄語音廣播 PRE-RECORDED BROADCAST

圖 **2-12** 說明車站廣播預錄語音時的資料流向。

For pre-recorded broadcasting, the data flow diagram is shown in Figure 2-12.

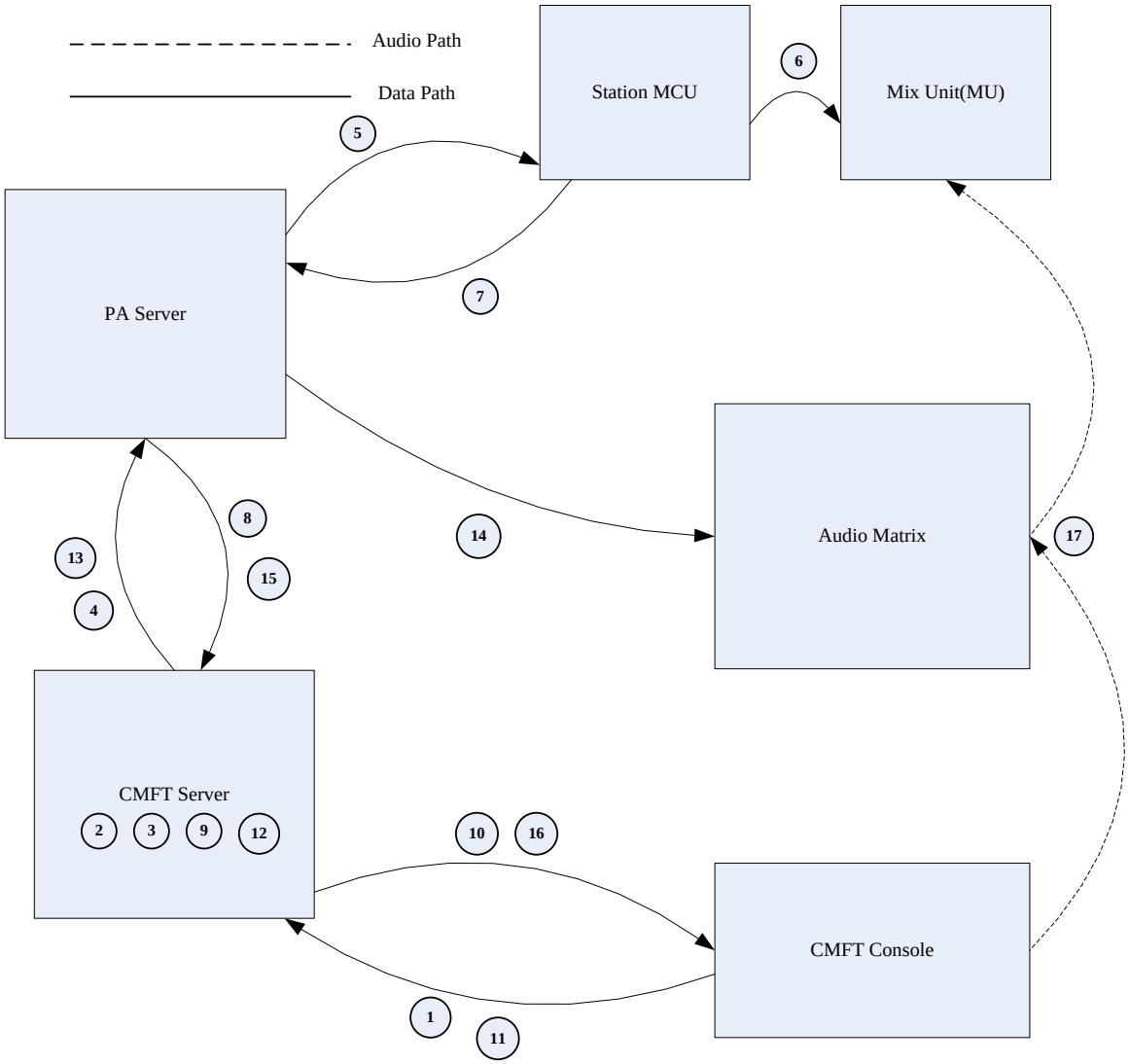

圖 2-12: 車站預錄語音廣播資料流程圖

Figure 2-12: Station Pre-recorded Broadcast Data Flow Diagram

車站預錄語音廣播流程說明

Station pre-recorded broadcast flow description

1. 操作員對被選取廣播播放地點發起一個預錄語音廣播。
2. CMFT 伺服器藉由 ICD 定義取得被選取車站主要控制單元的 ID。
3. CMFT 伺服器記錄由廣播系統提出的需求事件。
4. CMFT 伺服器藉由第二步驟所取得的 MCU ID 傳送一個訊息給廣播伺服器要求建立起兩端間的語音傳送通道。
5. 廣播伺服器依據 CMFT 伺服器要求傳送一個訊息給車站主要控制單元要求建立起兩端間的語音傳送通道。
6. 車站主控單元檢查系統的使用狀況並在混音器和喇叭播放迴路建立起一個連線。

7. 車站主控制單元通知行控中心廣播伺服器語音通道已建立。
8. 廣播伺服器通知行控中心 CMFT 伺服器語音通道已建立。
9. CMFT 伺服器記錄發生的事件。
10. CMFT 控制台接收到從 CMFT 伺服器通知。
11. 操作員從廣播選擇區塊中選擇”預錄語音訊息”和從下拉清單裡挑選預錄語音。CMFT 控制台將傳送選定的預錄語音 ID 給 CMFT 伺服器。
12. CMFT 伺服器取得預錄語音 ID 的檔案名稱。
13. CMFT 伺服器將傳送控制指令到廣播伺服器以切換到相符的預錄語音訊息頻道。
14. 廣播伺服器傳送 CMFT 伺服器要求的指令到語音矩陣控制器。
15. 廣播伺服器通知預錄語音訊息頻道已切換完成。
16. CMFT 控制台接收到由 CMFT 伺服器通知跟著開啟廣播按鈕。
17. 操作員按下播放按鈕開始播放預錄語音訊息。聲音廣播是在同步數位階層(SDH)網路上傳送透過被選定車站的喇叭發佈。

1. Operator initiates a pre-recorded message broadcast on selected destination.
2. CMFT server retrieves the ID of the selected Station MCU in the ICD protocol.
3. CMFT server logs the PA request event.
4. CMFT server sends a request to the PA server to ask for the establishment of the voice path.
5. PA server sends the CMFT’s request to Station MCU to ask for the establishment of the voice path.
6. Station MCU checks the availability of the system and establishes a connection between the input interface of the Mix Unit (MU) and the Speaker Loops.
7. Station MCU acknowledges the establishment of the voice path to the PA Server.
8. PAserver acknowledges the establishment of the voice path to CMFTserver.
9. CMFTserver logs the event.
10. CMFT console receives acknowledge from CMFTserver.
11. Operator selects “pre-recorded message” from the selection box, and select the pre-recorded message from the drop-down list. CMFT console will send the choice and message ID to CMFTserver.
12. CMFT server retrieves the filename of the message ID.
13. CMFT server sends a control command to PA server to switch to the corresponding channel for pre-recorded message.
14. PA server sendsthe command requested by CMFT server to Audio Matrix.
15. PA server acknowledges the establishment of the voice path to CMFT server.
16. CMFT consolereceives acknowledge from CMFTserver and enable the broadcast button.

17. Operator clicks the broadcast button to start playback the pre-recorded message. Voice broadcast on the SDH and announce on the speaker of the chosen station.

2.2.3.2 即時語音廣播 LIVE BROADCAST

圖 **2-13** 說明車站廣播即時語音時的資料流向。

For live broadcasting, the data flow diagram is shown in Figure **2-13**.

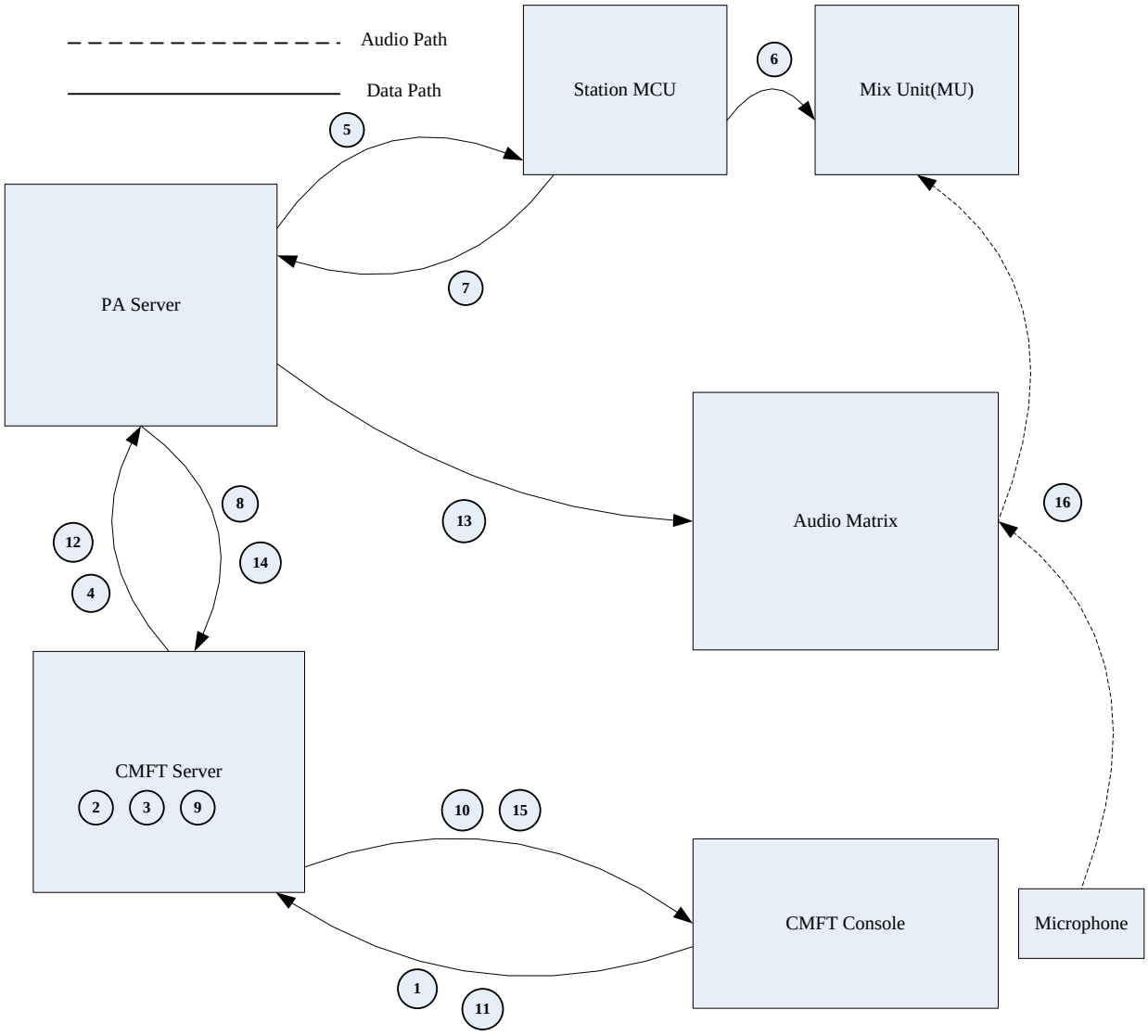

圖 2-13: 車站即時語音廣播資料流程圖

Figure 2-13: Station Live Broadcast Data Flow Diagram

車站即時語音廣播流程說明

Station live broadcast flow description

1. 操作員對被選取廣播播放地點發起一個即時語音廣播。

2. CMFT 伺服器藉由 ICD 定義取得被選取車站主要控制單元的 ID。
3. CMFT 伺服器記錄由廣播系統提出的需求事件。
4. CMFT 伺服器藉由第二步驟所取得的 MCU ID 傳送一個訊息給廣播伺服器要求建立起兩端間的語音傳送通道。
5. 廣播伺服器依據 CMFT 伺服器要求傳送一個訊息給車站主要控制單元要求建立起兩端間的語音傳送通道。
6. 車站主控單元檢查系統的使用狀況並在混音器和喇叭播放迴路建立起一個連線。
7. 車站主控制單元通知廣播伺服器語音通道已建立。
8. 廣播伺服器通知 CMFT 伺服器語音通道已建立。
9. CMFT 伺服器記錄發生的事件。
10. CMFT 控制台接收到從 CMFT 伺服器通知。
11. 操作員從廣播選擇區塊中選擇”即時語音訊息”。CMFT 控制台將傳送即時語音廣播要求給 CMFT 伺服器。
12. CMFT 伺服器將即時語音廣播要求傳送給行控中心廣播伺服器。
13. 廣播伺服器將傳送控制指令到語音矩陣控制器以切換到相符的廣播頻道。
14. 廣播伺服器通知預錄語音訊息頻道已切換完成。
15. CMFT 控制台接收到由 CMFT 伺服器通知跟著開啟廣播按鈕。
16. 操作員按下麥克風上的發話按鈕，然後開始透過麥克風說話。聲音廣播是在同步數位階層(SDH)網路上傳送透過被選定車站的喇叭發佈。

1. Operator initiates a live message broadcast on selected destination.
2. CMFT server retrieves the ID of the selected Station MCU in the ICD protocol.
3. CMFT server logs the PA request event.
4. CMFT server sends a request to the PA server to ask for the establishment of the voice path.
5. PA server sends the CMFT’s request to Station MCU to ask for the establishment of the voice path.
6. Station MCU checks the availability of the system and establishes a connection between the input interface of the Mix Unit (MU) and the Speaker Loops.
7. Station MCU acknowledges the establishment of the voice path to the PA Server.
8. PAserver acknowledges the establishment of the voice path to CMFTserver.
9. CMFTserver logs the event.
10. CMFT console receives acknowledge from CMFTserver.
11. Operator selects livebroadcast from the selection box. CMFT console will send the live broadcast request to CMFTserver.
12. CMFT server sendslive broadcast request to PA server.
13. PA server will send a control command to Audio Matrix to switch to the corresponding channel.

14. PA server acknowledges the establishment of the voice path to CMFT server.
15. CMFT console receives acknowledge from CMFTserver and enable the broadcast button.
16. Operator clicks the microphone push-to-talk button and start talking through the microphone. Voice broadcast on the SDH and announce on the speaker of the chosen station.

2.2.3.3 廣播時段設定 BROADCAST PARTITION SETTING

為了符合環保噪音法規，且能在不同條件下達成廣播效果，CMFT 提供可以針對不同時間進行廣播時段音量等級設定。圖 **2-14** 說明廣播設定的資料流向。

In order to comply with environmental noise regulations, and to avoid the broadcast effect in different conditions i, CMFT provide the function to distinghish different time for the broadcast volume level settings. The data flow diagram is shown in **2-14**.

廣播時段設定分成以下三種：

1. 尖峰時段；
2. 離峰時段；
3. 夜間時段。

The broadcast time setting is divided into the following three types::

1. Peak Time;
2. Off-Peak Time
3. Night Time;

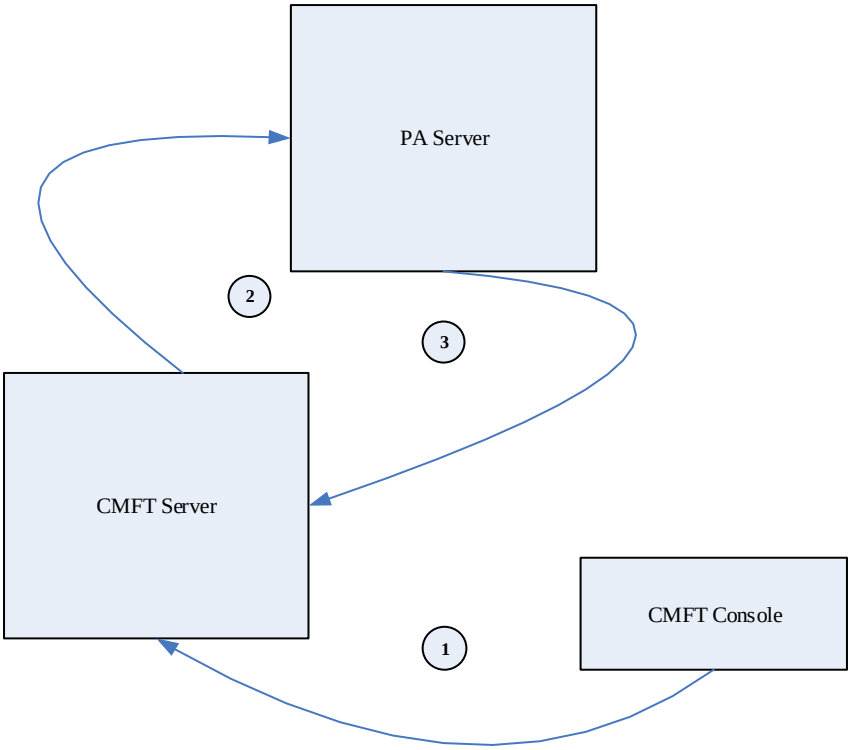

圖 2-14:廣播時段設定資料流程圖

Figure 2-14: Broadcast Time Setting Data Flow Diagram

廣播時段設定流程說明

Broadcast Time Setting flow description

1. 從 CMFT 主控台設定各車站的廣播區段。
2. CMFT 伺服器藉由 ICD 定義取得被選取車站主要控制單元的 ID，發送廣播時段設定的通訊協定。
3. PA 伺服器回應設定結果與狀態。

1. Set the broadcast section of each station from the CMFT master.
2. CMFT server retrieves the ID of the selected Station MCU from the ICD protocols ans sends a request to the PA server to ask for th broadcast time setting.
3. PA server sends back the result and status for the setting.

2.2.3.4 排程廣播 SCHEDULED BROADCAST

圖 **2-15** 說明排程廣播時的資料流向。

For scheduled broadcasting, the data flow diagram is shown in Figure**2-15**.

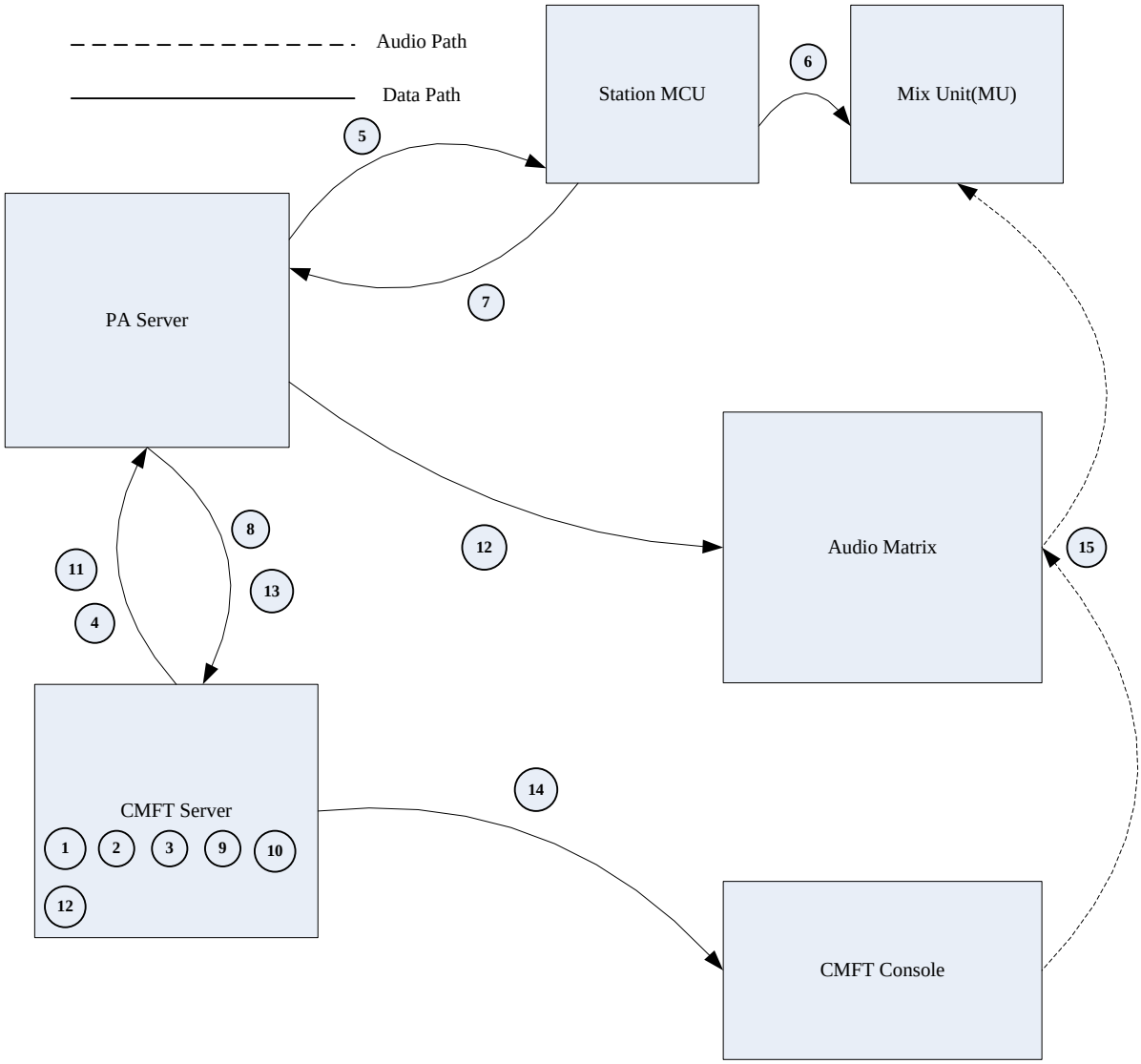

圖 2-15: 排程廣播資料流程圖

Figure 2-15: Scheduled Broadcast Data Flow Diagram

排程廣播流程說明

Scheduled broadcast flow description

1. CMFT 伺服器掃瞄廣播排程表，準備對符合時間的排程進行排程廣播。
2. CMFT 伺服器藉由 ICD 定義取得被選取車站主要控制單元的 ID。
3. CMFT 伺服器記錄由廣播系統提出的需求事件。
4. CMFT 伺服器藉由第二步驟所取得的 MCU ID 傳送一個訊息給廣播伺服器要求建立起兩端間的語音傳送通道。
5. 廣播伺服器依據 CMFT 伺服器要求傳送一個訊息給車站主要控制單元要求建立起兩端間的語音傳送通道。

6. 車站主控單元檢查系統的使用狀況並在混音器和喇叭播放迴路建立起一個連線。
7. 車站主控制單元通知行控中心廣播伺服器語音通道已建立。
8. 廣播伺服器通知行控中心 CMFT 伺服器語音通道已建立。
9. CMFT 伺服器記錄發生的事件。
10. CMFT 伺服器根據廣播訊息代碼從對照表取得預錄語音 ID 的檔案名稱。
11. CMFT 伺服器將傳送控制指令到廣播伺服器以切換到相符的預錄語音訊息頻道。
12. 廣播伺服器傳送 CMFT 伺服器要求的指令到語音矩陣控制器。
13. 廣播伺服器通知預錄語音訊息頻道已切換完成。
14. CMFT 伺服器傳送預錄語音檔案名稱給 CMFT 控制台要求播放預錄語音訊息。
15. CMFT 控制台開始播放預錄語音訊息。聲音廣播是在同步數位階層(SDH)網路上傳送透過被選定車站的喇叭發佈。

1. CMFT server scans the PA schedule table, and prepares to perform scheduled message broadcast on the schedule which meets the time.
2. CMFT server retrieves the ID of the selected Station MCU from the ICD protocols.
3. CMFT server logs the PA request event.
4. CMFT server sends a request to the PA server to ask for the establishment of the voice path.
5. PA server sends the CMFT's request to Station MCU to ask for the establishment of the voice path.
6. Station MCU checks the availability of the system and establishes a connection between the input interface of the Mix Unit (MU) and the Speaker Loops.
7. Station MCU acknowledges the establishment of the voice path to the PA Server.
8. PAserver acknowledges the establishment of the voice path to CMFTserver.
9. CMFTserver logs the event.
10. CMFT server retrieves the filename of the pre-recorded message from the mapping table.
11. CMFT server sends a control command to PA server to switch to the corresponding channel for pre-recorded message.
12. PA server sendsthe command requested by CMFT server to Audio Matrix.
13. PA server acknowledges the establishment of the voice path to CMFT server.
14. CMFT server sends the filename of the pre-recorded message to CMFT console to request for pre-recorded message playback.
15. CMFT console start playback the pre-recorded message. Voice broadcast on the SDH and announce on the speaker of the chosen station.

2.2.3.5 自動廣播 AUTOMATIC BROADCAST

在特殊情況下，如列車過站不停，CMFT 會依據 ATS 傳送的資訊，發出自動廣播訊息通知旅客，圖 2-16

In some special situations, like when train is bypassing a station, the CMFT will send an automatic broadcast message to stations based on ATS informations. The data flow diagram is shown in Figure 2-16

自動廣播的優先權與排程廣播相同。

以下的訊息有較高的優先權：

1. 車站消防主機作動時；
2. 車站 PAO 進行廣播時；
3. CMFT 主控台廣播時。

以上情形，自動廣播將不會被執行。

The priority of automatic broadcast messages will be the same as scheduled broadcast messages.

The following type of messages will have higher priority:

1. Fire alarm broadcast in station;
2. PA broadcast from PAO in the same station as automatic broadcast;
3. PA broadcast from the CMFT consoles;

In these cases, Automatic broadcast won't be activated.

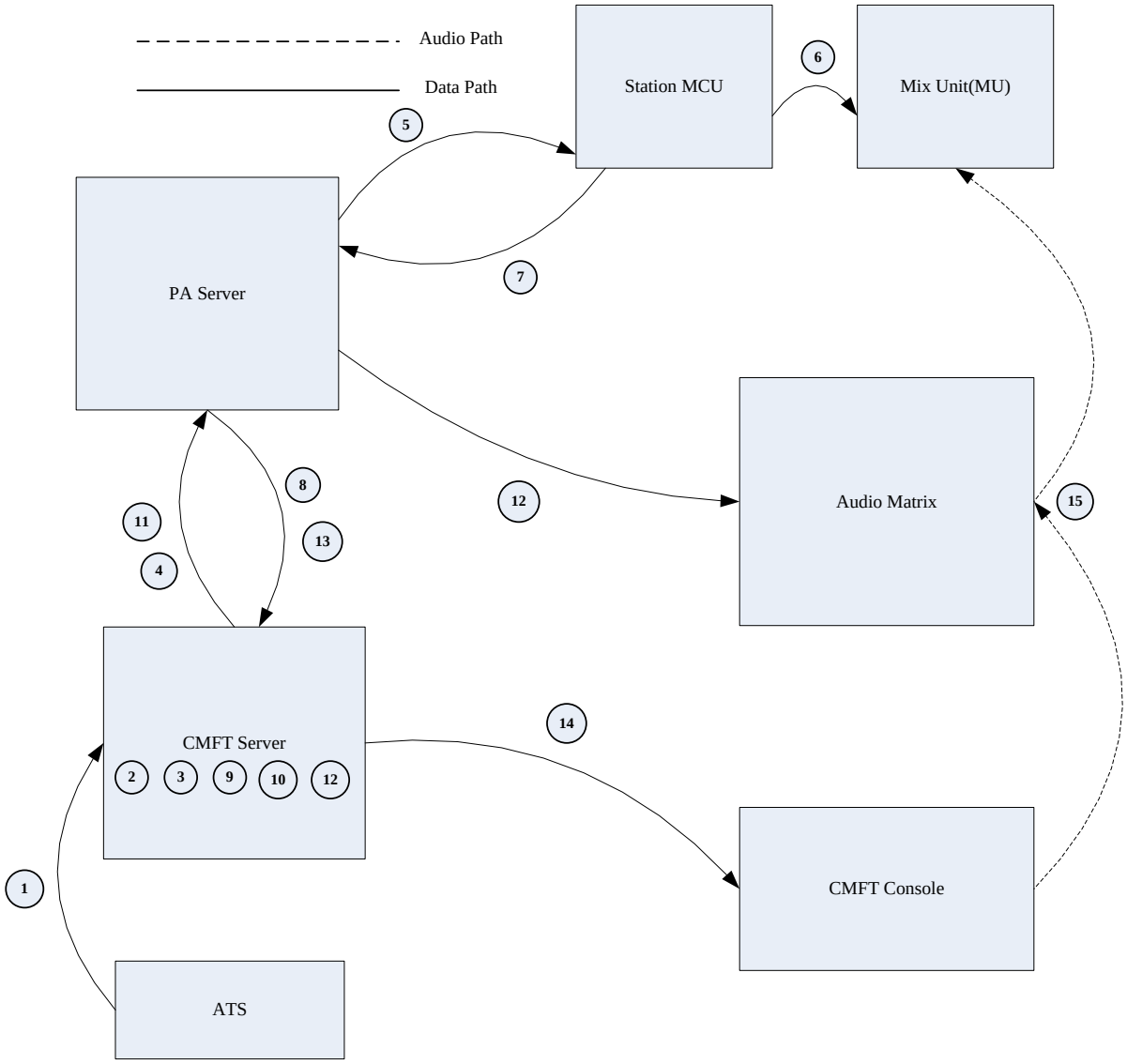

圖 2-16:自動廣播資料流程圖

Figure 2-16: Automatic Broadcast Data Flow Diagram

自動廣播流程說明

Automaticbroadcast flow description

1. CMFT 收到 ATS 訊息。
2. CMFT 伺服器藉由 ICD 定義取得被選取車站主要控制單元的 ID。
3. CMFT 伺服器記錄由廣播系統提出的需求事件。
4. CMFT 伺服器藉由第二步驟所取得的 MCU ID 傳送一個訊息給廣播伺服器要求建立起兩端間的語音傳送通道。

5. 廣播伺服器依據 CMFT 伺服器要求傳送一個訊息給車站主要控制單元要求建立起兩端間的語音傳送通道。
6. 車站主控單元檢查系統的使用狀況並在混音器和喇叭播放迴路建立起一個連線。
7. 車站主控制單元通知行控中心廣播伺服器語音通道已建立。
8. 廣播伺服器通知行控中心 CMFT 伺服器語音通道已建立。
9. CMFT 伺服器記錄發生的事件。
10. CMFT 伺服器根據 ATS 訊息代碼從對照表取得預錄語音 ID 的檔案名稱。
11. CMFT 伺服器將傳送控制指令到廣播伺服器以切換到相符的預錄語音訊息頻道。
12. 廣播伺服器傳送 CMFT 伺服器要求的指令到語音矩陣控制器。
13. 廣播伺服器通知預錄語音訊息頻道已切換完成。
14. CMFT 伺服器傳送預錄語音檔案名稱給 CMFT 控制台要求播放預錄語音訊息。
15. CMFT 控制台開始播放預錄語音訊息。聲音廣播是在同步數位階層(SDH)網路上傳送透過被選定車站的喇叭發佈。

1. CMFT server receives ATS information message.
2. CMFT server retrieves the ID of the selected Station MCU from the ICD protocols.
3. CMFT server logs the PA request event.
4. CMFT server sends a request to the PA server to ask for the establishment of the voice path.
5. PA server sends the CMFT's request to Station MCU to ask for the establishment of the voice path.
6. Station MCU checks the availability of the system and establishes a connection between the input interface of the Mix Unit (MU) and the Speaker Loops.
7. Station MCU acknowledges the establishment of the voice path to the PA Server.
8. PAserver acknowledges the establishment of the voice path to CMFTserver.
9. CMFTserver logs the event.
10. CMFT server retrieves the filename of the pre-recorded message from the mapping table according to the emergency message ID.
11. CMFT server sends a control command to PA server to switch to the corresponding channel for pre-recorded message.
12. PA server sendsthe command requested by CMFT server to Audio Matrix.
13. PA server acknowledges the establishment of the voice path to CMFT server.
14. CMFT server sends the filename of the pre-recorded message to CMFT console to request for pre-recorded message playback.
15. CMFT console start playback the pre-recorded message. Voice broadcast on the SDH and announce on the speaker of the chosen station.

2.2.4 點矩陣顯示器 DOT MATRIX DISPLAY

通訊多功能操作台整合點矩陣顯示器的系統運作有下列情況將在本文中描述：

For the system flow of CMFT integrates DMD, the following scenarios will be described in this section:

(1) ATS 列車訊息顯示

ATS Train Information Display

(2) 預錄訊息顯示(車站)

Pre-recorded Message Display (Stations)

(3) 手動輸入即時訊息顯示(車站)

Manual Input Real-time Message Display (Stations)

2.2.4.1 ATS 列車訊息顯示 ATS TRAININFORMATION DISPLAY

圖 **2-17** 說明 ATS 列車訊息顯示的資料流向。

ATS train information display data flow diagram is shown in Figure **2-17**.

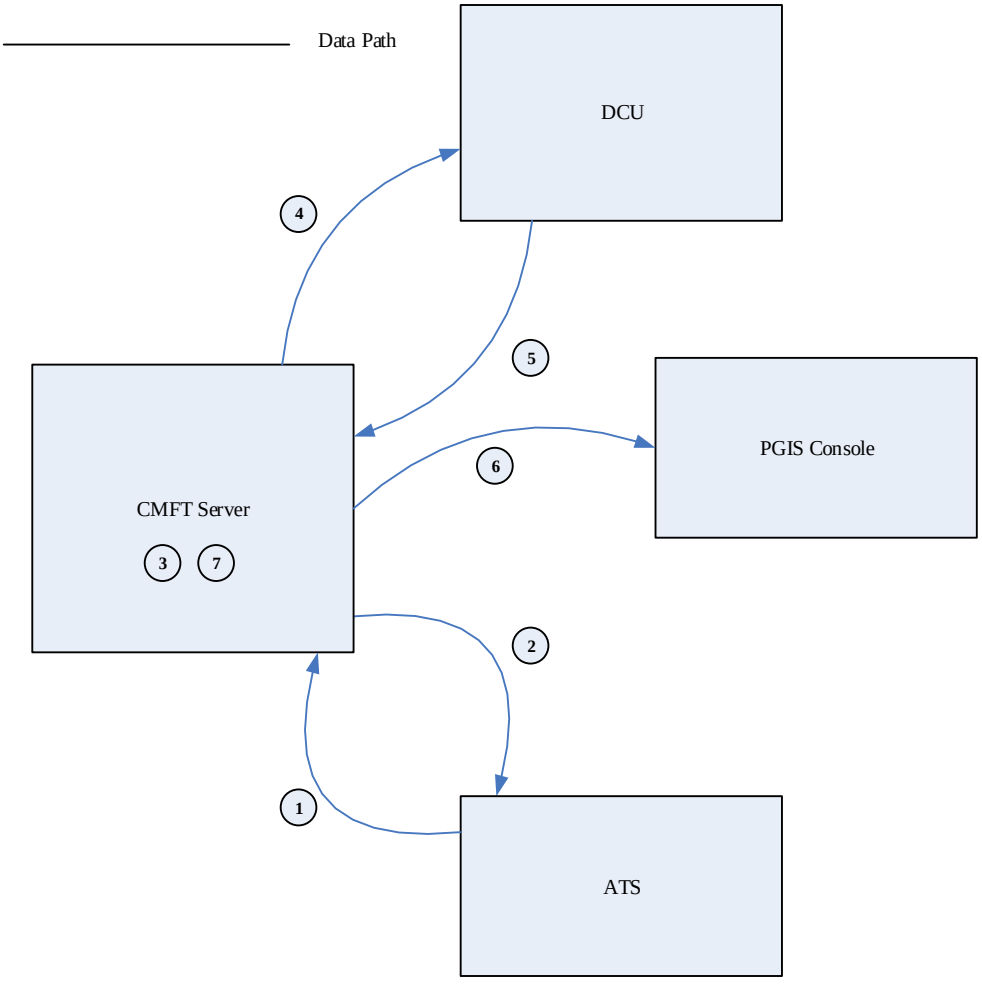

圖 2-17: ATS 列車訊息資料流程圖

Figure 2-17:ATSTrain Information Data Flow Diagram

ATS 列車訊息顯示流程說明

ATS train information display flow description

1. CMFT 伺服器接收 ATS 月台資訊與列車到離站資訊。
2. CMFT 伺服器傳送 ACK 訊息給 ATS。
3. CMFT 伺服器從 ICD 協定中取得車站的點矩陣顯示器控制單元(DCU)ID。
4. CMFT 伺服器傳送 ATS 月台資訊與列車到離站資訊給車站 DCU。
5. DCU 回覆 ACK 訊息給 CMFT 伺服器。
6. CMFT 伺服器傳送 ATS 月台資訊與列車到離站資訊給 PGIS Console。
7. CMFT 伺服器記錄點矩陣顯示器廣播需求的事件。

1. CMFT server received ATSplatform information and train arrival/departure message.
2. CMFT server send ACK message to ATS.
3. CMFT server retrieves the ID of the selected dot matrix display control unit (DCU) from the ICD protocols.
4. CMFT server sends ATS platform informationtrain arrival/departure messageto the station DCU.
5. DCU acknowledges the CMFT server on the request.
6. CMFT server sends ATS platform informationtrain arrival/departure messageto PGIS Console.
7. CMFT server logs the DMD broadcast request event.

2.2.4.2 預錄或手動訊息顯示(車站)PRE-RECORDED MESSAGE OR MANUAL INPUT REAL-TIME MESSAGE DISPLAY(STATION)

圖 **2-18** 說明車站預錄訊息或手動即時輸入文字顯示的資料流向。

Station pre-recorded or Manual Input Real-time message display data flow diagram is shown in Figure **2-18**.

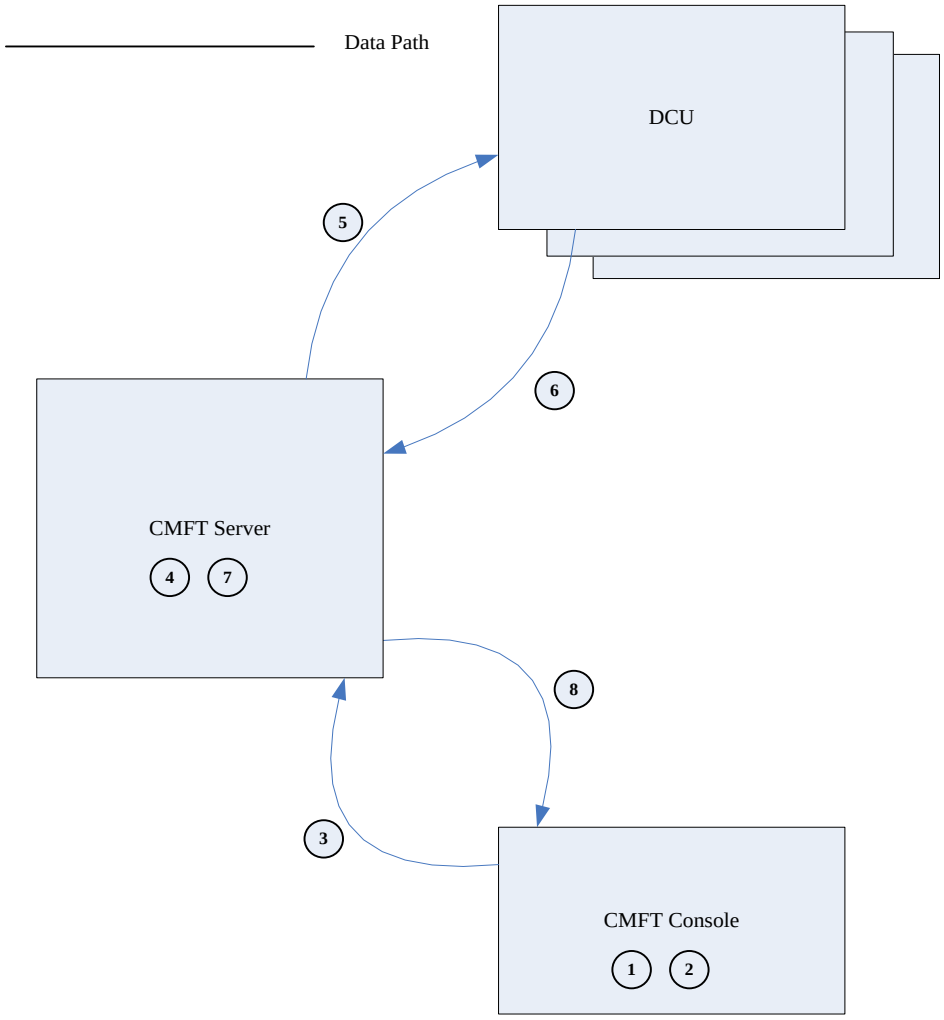

圖 2-18: 預錄訊息顯示(車站)資料流程圖

Figure 2-18: Pre-recorded MessageDisplay (Station) Data Flow Diagram

預錄訊息顯示或手動輸入即時訊息(車站)流程說明

Pre-recorded message or Manual input real-time message display(station) flow description

1. 操作員從畫面上選取事先預錄訊息 ID 或從畫面上輸入欲顯示訊息後，系統將訊息內容顯示於畫面上。
2. 操作員選取欲傳送目的位置（可為單一車站、全部車站或群組車站…等，如 Y9 上行月台）。
3. CMFT 主控台將訊息 ID、內容及目的位置資訊傳送給 CMFT 伺服器。
4. CMFT 伺服器從 ICD 協定中取得車站的點矩陣顯示器控制單元(DCU)ID。
5. CMFT 伺服器將訊息顯示內容逐一傳送給選定的車站 DCU 要求文字訊息廣播。
6. DCU 回覆 CMFT 伺服器文字訊息廣播需求結果。
7. CMFT 伺服器記錄點矩陣顯示器廣播需求的事件。

8. CMFT 伺服器傳送完成文字訊息顯示廣播的通知給 CMFT 主控台。

1. An operator chooses a pre-defined ID from GUI or inputs the text message in text area, the system will display the content of the chosen message ID on GUI.
2. Operator selects the destination of station(can be one station, all stations or any combination of trains…etc., ex: Y9 up platform).
3. CMFT console send the information of message ID, content and destination to CMFT server.
4. CMFT server retrieves the ID of the selected dot matrix display control unit(DCU) from the ICD Protocols.
5. CMFT server sends the broadcast message to each selected station's DCU to request for message broadcast.
6. DCU acknowledges the CMFT server on the request.
7. CMFT server logs the DMD broadcast request event.
8. CMFT server notifies CMFT console that message broadcast has completed.

2.2.4.3 排程訊息顯示(車站) SCHEDULE MESSAGE DISPLAY(STATION)

圖 **2-19** 說明車站排成訊息顯示的資料流向。

Station real-time message display data flow diagram is shown in Figure **2-19**.

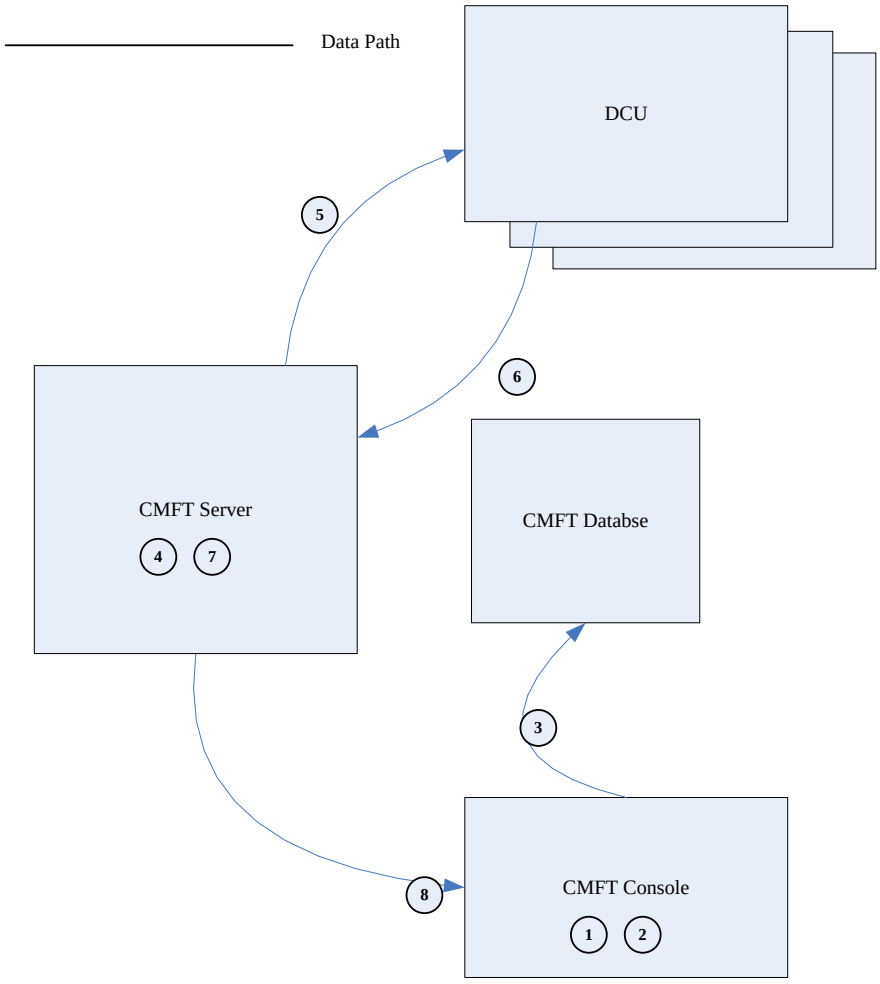

圖 2-19: 手動輸入訊息顯示(車站)資料流程圖

Figure 2-19:Manual Input Message (Station) Data Flow Diagram

顯示(車站)流程說明

display(station) flow description

1. 操作員在排程設定頁面上設定當日排程。
2. 操作員選取欲傳送目的位置（可為單一車站、全部車站或群組車站…等，如 Y9 上行月台）。
3. CMFT 主控台將排程設定及目的位置資訊儲存於 CMFT 資料庫。

4. CMFT 伺服器根據排程設定的觸發時間，對定義的目的地 DCU 發送設定的文字訊息。
5. CMFT 伺服器將訊息顯示內容逐一傳送給選定的車站 DCU 要求文字訊息廣播。
6. DCU 回覆 CMFT 伺服器文字訊息廣播需求結果。
7. CMFT 伺服器記錄點矩陣顯示器廣播需求的事件。
8. CMFT 伺服器傳送完成文字訊息顯示廣播的通知給 CMFT 主控台更新排程列表。

1. An operator set the schedule for DMD display.
2. Operator selects the destination of station (can be one station, all stations or any combination of trains…etc., ex: Y9 up platform).
3. CMFT console send the schedule informations to CMFT server, including message content and destination.Server will save the schedule to CMFT Database.
4. According schedule setting, CMFT server send messages to DCU that is defined as destination at each timer trigger.
5. CMFT server sends the message to each selected station's DCU to request for message broadcast.
6. DCU acknowledges the CMFT server on the request.
7. CMFT server logs the DMD broadcast request event.
8. CMFT server notifies CMFT console that message broadcast has completed and update the schedule list..

2.2.4.4 大廳點矩陣顯示模式 THE DISPLAY MODE ON THE HALL

CMFT 系統提供大廳的多種組合顯示模式：

CMFT system provides a variety of combinations display mode for the DMD on hall and platform:

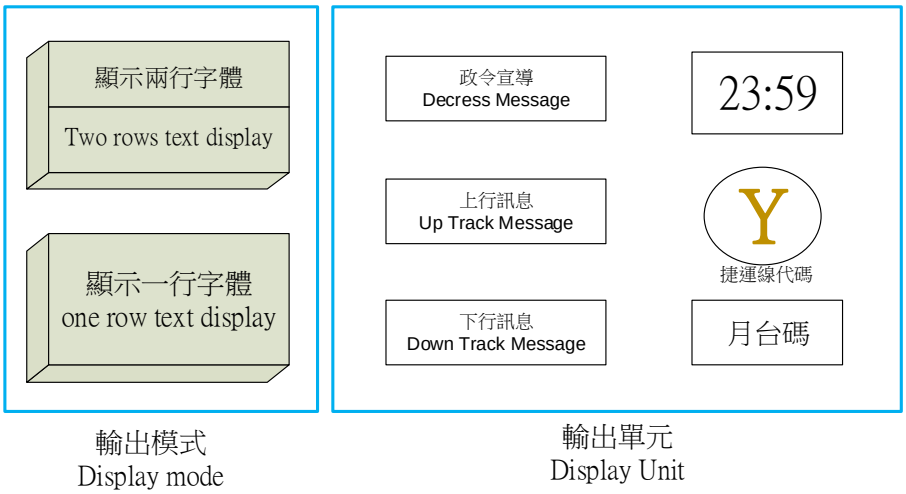

圖 2-20:點矩陣主要配置模式和單元體

Figure 2-20: The Mode and Unit configuration of DMD display

文字說明如下：

The description as follow：

1. 輸出模式：大廳點矩陣至多可以設置兩列輸出，月台點矩陣則只能一列輸出：

   Display Mode ：There are the most two row text display on the hall, but there is just the one row display on the platform.

2. 輸出單元：

   Display Unit ：

   a. 配置每一列顯示的主要文字訊息為政令宣導或上下行列車資訊。

      Configure each row to display the main text message form information of the Decrees or UP Track Or Down Track on the train.

   b. 月台點矩陣前後可以配置附屬的單元資訊，包含現在時刻、月台碼、捷運線代碼。

      The head or Tail of point matrix on the platform can be configured with subsidiary unit information, including the current time, platform code, MRT line code.

   c. 大廳點矩陣設定若為一行，則可以配置的附屬單元為前後兩端或四個角，當僅配置右上或左上或左右上方兩端的附屬單元，則附屬單元佔據附屬單元為前後端，如下圖所示，可以配置附屬的單元資訊，包含現在時刻、月台碼、捷運線代碼。

      For the point matrix on the Hall, which is set to one line, the auxiliary unit can be configured as the front and rear ends or four corners. When the auxiliary units at the upper right or upper left, or upper left and right are arranged, the unit occupies the front and rear whole layout as shown following figure, you can configure the attached unit information, including the current time, the platform code, the MRT code.

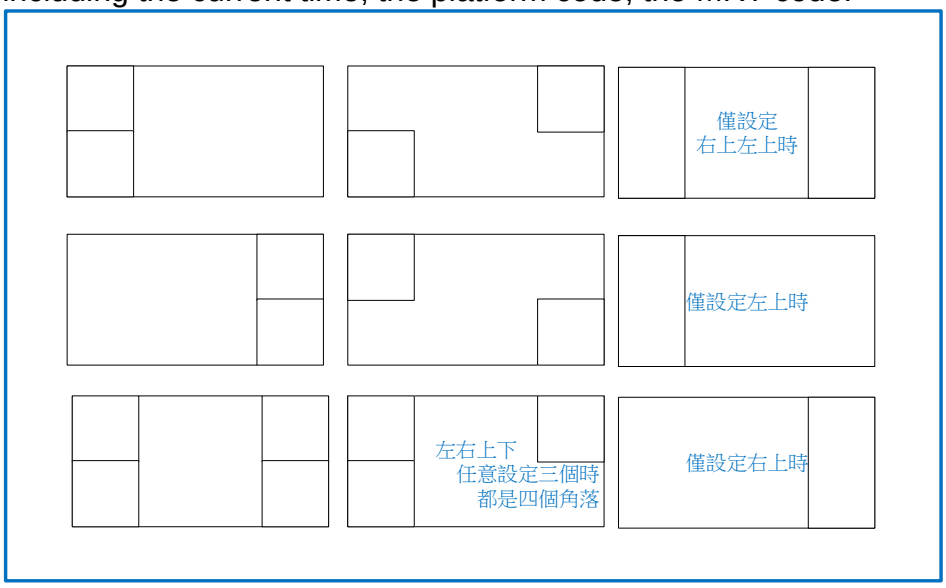

圖 2-21:大廳點矩陣一行字的主要配置模式和單元體示意圖

Figure 2-21: The Unit configuration of one-line setting DMD Illustration

d. 大廳點矩陣設定若為兩行，則可以配置的附屬單元為四個角，可以配置附屬的單元資訊，包含現在時刻、月台碼、捷運線代碼。

The point matrix on the hall that is configured at two line, the DMD can be deloy with subsidiary unit information, including the current time, platform code, MRT line code.

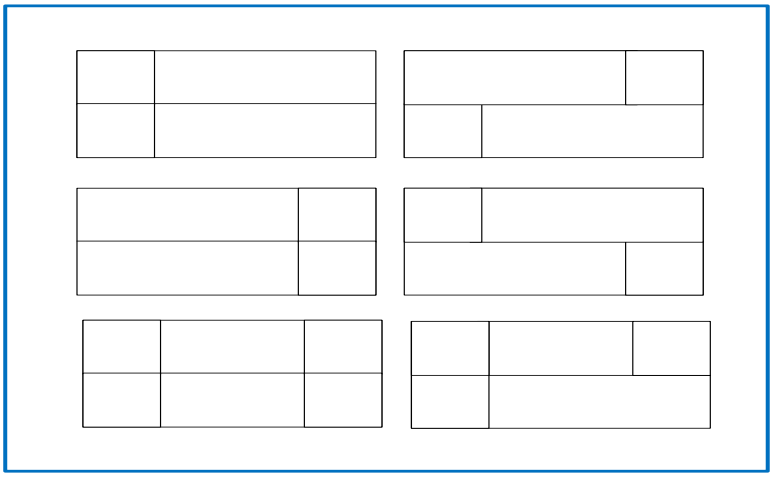

圖 2-22:大廳點矩陣兩行字的主要配置模式和單元體示意圖

Figure 2-22: The Unit configuration of Two-lines setting DMD Illustration

3. 捷運線代碼為黃色。

   The Color of MRT line code is yellow.

4. 緊急訊息系統自動辨識為紅色。

   The Color of emergency message is red.

5. 每個車站可以各自定義月台 ID 與一般訊息顏色。

   User can define color for the platform ID and the general message to each station.

2.2.5 列車通訊設備 OTC

行控中心與列車通訊設備之通訊皆必須經由無線電系統，CMFT 整合列車通訊設備的系統運作有下列情況將在本文中描述：

All the communications between OCC and OTC must by way of TETRA. For the system flow of CMFT integrates OTC, the following scenarios will be described in this section:

(1) 預錄語音廣播 Pre-recorded Broadcast

(2) 即時語音廣播 Live Broadcast

(3) 服務對講機通訊 Service Intercom

(4) 旅客緊急通訊 Passenger Emergency Intercom

(5) 行控中心掌控旅客動態 OCC Controls Passenger Movement

(6) 即時和預錄訊息播放 Instant Message and Pre-record Message Playback

2.2.5.1 預錄語音廣播 PRE-RECORDED BROADCAST

圖 **2-23** 說明列車預錄語音廣播的資料流向。

For train pre-recorded message broadcast, the data flow diagram is shown in Figure **2-23**.

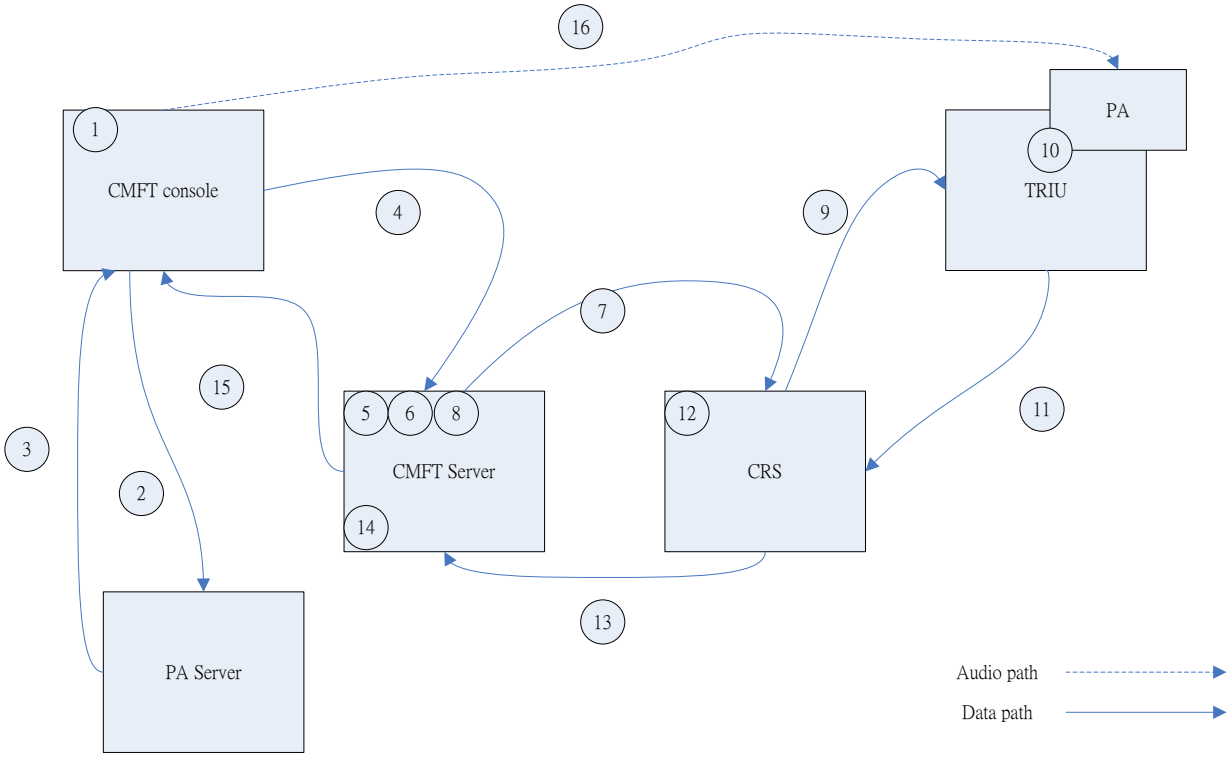

圖 2-23: 預錄語音廣播(列車)資料流程圖

Figure 2-23: Pre-recorded Broadcast (Train) Data Flow Diagram

列車預錄語音廣播流程說明

Train pre-recorded broadcast flow description

1. 操作員選擇預錄語音 ID 與目的列車給。
2. CMFT console 向 PA Server 要求預錄語音資料。
3. PA 傳送預錄語音資料給 CMFT console。
4. CMFT console 傳送列車廣播要求給 CMFT 伺服器。
5. CMFT 伺服器記錄列車廣播要求。
6. CMFT 伺服器依步驟 1 資料取得列車 ID。
7. CMFT 伺服器向 CRS 要求語音通道以播放預錄語音。
8. CMFT 伺服器記錄預錄語音要求-語音通道要求。

9. CRS 向 TRIU 要求 PA 連線。
10. TRIU 建立 PA 廣播連線。
11. TRIU 傳送狀態給 CRS。
12. CRS 建立語音通道。
13. CRS 通知 CMFT 伺服器語音通道建立。
14. CMFT 伺服器記錄預錄語音要求-語音通道建立。
15. CMFT 伺服器通知 CMFTconsole 語音通道建立。
16. 操作者按"開始廣播"向指定目標群組的 PA 播放預錄語音。

1. Operator selects pre-recorded message ID and destination trains for PA from console.
2. CMFT console request for pre-recorded voice data from PA server.
3. PA server send the pre-recorded voice data to CMFT console.
4. CMFT console send train pre-recorded message broadcast request to CMFT server.
5. CMFT server logs the pre-recorded broadcast request.
6. CMFT server retrieves the train ID from mapping table by step 1.
7. CMFT server send "create audio channel" request to CRS forpre-recorded message broadcast.
8. CMFT server logs the "audio channel" request.
9. CRS request for PA connection to TRIU.
10. TRIU build the connection to PA for broadcasting.
11. TRIU send the connection status to CRS.
12. CRS create a audio channel.
13. CRS notify CMFT server that audio channel has created.
14. CMFT server logs the result - "audio channel has created".
15. CMFT notify CMFT console the audio channel has created.
16. Operator press "Start PA" starting broadcasting pre-recorded message to selected destinations.

2.2.5.2 即時語音廣播 LIVE BROADCAST

圖 **2-24** 說明列車即時語音廣播的資料流向。

For train live message broadcast, the data flow diagram is shown in Figure **2-24**.

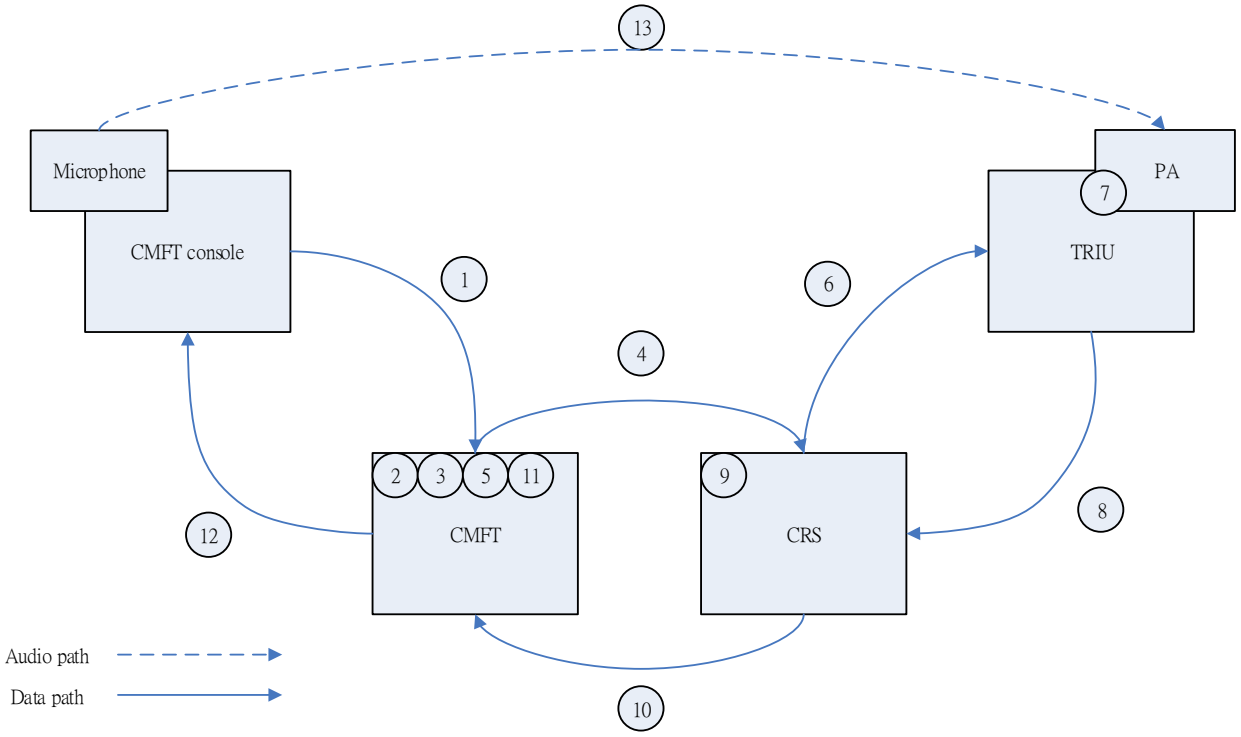

圖 2-24: 即時語音廣播(列車)資料流程圖

Figure 2-24: Live Broadcast (Train) Data Flow Diagram

列車即時語音廣播流程說明

Train live broadcast flow description

1. 操作員選擇列車要求進行 PA 廣播。
2. CMFT 伺服器記錄 PA 即時廣播要求。
3. CMFT 伺服器依照列車 ID 對照表得到列車 SI 號碼。
4. CMFT 伺服器要求 CRS 建立語音通道。
5. CMFT 伺服器記錄 PA 廣播要求-要求語音通道。
6. CRS 要求 TRIU 建立 PA 廣播。
7. TRIU 建立 PA 廣播連線。
8. TRIU 向 CRS 回報狀態。
9. CRS 建立語音通道。
10. CRS 向 CMFT 伺服器回報語音通道建立。
11. CMFT 記錄 PA 廣播要求-語音通道建立。
12. CMFT 伺服器通知 CMFT console 語音通道建立.。
13. CMFT console 開始向指定目標群組廣播。

1. Operator chooses designate trains for PA broadcast.

2. CMFT server logs the live broadcast request.
3. CMFT server retrieves the train's SI number by train ID from mapping table.
4. CMFT server send "create audio channel" request to CRS for live broadcast.
5. CMFT server logs the "create audio channel" request.
6. CRS request for PA connection to TRIU.
7. TRIU build the connection to PA for broadcasting.
8. TRIU send the connection status to CRS.
9. CRS create a audio channel.
10. CRS notify CMFT server that audio channel has created.
11. CMFT server logs the result - "audio channel has created".
12. CMFT notify CMFT console the audio channel has created.
13. CMFT start broadcasting to selected destinations.

2.2.5.3 服務對講機通訊 SERVICE INTERCOM

列車駕駛員使用服務對講機與行控中心通訊，圖 **2-25** 說明列車即時語音廣播的資料流向。

For train driver communicates with OCC operator via Service Intercom, the data flow diagram is shown in Figure **2-25**.

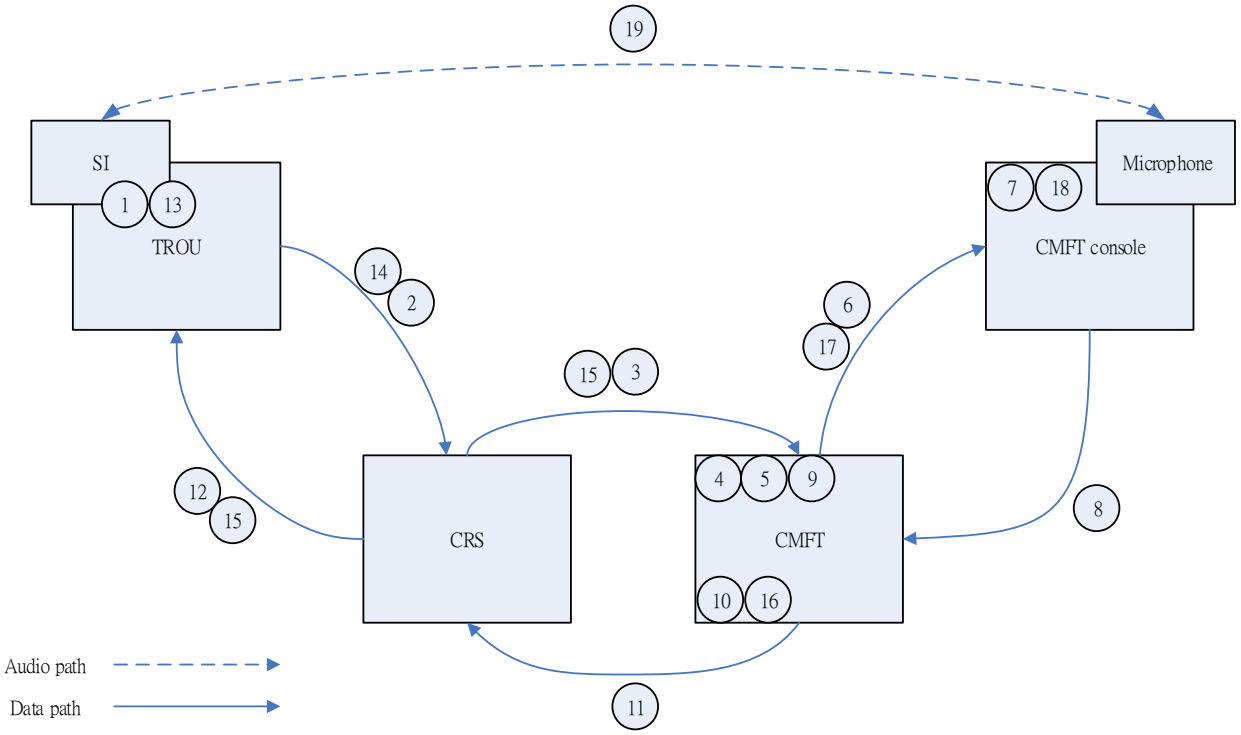

圖 2-25: 駕駛員通訊資料流程圖
Figure2-25:Driver Intercom Data Flow Diagram

駕駛員通訊廣播流程說明

Driver intercom flow description

1. 駕駛員使用服務對講機(SI)要求與行控中心通訊。
2. TROU 傳送 SI 要求簡訊。
3. CRS 通知 CMFTSI 要求簡訊。
4. CMFT 記錄 SI 通訊要求。
5. CMFT 將 SI 通訊加入 OTC 等待佇列。
6. CMFT 通知 CMFT console 有 SI 通訊要求。
7. CMFT console 顯示 SI 通訊資訊。
8. CMFT console 通知 CMFT 接受 SI 通訊。
9. CMFT 記錄 SI 通訊要求確認。
10. CMFT 取得 CMFT console 與 SI 資訊。
11. CMFT 要求 CRS 建立語音通道。
12. CRS 要求 TROU 建立 SI 連線。
13. TROU 建立 SI 連線。
14. TROU 回報連線狀態。
15.
    15.1. CRS 通知 CMFT 語音通道建立。
    15.2. CRS 通知 TROU 語音通道建立。
16. CMFT 記錄 SI 通訊連線建立。
17. CMFT 通知 CMFT console 語音通道建立。
18. CMFT console 顯示 SI 語音通訊資訊。
19. CMFT console 與 SI 開始語音通訊。

1. Driver request for communicating with OCC via ServiceIntercom (SI).
2. TROU send a short message to request SI intercom.
3. CRS notify CMFT server of SI intercom request.
4. CMFT server logs the SI intercom request.
5. CMFT server put the SI intercom request into OTC waiting queue.
6. CMFT server notify CMFT console of SI intercom request.
7. CMFT console display SI intercom information.
8. CMFT console notify CMFT server that accept the SI intercom request.
9. CMFT server logs that SI intercom request has accepted.
10. CMFT retrieve the information for CMFT console and SI.
11. CMFT request CRS to create audio channel.
12. CRS request TROU to build SI connection.
13. TROU built the SI connection.
14. TROU reply the SI connection status.
15.
    15.1. CRS notify CMFT server audio channel has created.
    15.2. CRS notify TROU server audio channel has created.

16. CMFT server logs that SI connection has built.
17. CMFT server notify CMFT console that audio channel has created.
18. CMFT console display the information of SI intercom.
19. CMFT console and SI begins to voice intercom.

2.2.5.4 旅客緊急通訊 PASSENGER EMERGENCY INTERCOM

圖 **2-26** 說明旅客緊急通訊的資料流向。

For Passenger Emergency Intercom, the data flow diagram is shown in Figure **2-26**.

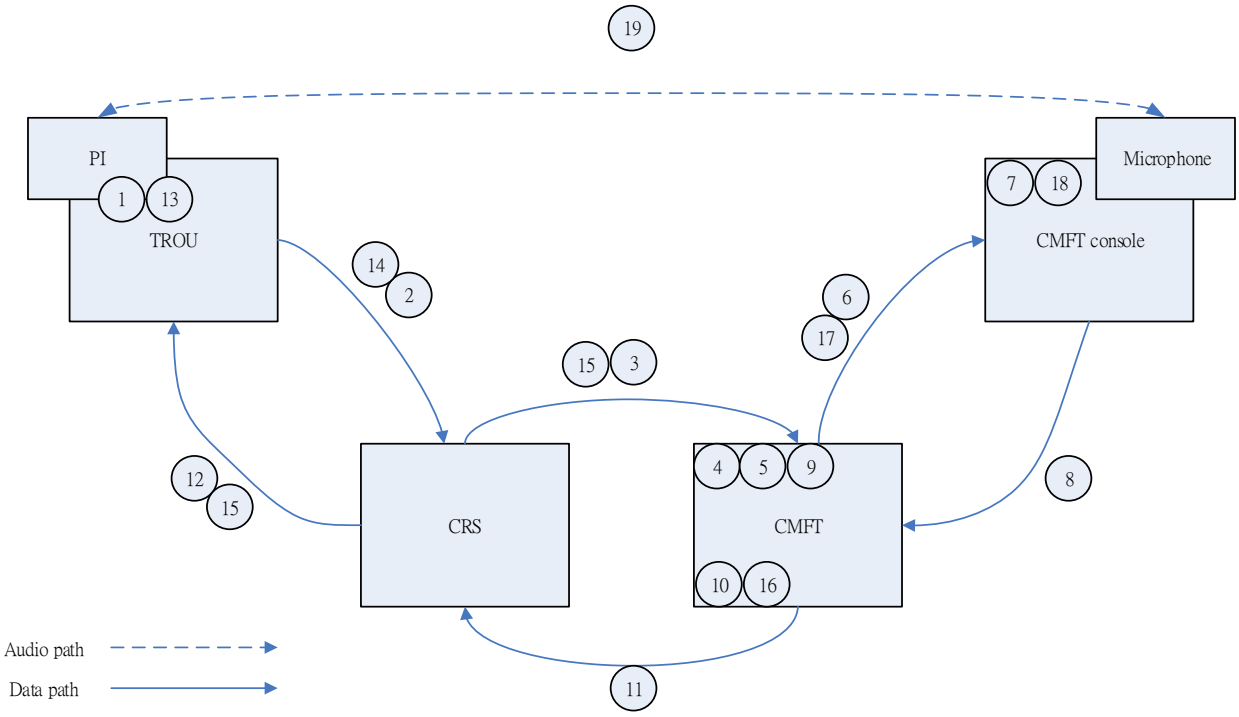

圖 2-26: 旅客緊急通訊資料流程圖

Figure 2-26:Passenger Emergency Intercom Data Flow Diagram

旅客緊急通訊廣播流程說明

Passenger emergency intercom flow description

1. 列車乘客按下”緊急通話”(PI)按鈕要求與行控中心通訊。
2. TROU 傳送緊急通訊要求簡訊。
3. CRS 通知 CMFT 緊急通訊要求簡訊。
4. CMFT 記錄 PI 緊急通訊要求。
5. CMFT 將 PI 緊急通訊加入等待佇列。
6. CMFT 通知 CMFT console 有 PI 緊急通訊要求。
7. CMFT console 顯示 PI 緊急通訊資訊。

8. CMFT console 通知 CMFT 接受 PI 緊急通訊。
9. CMFT 記錄 PI 緊急通訊要求確認。
10. CMFT 取得 CMFT console 與 PI 資訊。
11. CMFT 要求 CRS 建立語音通道.。
12. CRS 要求 TROU 建立 PI 連線。
13. TROU 建立 PI 連線。
14. TROU 回報連線狀態。
15.
    15.1. CRS 通知 CMFT 語音通道建立。
    15.2. CRS 通知 TROU 語音通道建立。
16. CMFT 記錄 PI 緊急通訊連線建立。
17. CMFT 通知 CMFT console 語音通道建立。
18. CMFT console 顯示 PI 語音通訊資訊。
19. CMFT console 與 PI 開始語音通訊。

1. Train passenger request for communicating with OCC by pressing “Emergency Intercom” (PI) button.
2. TROU send a short message to request PI intercom.
3. CRS notify CMFT server of PI intercom request.
4. CMFT server logs the PI intercom request.
5. CMFT server put the PI intercom request into OTC waiting queue.
6. CMFT server notify CMFT console of PI intercom request.
7. CMFT console display PI intercom information.
8. CMFT console notify CMFT server that accept the PI intercom request.
9. CMFT server logs that SI intercom request has accepted.
10. CMFT retrieve the information for CMFT console and PI.
11. CMFT request CRS to create audio channel.
12. CRS request TROU to build PI connection.
13. TRIU built the PI connection.
14. TRIU reply the PI connection status.
15.
    15.1. CRS notify CMFT server audio channel has created.
    15.2. CRS notify TROU server audio channel has created.
16. CMFT server logs that PI connection has built.
17. CMFT server notify CMFT console that audio channel has created.
18. CMFT console display the information of PI intercom.
19. CMFT console and PI begins to voice intercom.

2.2.5.5 動態啟動旅客緊急通訊 DYNAMIC ACTIVATED PASSENGER EMERGENCY INTERCOM

行控中心操作員可於 CMFT 主控台啟動列車乘客緊急通話功能，透過列車緊急電話(PI)取得列車上的聲音，以瞭解旅客動態。圖 **2-27** 說明動態啟動旅客緊急通話的資料流向。

OCC operator can activate PI function from the CMFT console to access the voice on train via on-train PI, so that can understand passengers’ movement.

Figure **2-27** described monitoring of on-train passenger movement data flow.

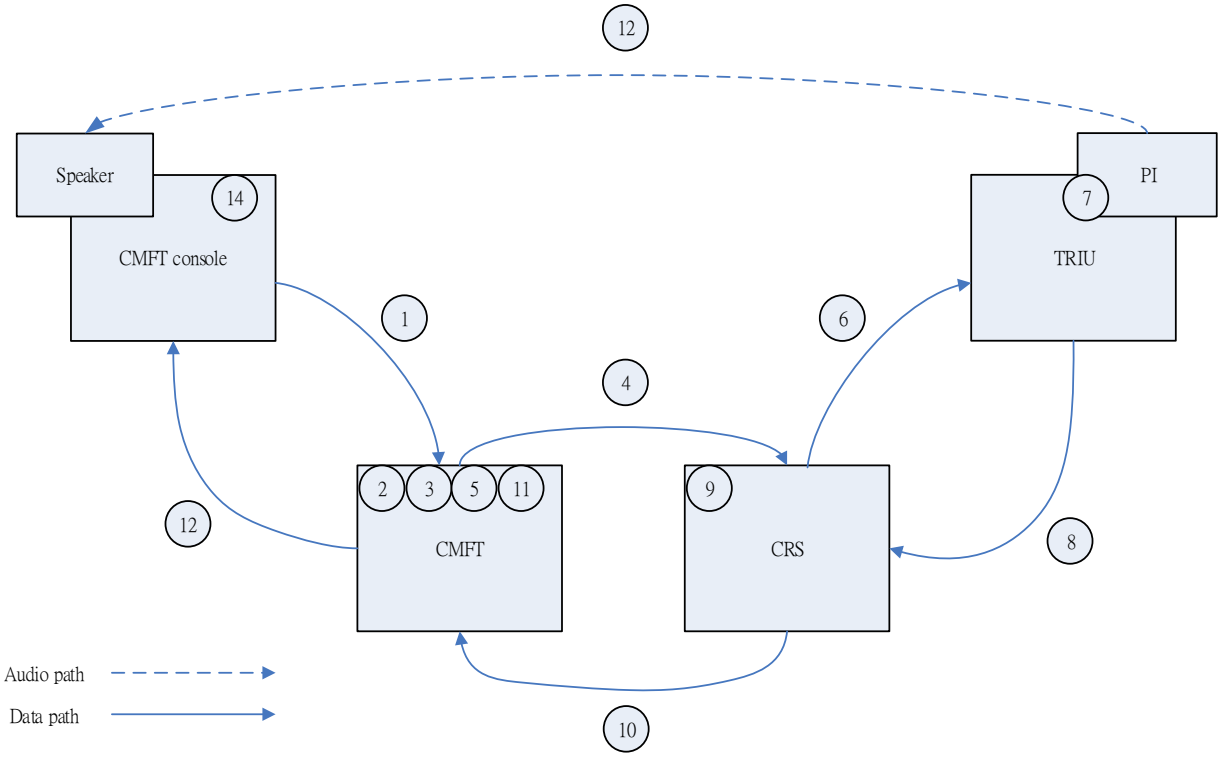

圖 2-27: 動態啟動旅客緊急通訊資料流程圖

Figure 2-27: Dynamic Activated Passenger Emergency Intercom Data Flow Diagram

動態啟動旅客緊急通訊廣播流程說明

Dynamic Activated Passenger Emergency Intercom flow description

1. 操作員選擇列車要求進行動態啟動旅客緊急通訊。
2. CMFT 記錄啟動旅客緊急通訊要求。
3. CMFT 依照列車 ID 對照表得到列車 PI 號碼。
4. CMFT 傳送啟動 PI 要求給 CRS,要求建立語音通道。
5. CMFT 記錄啟動 PI 要求 - 要求建立語音通道。
6. CRS 取得車上設備狀態並要求 TRIU 建立 PI 連線。
7. TRIU 建立 PI 連線。
8. TRIU 回報狀態。
9. CRS 建立語音通道。
10. CRS 回報語音通道建立。
11. CMFT 記錄 PI 通訊要求 - 語音通道已建立。
12. CMFT 通知 CMFT console 語音通道建立。
13. CMFT console 開始收取車上旅客動態。
14. CMFT console 顯示 PI 啟動狀態資訊。

1. Operator selects designate trains to request for activated PI function.

2. CMFT server logs the activate PI request.
3. CMFT server retrieves the PI number by train ID from mapping table.
4. CMFT send activated PI request to CRS to create audio channel.
5. CMFT server logs the activated PI request - request for creating audio channel.
6. CRS gets the equipment status on train and requests TRIU to build PI connection.
7. TRIU built the PI connection.
8. TRIU reply the PI connection status.
9. CRS created the audio channel.
10. CRS notify CMFT server audio channel has created.
11. CMFT server logs that audio channel has created.
12. CMFT server notifies CMFT console that audio channel has created.
13. CMFT console start monitoring of on-train passengers movement.
14. CMFT console display activated PI information.

2.2.5.6 PIDS 即時和預錄訊息播放 INSTANT PISDMESSAGE AND PRE-RECORD MESSAGE PLAYBACK TO PIDS

圖 **2-28** 說明 PIDS 訊息播放的資料流向。

Figure **2-28** described PIDS message playback data flow.

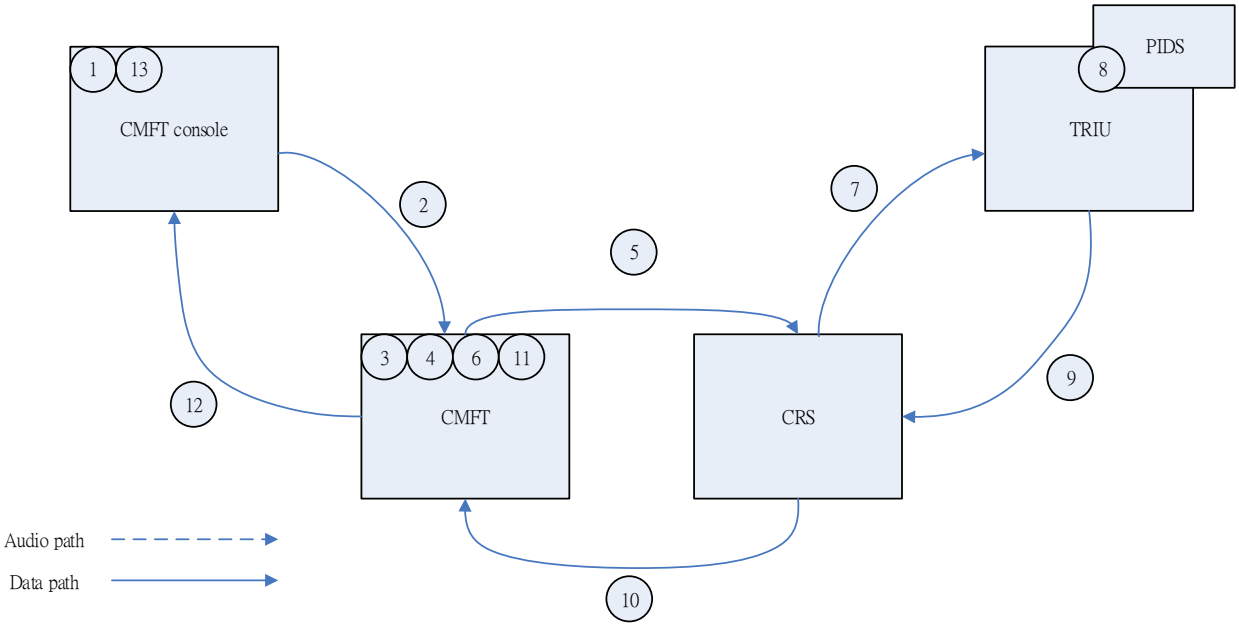

圖 2-28: 即時和預錄訊息播放資料流程圖

Figure 2-28:Instant Message and Pre-record Message Playback Data Flow Diagram

即時和預錄訊息播放流程說明

Instant message and pre-recorded message playback flow description

1. 操作員選擇預錄訊息或輸入訊息以及指定的列車。
2. CMFT console 傳送訊息給 CMFT 伺服器要求進行 PIDS 訊息顯示。

3. CMFT 記錄 PIDS 訊息要求。
4. CMFT 依照列車 ID 對照表得到列車通訊號碼。
5. CMFT 要求 CRS 顯示 PIDS 訊息。
6. CMFT 記錄 PIDS 訊息要求-要求傳送 PIDS 訊息。
7. CRS 要求 TRIU 顯示 PIDS 訊息。
8. TRIU 輸出訊息至 PIDS。
9. TRIU 向 CRS 回報狀態。
10. CRS 向 CMFT 回報狀態。
11. CMFT 記錄 PIDS 訊息要求-PIDS 訊息回報狀態。
12. CMFT 通知 CMFT console PIDS 訊息顯示結果。
13. CMFT console 顯示 PIDS 廣播狀態。

1. Operator selects pre-recorded message or inputs instant message and designates trains from console.
2. CMFT console send request to CMFT server to perform PIDS message display.
3. CMFT server logs the request of PIDS message display.
4. CMFT server retrieves the train SI number by train ID from mapping table.
5. CMFT server request CRS to display PIDS message.
6. CMFT server logs the request of PIDS message display - request for sending PIDS message.
7. CRS request TRIU for PIDS message display.
8. TRIU output the message to PIDS.
9. TRIU reply the result to CRS.
10. CRS reply the result to CMFT server.
11. CMFT server logs the request of PIDS message display - result of PIDS message display.
12. CMFT server notify CMFT console theresult of PIDS message display.
13. CMFT console display the status of PIDS broadcast.

2.2.5.7 PIDS 排程與 ATS 訊息播放 SCHEDULE MASSAGE AND ATS MESSAGE PLAYBACK ON PIDS

PIDS 無法設置排成訊息，其 ATS 相關資訊也完全由列車上 CC 和車載系統，根據觸發時間與 ATS 直接通訊，進行 PIDS 訊息播放。

PIDS can not set the scheduling information from CMFT, the ATS related information is also entirely by the train CC and vehicle system, according to the trigger time and ATS direct communication, to achieve PIDS message playback.

2.2.6 數位無線電派遣台 TETRA DISPATCHER

CMFT 系統整合數位無線電派遣台功能的系統運作有下列情況將在本文中描述：

For the system flow of CMFT integrates the functions of TETRA Dispatcher, the following scenarios will be described in this section:

(1) 手機語音通訊。
Audio Communications for Handheld Portable Radio.

(2) 短訊。
SDS.

在 CMFT 系統上無線電不僅提供派遣台功能，2.2.5 章節中也提及車載系統在進行列車上廣播、PIDS 與緊急通訊也透過無線電系統傳輸資料。當透過無線電系統進行語音通訊時，都必須和無線電系統註冊相關門號，由於門號限制的關係，每一台 CMFT Console 端僅配置 2 個臨時動態群組號碼。

一組號碼專職進行列車廣播：

(1) 列車廣播。

一組進行由 CMFT 系統配置的『無線電群組』語音行為：

(1) 由 CMFT 介面定義的手機群組呼叫。

(2) 由個別呼叫群組功能中進行臨時手機群組呼叫。

.

In the CMFT system, the tetra radio not only provides the dispatch function, and also provides the transmission of OTC through the radio system as mention as in section 2.2.5, such as broadcasting for the trains, PIDS, and emergency communication from train. When the voice communication through the radio system, and the radio system must be related to the registration number, due to the number restrictions of tetra number, only two temporary dynamic group number is configured on each CMFT Console.

One for the broadcast on the train

(1). Make a Broadcast to trains.

Other one for a "group " oral action

(1). Called a mobile phone group that defined by the CMFT.

(2). Called a temporary phone group are composed by several individual.

2.2.6.1 手機語音通訊 AUDIOCOMMUNICATIONS FOR HANDHELD PORTABLE RADIO

圖 **2-29** 說明行控中心操作員撥出給手機的資料流向。

For OCC operator dials out a call to handheld portable radio, the data flow

diagram is shown in Figure **2-29**.

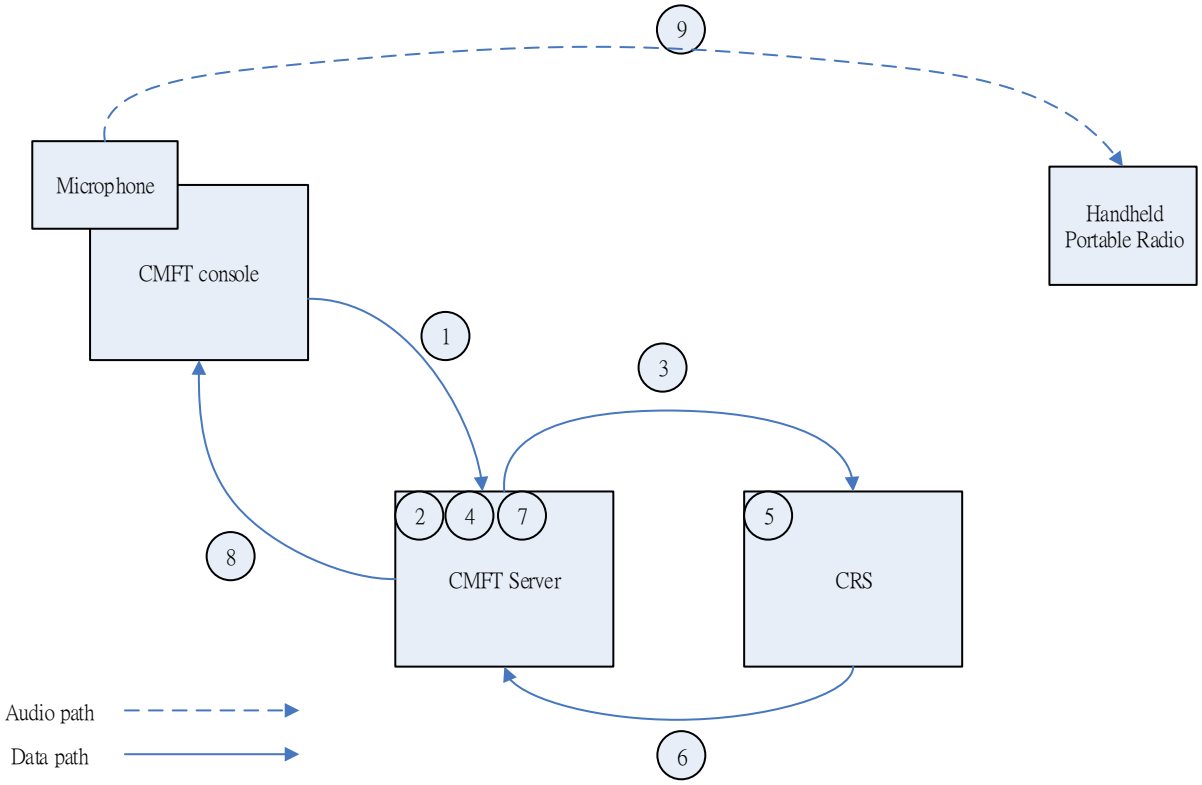

圖 2-29: 行控中心撥給手機資料流程圖

Figure 2-29: OCC Dial Out Call to Handheld Portable RadioData Flow Diagram

行控中心撥給手機資料流程說明

OCC dial out call to handheld portable radio flow description

1. 操作員輸入手機號碼要求與手機進行語音通話（可為個別號碼或群組號碼）。
2. CMFT 伺服器記錄”語音通話要求”。
3. CMFT 伺服器要求 CRS 建立語音通道。
4. CMFT 伺服器記錄”要求建立語音通道”。
5. CRS 建立語音通道。
6. CRS 向 CMFT 伺服器回報語音通道建立。
7. CMFT 記錄”語音通道建立”。
8. CMFT 伺服器通知 CMFT console 語音通道建立。
9. CMFT console 開始與手機通話。

1. Operator enters phone number for communications with handheld portable radio. (Can be an individual phone number or group phone number)
2. CMFT server logs the “audio communication” request.

3. CMFT server send "create audio channel" request to CRS for audio communication.
4. CMFT server logs the "create audio channel" request.
5. CRS created an audio channel.
6. CRS notify CMFT server that audio channel has created.
7. CMFT server logs the result - "audio channel has created".
8. CMFT notify CMFT console the audio channel has created.
9. CMFT start conversations with handheld portable radio.

2.2.6.2 短訊 SDS

圖 **2-30** 說明行控中心操作員撥出給手機的資料流向。

For OCC operator send a SDS message to handheld portable radio, the data flow diagram is shown in Figure 2-30.

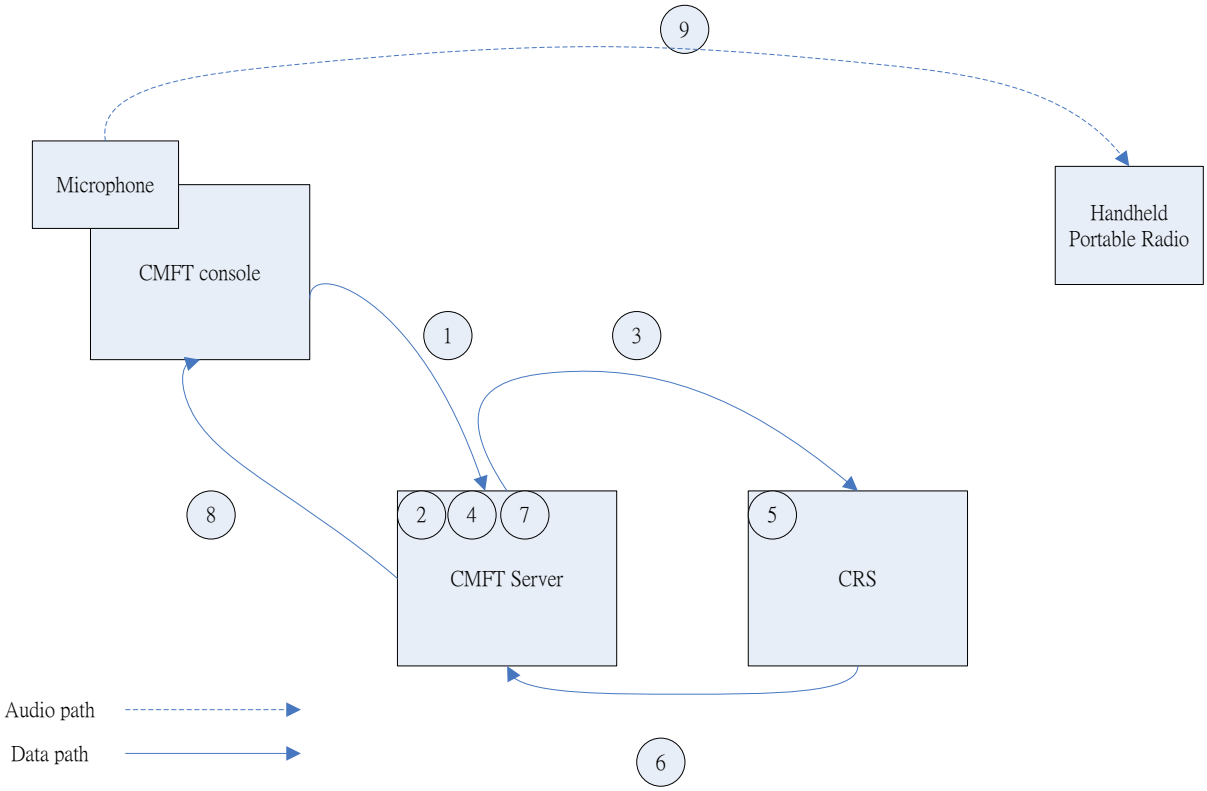

圖 2-30: 行控中心轉發 SDS 至手機資料流程圖

Figure 2-30: OCC Send SDS to Handheld Portable Radio Data Flow Diagram

行控中心撥給手機資料流程說明

OCC dial out call to handheld portable radio flow description

1. 操作員輸入短訊內容及手機號碼要求發送短訊給手機（可為個別號碼或群組號碼）。
2. CMFT 伺服器記錄”短訊發送要求”。
3. CMFT 伺服器要求 CRS 發送短訊。
4. CRS 發送短訊給指定手機。
5. CRS 向 CMFT 伺服器回傳短訊發送結果。
6. CMFT 記錄”短訊發送結果”。
7. CMFT 伺服器通知 CMFT console 短訊發送結果。

1. Operator enters text message and phone number to request for sending a SDS to handheld portable radio. (Can be an individual phone number or group phone number)
2. CMFT server logs the “send SDS” request.
3. CMFT server send “send SDS" request to CRS for sending SDS.
4. CRS sent the SDS to specified handheld portable radio.
5. CRS notify CMFT server the result of the "send SDS" request.
6. CMFT server logs the result.
7. CMFT notify CMFT console the result of the "send SDS" request.

2.2.6.3 監控和數據採集系統告警轉發 FORWARD THE SCADA ALERT MESSAGE BY SDS

圖 2-31: 行控中心轉發 SCADA 告警給手機資料流程圖

For OCC operator send a alert message of SCADA to handheld portable radio, the data flow diagram is shown in Figure 2-31.

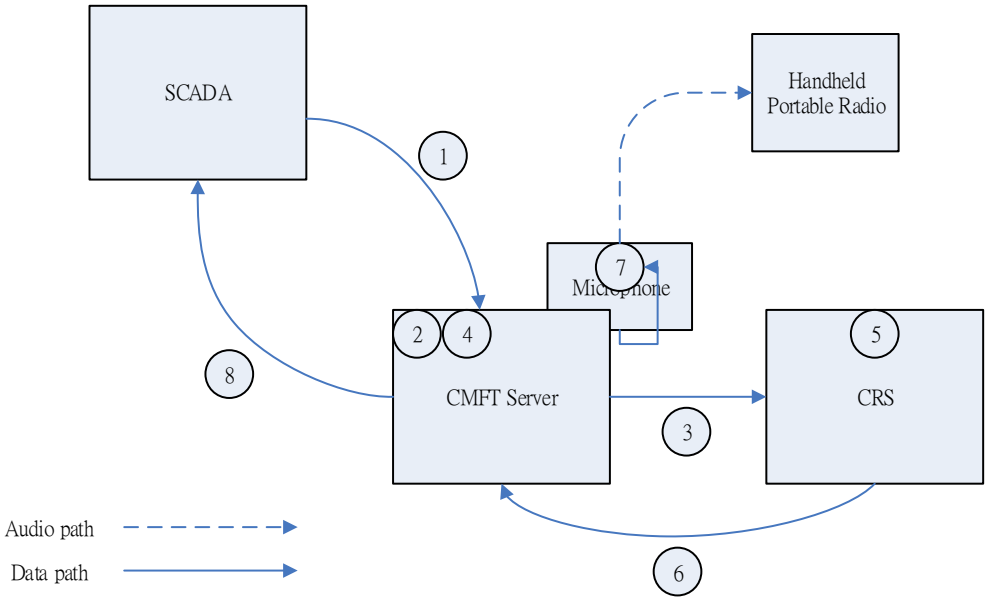

圖 2-31: 行控中心轉發 SCADA 告警給手機資料流程圖

Figure 2-31: Forward the Alert Message of SCADA to Handheld Portable Radio Data Flow Diagram

行控中心轉發 **SCADA** 手機資料流程說明

OCC Forwad the alarm of SCADA to portale radio flow description

1. CMFT 伺服器擷取 SCADA 上的告警資訊。
2. CMFT 伺服器記錄”短訊發送要求”。
3. CMFT 伺服器要求 CRS 發送短訊。
4. CRS 發送短訊給指定手機。
5. CRS 向 CMFT 伺服器回傳短訊發送結果。
6. CMFT 記錄”短訊發送結果”。
7. CMFT 伺服器通過 API 短訊發送結果。

1. CMFT server captures alarm information of SCADA.
2. CMFT server logs the “send SDS” request.
3. CMFT server send “send SDS" request to CRS for sending SDS.
4. CRS sent the SDS to specified handheld portable radio.
5. CRS notify CMFT server the result of the "send SDS" request.
6. CMFT server logs the result.
7. CMFT server send SDS" request using API.

2.3 時間同步 TIME SYNCHRONIZATION

為了達到讓各通訊設備，伺服器及工作站的系統時間一致，故各通訊系統必須與時間伺服器進行時間同步。各系統須以網路時間協定(NTP)方法與架構來達成各主機間的時間同步。時鐘系統在行控中心通訊設備房安裝母鐘設備取得 GPS 標準時間，是為第一層時鐘參考來源，各車站設有次母鐘、數位子鐘分別與其上層時間伺服器做時間同步。

In order to make consistent in system time among communications equipment, servers and workstations, therefore the communication system must have be time synchronized with time servers. The system shall use Network Time Protocol(NTP) methods and architecture to achieve time synchronization among various hosts. The Clock system will allocate a master clock device to get GPS standard time in the OCC communications equipment room which will act as the first layer of the clock reference source, the station has a sub-master clock, digital clock which will respectively do time synchronization with upper layer time server.

2.3.1 行控中心 CMFT 時鐘 CMFT CLOCK AT OCC

CMFT 伺服器將以母鐘做為時鐘伺服器，以 NTP 方式與母鐘進行時間同步。同時 CMFT 伺服器也是一第二層的時間伺服器，同樣的提供 NTP 方式讓 CMFT 主控台、行控中心其他通訊子系統伺服器（如 PA 伺服器、CCTV 伺服器）、ATS 伺服器、SCADA 伺服器等做時間同步。

CMFT server will use master clock as the time server, use NTP method to perform time synchronization with the master clock. Meanwhile CMFT server is also act as a second layer time server which also provides time synchronization service by NTP way for CMFT consoles, other servers of Communication subsystems (ex. PA server, CCTV server), ATS server, SCADA server, etc.

2.3.2 備援行控中心 CMFT 時鐘 CMFT CLOCK AT ROCC

在備援行控中心另設有一備援母鐘。備援行控中心所有伺服器與工作站將使用與行控中心相同的時間同步階層架構設定進行時間同步。

In redundant OCC will allocate another backup master clock, all servers and workstations in redundant OCC will use the same time synchronization hierarchy and structure configurations with OCC to perform time synchronization.

2.3.3 時間同步設計架構 TIME SYNCHRONIZATION ARCHITECTURE DESIGN

時間同步系統設計架構如下：

System design for time synchronization is as follows:

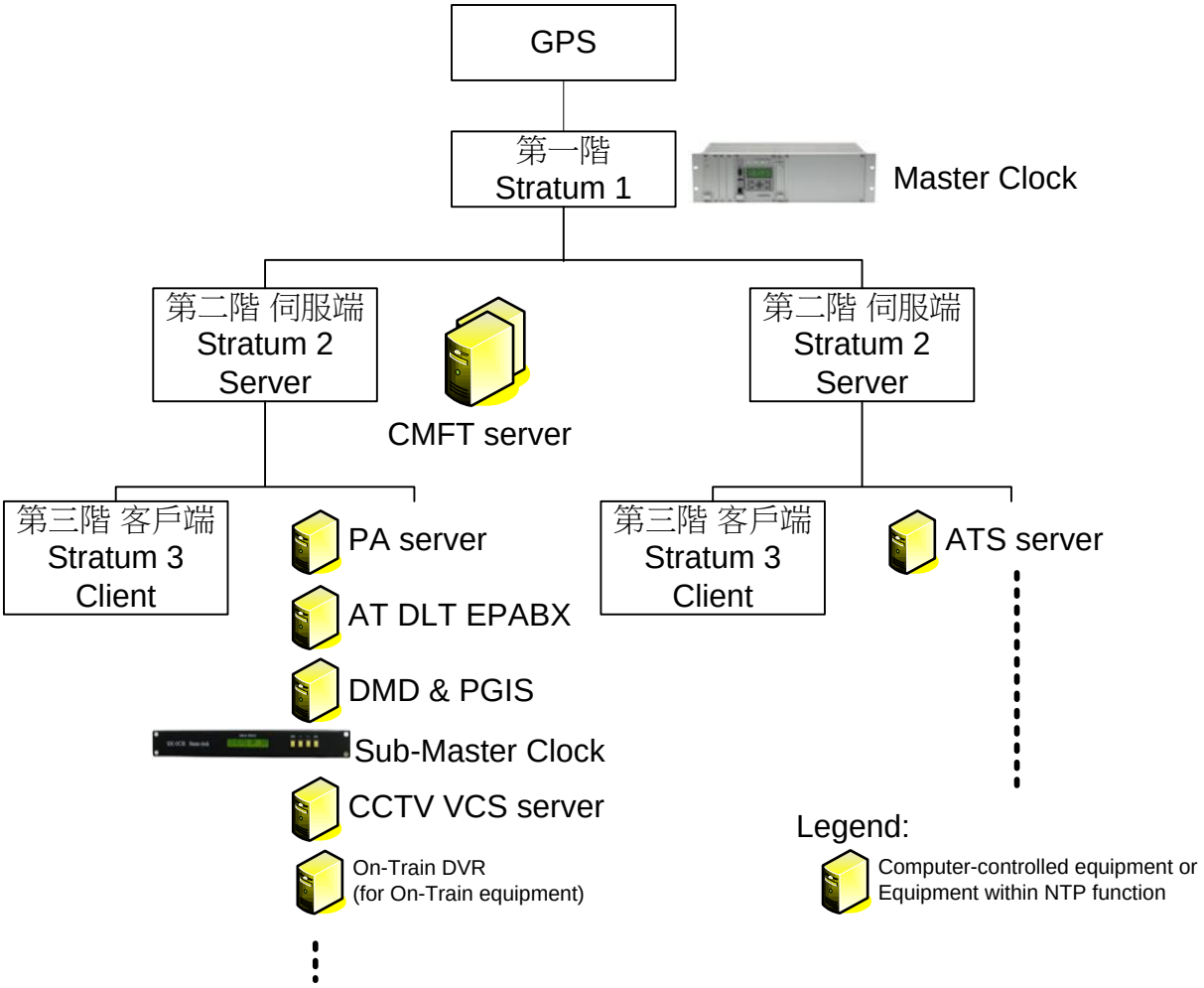

圖 2-32: NTP 協定階層架構圖

Figure2-32:NTP Protocol Stratum Structure Diagram

2.3.4 NTP 失效處置 NTP OUT OF SERVICE DISPOSAL

若是母鐘失效時，請手動調節 CMFT 伺服器，則以下子系統仍舊同步 CMFT 伺服器時間，若為 CMFT 系統 NTP 對時服務失效，請手動調節各子系統軟硬體的相關時間，直到修復 NTP 功能。

If the master clock fails, manually adjust the CMFT server. The following subsystems still synchronize the CMFT server time. If the CMFT system fails to service the NTP server, manually adjust the time of each subsystem hardware and software until the NTP is repaired.

2.4 告警管理 ALARM MANAGEMENT

CMFT 伺服器上將安裝告警監視軟體負責整合各通訊子系統之設備告警資訊，將告警資訊依嚴重等級以不同顏色與警音顯示於 CMFT 主控台畫面上提示行控中心操作員，達到即時監控之目的。CMFT 主控台端提供三大系統進行語音作業，包含車站廣播、無線電語音通訊以及告警音效，每一個系統與語音輸入與輸入皆為獨立設備，故告警音量的輸出為獨立網卡與喇叭，不會與其他系統衝突。

Alarm monitoring software will be installed on the CMFT server, and is responsible for integrating equipment alarm information with the various communication subsystems, alarm information will be displayed on CMFT console screen in different colors and sounds according to the severity level of the alarm so that can inform operators in OCC to achieve real-time monitoring purposes. CMFT Console provides three systems for voice operations, including broadcast of station radio, radio communications and alarm sound, each system voice input and output are controled by independent equipment, so the alarm volume is outputed by the independent sound card and trumpet, won't be conflicted with other System

2.4.1 告警資訊來源 SOURCES OF ALARM INFORMATION

CMFT 告警資訊主要來自三個部分：

CMFT alarm information mainly from two parts:

(1) 各通訊子系統的設備告警，包括 DLT、CCTV system、PA system、DMD、TETRA 系統、OTC 系統及 FOT 等之設備。

Communication subsystems' equipment alarms, include equipment of DLT system, CCTV system, PA system, DMD system, TETRA system, OTC system and FOTsystem etc.

(2) CMFT 操作告警及系統告警。

CMFT operational alarms and system alarms.

(3) DCS NMS 傳送的告警。整合 DCS NMS 告警資訊供 CMFT 操作員參考。

Alarms from DCS NMS.Integrated DCS NMS alarm information for CMFT operator.

表格 2-3 說明與各系統資訊交換介面方式。

Table 2-3 described the information exchange interfaces with various systems.

表 2-3: 與各子系統警報介面清單

Table 2-3: Alarm Interface List with Subsystems

子系統 **Subsystem**	目標伺服器 **Object Server**	通訊方式 **Communication Method**	所在位置 **Location**
直線電話系統 DLT System	CTI/TAPI Server	SNMP	OCC
閉路電視系統 CCTV System	VCS	SNMP	OCC
廣播系統 PA System	PA Server	Socket	OCC
點矩陣顯示系統 DMD System	DCU	Socket	Station

列車通訊設備 OTC System	TRIU	Socket	Train
數位無線電 TETRA	CRS	SNMP	OCC
光纖傳輸系統 FOT	FOT Server	SNMP	OCC
時鐘系統 Clock	Clock Server	SNMP	OCC

圖 **2-33** 說明系統告警架構規劃：

System alarm architecture planning is as figure**2-33**:

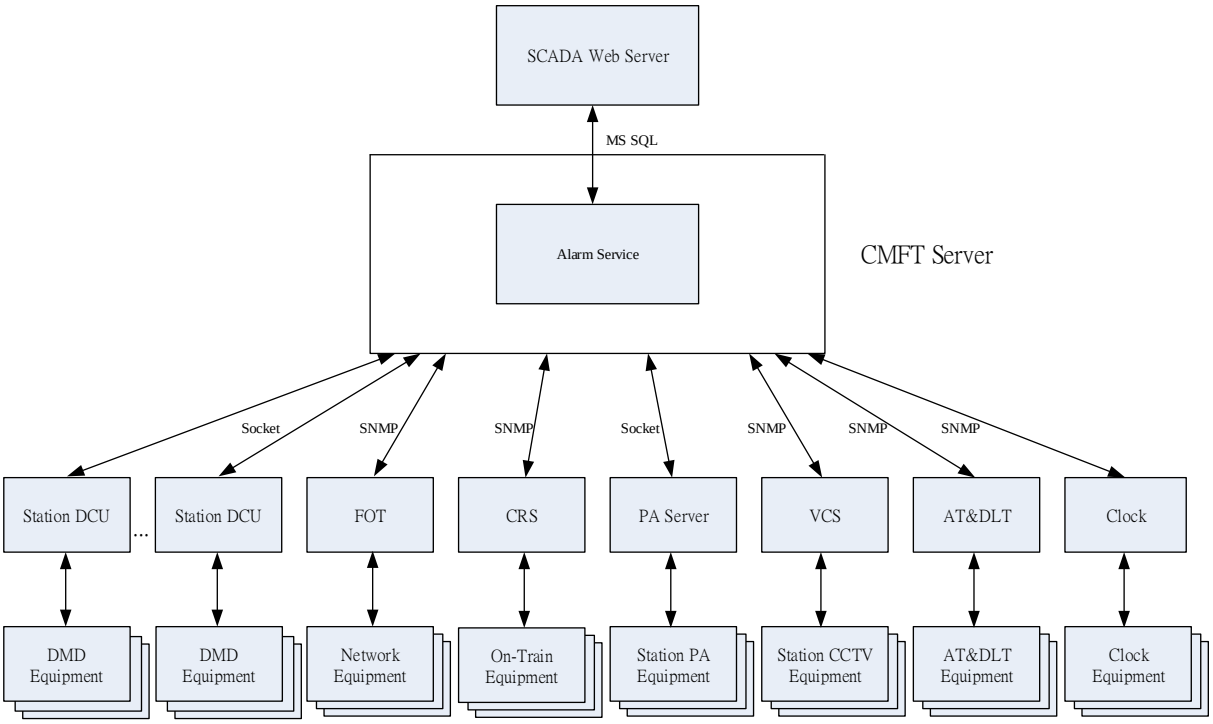

圖 2-33: 系統警報架構

Figure 2-33:SystemAlarm Architecture

2.4.2 告警處理 ALARM HANDLING

CMFT 針對告警的處理原則是依告警的”緊急程度”不同而有不同的”告警方式”。”緊急程度”與”告警方式”採參數化設計，管理者可依據需求設定個別告警訊息的”緊急程度”與”告警方式”。

主要通訊設備的故障訊息，依”告警方式”參數化的設定方式，可以選擇告警是否傳送給 SCADA 網路伺服器。

For the principle of alarm processing in CMFT, are in accordance with the principle of "Urgency" different and have different "Alarm way". "Urgency" and "Alarm way" take the parametric design, administrators can set the "Urgency" and "Alarm way." of individual alarms based on demand.

Communication equipment failure message will be sent to SCADA Web Server which according to the setting of the Alarm parameters.

2.4.2.1 告警等級分類 ALARM SEVERITY CLASSIFICATION

系統告警將分為 1~5 級的 5 種嚴重等級，並且會預先定義每個告警等級的告警方式，包括告警顏色以及告警聲音。告警方式採參數化的設計方式讓管理者可依照需求修改告警方式，包括顏色與聲音。表 **2-4** 說明預先定義的告警方式。

System alarm will be divided into five kinds of severity, 1 to 5 grade, and will previously definesthe display ways for each alarm severity, including colors, and sounds.Alarm way is adopted parametric design approach allows administrators to modify the alarm way based on requirements, including color and sound. Table **2-4** describes the predefined alarm ways.

表 2-4: 告警等級

Table 2-4: Alarm Severity

嚴重程度 Severity	確認需求 Ack - Required	告警顏色 Alarm Color	告警聲音 Sound	閃爍 Blinking	傳送 SCADA Sent to SCADA
1 – Very High	是 Yes	Red(255,0,0)	警示音 1 Warning sound 1	是 Yes	是 Yes
2 – High	是 Yes	Yellow(255,255,0)	警示音 2 Warning sound 2	是 Yes	是 Yes
3 – Operational	是 Yes	Cyan(0,255,255)	警示音 3 Warning sound 3	是 Yes	是 Yes
4 – Low	否 No	Amber(251,191,0)	無 NO	否 No	否 No
5 – Very Low	否 No	White(255,55,255)	無 NO	否 No	否 No

當進行告警等級的提示設定時，只要告警聲音與閃爍的功能存在，則『確認需求』一定為 YES，以提供操作員在進行確認後，可以解除提示音與主畫面車站的告警閃爍。

When the alarm level setting is made, the "confirmation request" must be YES as long as the alarm sound and flash function are setted up, so that the operator can cancel the alarm sound and the alarm flash for station button on the main screen after confirming.

2.4.2.2 告警訊息定義 ALARM MESSAGE DEFINITION

CMFT 將設有”告警訊息定義”資料表，其定義了每個告警訊息的屬性，定義的項目包括：告警代碼、系統別、設備別、嚴重等級及告警內容等。”告警訊息定義”資料表中將預先輸入各通訊子系統的告警訊息定義資料，並將提供圖形介面讓管理者可修改每一種告警定義的等級，以符合告警的需求。

Table 2-5 描述了告警代碼之規劃：

CMFT will have a "Alarm Definition" table which defines the properties of each alarm message, definition items includes: alarm code, system types, equipment types, severity and alarm content.All of the alarm definition data for various communication subsystems will be pre-entered into "Alarm Definition" table, and provides a graphical interface allows administrators to edit the level of each alarm message definitions, to meet Alarm demand.

Table 2-5 describes the planning of alarm code:

表 2-5: 告警代碼範圍

Table 2-5: Ranges of Alarm ID

子系統 Subsystem	告警代碼 Alarm Code
FOT	0000 ~ 0999
CMFT	1000 ~ 1999
DLT	2000 ~ 2999
CCTV	3000 ~ 3999
TETRA	4000 ~ 4999
OTC	5000 ~ 5999
DMD	6000 ~ 6999
PA	7000 ~ 7999
SCADA	8000 ~ 8999
CLOCK, Server	9000 ~ 9999

2.4.2.3 告警訊息顯示與記錄 ALARM DISPLAY AND LOGGING

當 CMFT 告警軟體監視到設備告警時，會依據告警代碼從”告警訊息定義”資料表取得訊息定義資訊，然後組合成告警訊息，告警訊息欄位將包含：告警時間、告警代碼、設備代碼、系統別、設備別、嚴重等級及告警內容等，將此告警資訊記錄於”歷史告警記錄”資料表中，並傳送給各 CMFT 主控台即時顯示告警訊息，當 CMFT 主控台軟體接收到此告警訊息時，將依據告警訊息嚴重等級以定義的顏色及警音即時顯示告警資訊，提醒操作員。

When CMFT alarm software monitored an equipment alarm, it will retrieve the alarm definition information from the "Alarm Definition" table based on the alarm code, and then combined into alarm message, alarm message data fields will include: alarm time, alarm code, equipment code, system types, equipment types, severity and alarm content, this alarm message will be recorded into the "Historical Alarm" table, and send to each CMFT console for real-time display,when CMFT console software receives the alarm message, it will real-time display the alarm message in pre-defined color and sound based on a severity to alert the operators.

當告警的等級需要操作員進行確認流程，告警訊息的主畫面將會提供『確認』按鈕，供操作員可以進行確認機制。當告警尚未進行確認，若有設置告警音與閃爍提示，則主控台將會持續聲響或閃爍。若有多個未確認的告警，閃爍及聲音的提示邏輯依照等級優先，若同等級的告警則依照告警事件發生的先後次序，先進先出。列車事件的告警聲音另外制定七個特別的提示音，此七種告警音大於任何等級的提示音。

When the alarm level setting requires that the operator need to do a confirmation, the alarm page will provide the "confirmation" button on the alarm table. When the alarm has not yet been confirme and is setted to sound or flash, the console will continue to sound or flash. If there are multiple unconfirmed alarm, flashing and voice prompt logic in accordance with the level of priority. At the same level of alarm, the sound or flash are in accordance with the alarm occurred in the order. For the seven alarm events from the train, the sound and flash logic is Priorityer than level 1.

2.4.2.4 歷史告警查詢 HISTORICAL ALARMS QUERY

CMFT 軟體提供歷史告警資訊查詢功能，操作員可設定不同的查詢條件查詢歷史告警資訊，包括：告警起迄時間、系統別、設備別、設備代碼、嚴重等級及訊息內容關鍵字等，操作員亦可對此查詢結果進行列印以或匯出，詳細的人機操作介面設計將於”通訊多功能操作台系統–系統軟體”文件中描述。

CMFT software provides the query function about historical alarm data, operators can set different query conditions to search history alarm data, including: starting and ending time of alarm, system type, equipment type,

equipment code, severity and keywords of message content, etc., operators can also print or export the query results, detailed human-machine interface design will be described in the "Communications Multi-Function Terminal - System Software" document.

告警訊息將會儲存於"歷史告警記錄"資料表中，此資料表將規劃保留最近 14 天的歷史資料。

Alarm message will be stored in the "Historical Alarm" table, the table will be planned to keep the last 14 days of historical data.

2.4.3 告警管制設備清單 ALARM CONTROLLED EQUIPMENTLIST

CMFT 告警軟體管制的各通訊子系統設備清單如下表：

The various communication subsystems equipment list which CMFT alarm software controlled of,are as the following table:

表 2-6: 告警管制設備清單

Table 2-6: Alarm Controlled Equipment List

子系統 Subsystem	設備名稱 Equipment Name	地點 Location
通訊多功能操作台 CMFT	通訊多功能操作台伺服器 CMFT Server	行控中心, 備援行控中心 OCC, ROCC
	通訊多功能操作台主控台 CMFT Console	行控中心, 備援行控中心 OCC, ROCC
閉路電視 CCTV	影像控制伺服器 VCS	行控中心, 備援行控中心 OCC, ROCC
	監看工作站 Surveillance Workstation	機廠, 車站 Depot, Station
	數位影像錄放影機 DVR	機廠, 行控中心, 車站 Depot, OCC, Station
	磁碟陣列 Disk Array	機廠, 行控中心, 車站 Depot, OCC, Station
	IP 網路攝影機 IP Camera	機廠, 車站, 列車 Depot, Station, Train
時鐘 CLOCK	母鐘 Master Clock	行控中心, 備援行控中心 OCC, ROCC
	次母鐘 Sub-Master Clock	車站 Station
點矩陣顯示器	顯示器控制單元 DCU	車站 Station

子系統 Subsystem	設備名稱 Equipment Name	地點 Location
DMD	月台顯示器 PDU	車站 Station
	大廳顯示器 CDU	車站 Station
自動電話/直線電話 AT/DLT	多媒體閘道器 Media Gateway	機廠,車站 Depot, Station
	電子數位用戶交換機 EPABX	行控中心,備援行控中心 OCC, ROCC
	CTI 電腦 CTI&TAPI Computer	行控中心,備援行控中心 OCC, ROCC
	數位錄音設備 Digital Audio Recorder	行控中心 OCC
廣播 PA	混音單元 Mixer Unit	車站 Station
	車站主控制單元 Station Main Control Unit	車站 Station
	列車離站音產生器 Train Departure Tone Generator	車站 Station
	功率放大器 Amplifier	車站 Station
	火警廣播控制設備 Fire PA Control Equipment	車站 Station
	控制面盤 Main Control Unit	車站 Station
	自動切換單元 Auto Switch Over Unit	車站 Station
	廣播伺服器 PA Server	行控中心,備援行控中心 OCC, ROCC
列車通訊設備 OTC	車載旅客資訊顯示器 PIDS	列車 Train
	TETRA 無線電介面單元 TETRA Radio Interface Unit	列車 Train
	TETRA 無線電控制平台 TETRA Radio Control Panel	列車 Train
	旅客對講機 Passenger Intercom	列車 Train
	閉路電視 CCTV	列車 Train
	語音放大器 Audio Amplifier	列車 Train
	TETRA 無線電車機 TROU	列車 Train
無線電系統 TETRA	基地台 Base Station	
	控制交換中心 SCN	行控中心, 備援行控中心 OCC, ROCC
	控制室伺服器 Control Room	行控中心, 備援行控中心

子系統 Subsystem	設備名稱 Equipment Name	地點 Location
	Server	OCC, ROCC
	網路管理終端機 Network Management Terminal	
	派遣台 Dispatcher	行控中心 OCC
光纖傳輸系統 FOT	SDH	行控中心,備援行控中心,車站 OCC, ROCC,Station
	E1 多工機 E1 MUX	
	超高速乙太網路交換器 Gigabit Ethernet Switch	

2.5 系統管理 SYSTEM MANAGEMENT

CMFT 系統管理主要分成三個部分：

CMFT management is divided into three parts

- 使用者管理 User Management

  每一使用者帳號皆設有存取權限，使得資料存取皆受到安全控管。

  Each user account has his access right, making data access are subject to security control.

- 應用程式管理 Application Management

  監視 CMFT 應用軟體，並即時反應與處理系統異常，增加系統可用度。

  Monitoring CMFT application software and real-time response and handling system exception, increase system availability.

- 主控台管理 CMFT Console management

  每一主控台皆需要通過 CMFT Server 授權才可以進行連線，以此程序進一步確保系統安全。

  Every CMFT console mustget the authorization from CMFT server to connect to CMFT server, this process enhances system security.

表 2-7: CMFT 主控台與主要通訊功能的限制表

Table 2-7:CMFT Console communication function limitations

		操作員 B Operator B					
		CCTV	DLT	DMD	OTC	PA	TETRA
	CCTV	●*1	○	○	○	○	○

操作員 AOperator A	DLT	○	○	○	○	○	○
	DMD	○	○	○	○	○	○
	OTC	○	○	○	●*2	○	○
	PA	○	○	○	○	●*3	○
	TETRA	○	○	○	○	○	○

○: 可執行, ●: 有限制條件

○: Executable, ●: Restrictions

*1: 最多只能有兩個席位使用 CCTV 調閱歷史影像.

*2: 不同主控台在執行列車廣播時，無法同時對同一列車廣播，但可以同時對不同列車廣播.

*3: 不同主控台在執行車站廣播時，無法同時對同一車站廣播，但可以同時對不同車站廣播.

*1: Allow 2 CMFT console playback historical image at the same time.

*2: Different consoles can be broadcast to different stations, but cannot broadcast to the same station at the same time.

*3: Different consoles can be broadcast to different trains, but cannot broadcast to the same train at the same time.

2.5.1 使用者管理 USERMANAGEMENT

操作員使用 CMFT 主控台上的圖形介面軟體來監視與操作通訊設備，他們的操作行為必須受到控管。CMFT 採兩層式之帳號設定來控管系統的使用者，系統必須先建立角色，然後才能建立帳號並為該帳號指定角色。帳號之新增與刪除必須由管理員身分者才能執行。

Operators used GUI software to monitor and operate communication equipment on CMFT Console, and their operating behavior must be controlled and managed. CMFT adoptstwo-tier account settingsto control and manage system users, the system must first establish roles before you can create an account and assign a role for the account.To add or to delete an account must be performed by who has the administrator role.

- 角色 Role

  角色意指操作者的執掌，角色不同操作權限也會有不同。CMFT 將預先定義下列角色，管理員可依需求做新增、刪除或修改角色權限。權限的設定方式是讓管理員指定該角色在每個畫面的”讀”與”寫”的權限。

  Role means the operator’s duty, different roles will have different operating authorities. CMFT will pre-define the following roles, and the administrator can add, delete or modify the role permissions based on requirements. The way of permission settings is allowed administrators to specify the role’s"read" and "write" permissions on each screen.

表 2-8: 角色與權限對照表

Table 2-8:Roles and Permissions Mapping Table

	管理員 Administrator	主任控制員 Chief	Traffic Management and Supervision 正線控制員	Station Equipment Controller 車站控制員	電力控制員 Power Supply Manager	機廠控制員 Depot Controller	維修員 Maintenance Staff
閉路電視 CCTV							
監看牆上監視器 Monitoring of Wall-Mounted Monitor	●	●	●	●	●	●	
變更牆上監視器影像 Change Video Image on Wall-mounted Monitor	●	●	●	●	●	●	
Speed Dome Camera 操作 Speed Dome Camera Operation	●	●	●	●	●	●	
歷史影像調閱與下載 Video Image Access and Download	●	●	●	●	●	●	
點矩陣顯示 DMD							
手動輸入即時訊息顯示 Manual Input Real-Time Message Display	●	●	●	●			
預錄訊息顯示 Pre-recorded Message Display	●	●	●	●			
訊息排程編輯與下載 Schedule Message Edit and Download	●	●		●			
開啟/關閉車站顯示器 On/Off Station DUs	●	●		●			
廣播 PA							
預錄語音廣播 Pre-recorded Broadcast	●	●	●	●	●	●	
即時語音廣播 Live Broadcast	●	●	●	●	●	●	
廣播排程編輯 Broadcast Schedule Edit	●	●		●			

	管理員 Administrator	主任控制員 Chief Supervision	Traffic Management and Traffic 正線控制員 Controller	Station Equipment 車站控制員	電力控制員 Power Supply Manager	機廠控制員 Depot Controller	維修員 Maintenance Staff
OTC							
預錄語音廣播 On-Train Pre-recorded Broadcast	●	●	●	●			
即時語音廣播 On-Train Live Broadcast	●	●	●	●			
服務對講機通訊 Service Intercom	●	●	●	●			
旅客緊急通訊 Passenger Emergency Intercom	●	●	●	●			
動態啟動旅客緊急通訊 Dynamic Activated Passenger Emergency Intercom	●	●	●	●	●	●	
車載旅客資訊訊息廣播 Onboard PID Message Display	●	●	●	●	●		
直線電話 DLT							
直線電話通話資訊顯示 Display information of DLT Phone Set of OCC	●	●	●	●	●	●	●
數位無線電 TETRA							
個別呼叫 Individual Call	●	●	●	●	●	●	●
群組呼叫 Group Call	●	●	●	●	●	●	●
短訊 SDS	●	●	●	●	●	●	●
系統 System							
使用者管理 User management							
登入/登出 Login/Logout	●	●	●	●	●	●	●

	管理員 Administrator	主任控制員 Chief Traffic Supervision	Management and Traffic Controller 正線控制員	Station Equipment 車站控制員	電力控制員 Power Supply Manager	機廠控制員 Depot Controller	維修員 Maintenance Staff
權限管理 Permission Management	●						
操作記錄查詢 Operation Logging	●	●					
應用程式管理 Application management							
程式監視 Application monitoring	●	●					
告警 Alarm							
設備告警監視 Equipment Alarm Monitor	●	●	●	●	●	●	●
告警顯示與記錄 Alarm Display and Logging	●	●	●	●	●	●	●
報表輸出 Report Exporting	●	●	●	●	●	●	●

- 系統管理員 System Administrator

  系統管理員擁有全部管理及操作權限，所有帳號及角色必須經由系統管理員來做新增、修改與刪除之維護，系統將會預先建立一系統管理員帳號擁有管理員角色。系統管理員角色的權限無法修改，此角色對所有功能皆擁有最高權限。

  System administrators have full management and operational authority, and all the accounts and roles maintenance must be performed by the administrators to add, modify and delete the accounts and roles, the system will pre-establish system administrator account that has administrator role. The role permissions of System Administration cannot be modified, this role has the highest authority for all functions.

- 帳號 Account

  使用者使用操作 CMFT 人機介面軟體前必須先登入個人帳號，系統會依據帳號的角色權限配置適當的操作環境供使用者操作。每一系統帳號皆為唯一，必須由系統管理員來執行帳號之新增。

  Users must first login using their personal account before operating CMFT HMI software, and the system will allocate an appropriate operating environment

based on the role permission of the account for user operation.Accounts in the system are all unique, create a new account must be performed by the system administrator.

帳號驗證規則 Account Rule：

(1) 每一系統帳號皆為唯一。

(2) 初建帳號時密碼統一為預設密碼，管理員腳色協助恢復密碼時也為預設密碼。

(3) 第一次登入時要強制使用者修改密碼。

(4) 三個月未修改密碼者要強制該使用者變更密碼，三個月內若有自行修改過密碼則重算時間。

(5) 密碼修改時，新舊密碼不可相同。

(6) 密碼內需包含英文大小寫、數字，允許輸入空格以及特殊字元，密碼長度需於限制為 8 碼～16 碼。

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(1) Each system account is unique

(2) The initial password is unified default data, when the administrator role to help restore the password, the password is the same, the default password.

(3) When the password is modified, the old and new passwords can not be the same.

(4) When account login first time, the user is forced to change the password.Three months without change the password to force the user to change the password, because the password has been modified by the re-calculation time each three months.

(5) When the password is modified, the old and new passwords can not be the same.

(6) Password needs to include English capitalization, numbers, allowing the entry of spaces and special characters, the password length to be limited to 8 yards to 16 yards.

- 限制 Limitations

為系統效能的考量，使用者帳號與角色的數量將受到以下的限制：

表 2-9: 使用者帳號限制

Table 2-9:Limitations of User Account

項目 Item	數量限制 Limitation
角色 Role	32
帳號 Account	1024

2.5.2 應用程式管理 APPLICATION MANAGEMENT

CMFT 設有應用程式管理軟體，其主要管理功能如下：

CMFT provides application management software, its main management functions are as follows:

- 應用程式之啟動與停止 Applications Startup and Shutdown

  CMFT 伺服器端應用程式通常在作業系統啟動後會自動啟動，管理者無須手動啟動。除此之外，在 CMFT 伺服器端提供一圖形界面軟體供管理者手動啟動、終止或重啟全部、部分或單一應用程式。

  CMFT Server-side applications are typically automatically start after the operating system starts, managers need not to manually start it. In addition, CMFT server side provide a graphical interface software for managers to manually start, stop or restart the whole, part or a single application.

- 應用程式之監視 Applications Monitoring

  CMFT 設有應用程式監視軟體即時監視 CMFT 伺服器上所有的伺服程式狀態，若偵測到有異常終止除了會發出告警訊息通知使用者之外，並且會自動重新啟動該應用程式以增加系統的可用性。

  CMFT provide with a real-time application monitoring software to monitor of the state for all daemon applications running on the CMFT server, if there is abnormal termination detected, it will issue an alarm message to alert users, in addition, it also will automatically restart the application to increase system availability.

CMFT 採參數化設計來管理伺服器應用程式，系統會預先將所有應用程式建立於”應用程式配置”資料表中，應用程式管理軟體依據”應用程式配置”資料表的設定來管理所有應用程式。”應用程式配置” 資料表的的設定內容將包括：

CMFT adopts parametric design to manage server applications, the system will pre-build all the applications in the "Application Configuration" table, the application management software based on "Application Configuration" table settings to manage all applications. The content of "Application Configuration" table settings will include:

表 2-10: 應用程式配置資料表

Table 2-10:Application Configuration Table

欄位	說明
影像名稱 image name	執行檔名稱 name of the execution file
應用程式描述	應用程式主要功能描述

欄位	說明
application description	application main function description
命令列 command-line	啟動應用程式所伴隨之參數 parameters associated with application startup
監視旗標 monitoring flag	應用程式監視指標 application monitoring indicator
自動重起旗標 automatic restart flag	應用程序異常終止自動重新啟動指標 automatic restart indicator for application abnormal termination

2.5.3 主控台管理 CMFT CONSOLE MANAGEMENT

CMFT 設有主控台管理，授權主控台與 CMFT 伺服器連線的權力，不在授權清單上的主控台，無法執行 CMFT 之功能。管理員可以透過主控台配置資料表瞭解 CMFT 主控台的數量與登入狀態，也可以達成 CMFT 主控台增減與配置的管理。

未來擴充之需求。

CMFT provides console management function to empower consoles to connect to CMFT Server. The console must in CMFT authoritylist to provide CMFT functions.

Administrators can use CMFT Console allocation table to understand the number of CMFT consoles used, logging status and console allocation management.

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CMFT 主控台配置位置與功能差異如下表：

CMFT functions in OCC room and Maintenance room:

表 2-11: CMFT 主控台功能表

Table 2-11:CMFT Console function table

	行控中心/備援行控中心 OCC/ROCC	行控中心維修室 Maintenance Room
直線電話系統 DLT	●	●
閉路電視系統 CCTV	●	○ *1
廣播系統 PA	●	
點矩陣顯示系統 DMD	●	
OTC 系統 OTC	●	
數位無線電 TETRA	●	●

●完整功能 Full functionality

○部分功能 Part of functionality

當主控台不允許操作功能時，操作員擁有該功能權限，也無法在這個主控台上啟用該功能。

Even operators possess the operational functions which are not permitted CMFT console still can not activate these functions.

CMFT 主控台配置位置也可以根據區域來分配權責，如在區域內的列車與車站估能進行分區管制或者權責差異顯示。

CMFT console configuration location can also be based on regional distribution of authority, such as in the region of the train and the station can be divided into district control or duty differences show.

2.6 ATS 訊息介面 ATS MESSAGE INTERFACE

CMFT 系統透過 TCP/IP 通訊方式自動接收所有來自 ATS 的訊息，若於 90 秒內未收到 ATS 訊息，CMFT 系統將會發出告警資訊。以下描述，ATS 將提供的主要訊息內容與格式。

Through TCP / IP communication automatically, CMFT system receive all messages from the ATS. If the ATS message is not received within 90 seconds, the CMFT system will make an alarm message. The following describes the main detail about the packects that ATS will provide the message contents and formation.

2.6.1 列車狀態訊息 TRAINS STATUS

ATS 系統中通電列車狀態的訊息。

一個封包涵蓋 n 組列車的資訊。

每個列車所包含資訊為以下所述：

The message is about the active trains information.

A packet is composed of the information of all active trains

The content of a train is following：

1) 列車永久號 Train PVID
2) 列車追蹤號 Train TID
3) 列車是否在手動模式 Train VR Control Vehicle Regulation
4) 列車是否在月台內暫停 Hold Train Status
5) 列車是否未回應 ATS 命令 Dead Train Status
6) 列車停在月台的停留時間是否要延長 Train Dwell Extended Status
7) 列車是否為救援車 Rescue Train
8) 列車是否為休眠模式 Train Sleep Mode Status

2.6.2 月台資訊 PLATFORM INFORMATION

每個月台 20 分鐘內即將到站的列車群，若 20 分鐘內無即將到站的列車，將提供最近一輛到此月台的列車群訊息。

一個封包就是送 m 個月台，每個月台內含 1-n 組即將到站列車資訊 。

每個月台所包含資訊為以下所述：

The message information contains the last coming train or the trains arrived during the 20 mins for eachl platform. A packet is composed of the information of all platforms, each platform is including 1-n trains informations.

The content of each platform is following：

1) 車站和月台代號 Platform 1 ID
2) 月台開放狀態 Status (status, 1 – 開放 open, 2 – 關閉 closed, 3 – 單側開放 single tracking, and 4 – 未知 unknown)

   後面緊接著是 1-n 組即將到站列車資訊

   Followed by a 1-n group of upcoming train information
3) 列車永久號 Train PVID

4) 預計到站時間 Train Arrival Time
5) 預計離站時間 Train Departure Time
6) 列車跑過幾趟計畫 Train Run ID
7) 列車是否將停在此月台 Train Stopping
8) 表示估計到站和離站時間是否準確 Train Accurate
9) 列車是否提供載客服務 Train Loading
10) 表示列車行駛方向 Train Direction
11) 是否為 Track 1(上行)上的最後一班列車 Train is Last Train on Track 1
12) 是否為 Track 2(下行)上的最後一班列車 Train is Last Train on Track 1
13) 列車預計開往的終點站 Train Destination Platform
14) 表示該 Station 是否為終點站 Train is on Terminus Station
15) 以下重複(3)~(14)的資料，表示該月台即將抵達的第 2 ~ n 班列車資訊
Below, the information of items 3 to 14 will be repeated about Train 2 ~ Train n Informations

2.6.3 列車停站錯誤 TRAIN BERTHING ERROR

當列車進月台停車後發現位置錯誤時會發送此封包
封包內含資訊為以下所述：
When the train will enter to the platform, ATS will send the packet to CMFT.
The content is following：

1) 列車永久號 PVID
2) 車站代號 Station ID
3) 月台代號 Platform ID
4) 是否嘗試重停 Berthing Error
(1=嘗試重停，2=不嘗試重停或重停失敗)
(1=Try to park again, 2= do not try to repark or repark failed)

2.6.4 列車進入月台 TRAIN ARRIVING AT PLATFORM

當列車準備進入月台時會發送此封包
封包內含資訊為以下所述：
When the train will enter to the platform, ATS will send the packet to CMFT.
The content is following：

1) 列車永久號 PVID

2) 車站代號 Station ID
3) 月台代號 Platform ID

2.6.5 列車離開月台 TRAIN LEAVES AT PLATFORM

當列車準備離開月台時會發送此封包
封包內含資訊為以下所述：
When the train will leave the platform, ATS will send the packet to CMFT.
The content is following：

1) 列車永久號 PVID
2) 車站代號 Station ID
3) 月台代號 Platform ID

2.6.6 列車位置訊息 TRAIN LOCATION MESSAGE

ATS 系統中通電列車的位置訊息。
一個封包涵蓋 n 組列車的資訊。
每個列車所包含資訊為以下所述：
The message is location informations from the actives trains.
A packet is composed of the information of all active trains
The content of a train is following：

1) 列車永久號 Train PVID
2) 列車追蹤號 Train TID
3) 列車所在位置(前端軌道感測) Train Location
4) 列車所佔據的軌道電路區間 Train Occupied Track Circuit

2.6.7 月台警報訊息 PLATFORM ALARM INFORMATION

當任一月台的告警狀態有改變時也會發送封包。
一個封包只包含一個月台的 12 個 doors
When any alarm status of the doors on the platform is changed, ATS will send packets to CMFT server.
A packet contains only a platform with12 doors
The content is following：

1) 車站代號 Station ID

2) 月台代號 Platform ID
3) 1 號月台門的告警狀態 PSDS Door 1 Obstruction Status
4) 2 號月台門的告警狀態 PSDS Door 2 Obstruction Status
5) 3 號月台門的告警狀態 PSDS Door 3 Obstruction Status
6) 4 號月台門的告警狀態 PSDS Door 4 Obstruction Status
7) 5 號月台門的告警狀態 PSDS Door 5 Obstruction Status
8) 6 號月台門的告警狀態 PSDS Door 6 Obstruction Status
9) 7 號月台門的告警狀態 PSDS Door 7 Obstruction Status
10) 8 號月台門的告警狀態 PSDS Door 8 Obstruction Status
11) 9 號月台門的告警狀態 PSDS Door 9 Obstruction Status
12) 10 號月台門的告警狀態 PSDS Door 10 Obstruction Status
13) 11 號月台門的告警狀態 PSDS Door 11 Obstruction Status
14) 12 號月台門的告警狀態 PSDS Door 12 Obstruction Status

2.6.8 列車事件警報訊息 CCTV ACTIVATION ALARM

當任一列車上產生異常事件會發送封包。
共包含九種事件
When any alarm is detected from the train, ATS will send packets to CMFT server.
A packet contains 9 events ：
1=站間停車 Unintended Stop between Stations
2=列車偵煙器作動 Fire Detection on Board
3=拉下緊急疏散裝置 EED Pulled
4=異常車門開啟 Abnormal Door Opening
5=車載控制器連結失敗 CC Failure
6=車門內部把手被拉下 DIH/DEH Pulled
7=車門功能障礙 Vehicle Door Obstructed
8=障礙物偵測異常 Obstacle Detetctor Activated
9=脫軌檢測器偵測異常 Derailment Detector Activated

封包內容如下
The content is following：

1) 訊息長度 Msg Length
2) 訊息類別(O 表示列車告警訊息) Msg Type (O= Train Alarm Message)
3) PVID 列車永久編號

4) 車廂代碼 Car ID
5) 車門號碼 Door ID
6) 告警事件代碼(如上 1~9) Alarm Type (avobe nine code)
7) 告警狀態(1=告警驅動) Alarm State (1=active alarm condition)

2.7 CMFT 與個子系統通訊 LOG 紀錄架構格式 THE LOG RECORDED FORMAT FOR CMFT AND EACH SUB-SYSTEM

CMFT 伺服器中，各子系統皆有相對應的服務進行雙方訊號擷取與溝通。所有的通訊紀錄皆會儲存於 CMFT 主伺服器中，保留三個月內的所有通訊資料，檔案路徑統一為 CMFT 系統下，LOG 資料夾裡。各個子系統皆為一組資料夾進行一天一個日程檔紀錄。負責各自子系統通訊的服務皆為 Agent，故資料夾名稱為 CMFT_XXXAgent，其中 XXX 為個子系統命名或縮寫，所有通訊紀錄將保留於每個子系統的 Agent 命名的資料夾中，例如，直線電話的所有通訊紀錄於 LOG\CMFT_DltAgent 資料夾下，以時間開頭 yyyyMMDD_CMFT_DltAgemt.optl 之檔案。

n the CMFT server, each subsystem has a corresponding service for both signal acquisition and communication. All communication records will be stored in the CMFT master server. All communication data in three months will be kept. The file path is unified into the CMFT system and the LOG folder. Each subsystem is a set of folders for a daily schedule. The services responsible for the communication of their respective subsystems are named by XXXAgents, so the folder name is CMFT_XXXAgent, where XXX is the name or abbreviation of the subsystem. All communication records will be kept in the agent named folder of each subsystem, for example, all of the direct-line phones. The communication is recorded in the LOG\CMFT_DltAgent folder and starts with the file yyyyMMDD_CMFT_DltAgemt.optl.

LOG 格式皆統一為以中括號[ ]內容為時間開頭，其中紀錄時間為時分以及毫秒，再根據各子系統通訊協定與邏輯記錄所有訊息交談過程。

The LOG format is unified with the brackets[ ] and time as the beginning, in which the recording time is in hours and milliseconds, and then all the message conversation processes are recorded according to the communication protocols and logic of the various subsystems.

2.8 備援設計 SYSTEM BACKUP DESIGN

通訊多功能操作台系統架構採備援設計以增加系統的可用性，又本系統的備援設計分成：本地備援(OCC)與異地備援(ROCC)，其設計架構將在下文中描述。

The system architecture of CMFT adopts redundant design to increase system availability, and the redundant design is divided into: local backup (OCC) and remote backup (ROCC), the design architecture will be described below the sections.

2.8.1 行控中心備援設計 REDUNDANCY DESIGN IN OCC

行控中心系統備援設計採用 Microsoft Windows Server 作業系統容錯移轉叢集技術做為系統備援的解決方案，以提供伺服器故障轉移的能力，增加系統的可用性。也就是說，當一部 CMFT 伺服器失效後，在行控中心的另一部 CMFT 伺服器會接管其服務，使得 CMFT 得以持續運作，達到長時間操作之目的。

At OCC, the system redundancy design adopts Microsoft Windows Server operating system failover clusterstechnologiesas the system backup solution, and it provides the server failover capabilities to increase system availability. That is, when a CMFT server fails, its service will be taken over by the other CMFT server at OCC, making the continued operation the CMFT to achieve long operating purpose.

2.8.1.1 備援設計的硬體規劃 HARDWARE PLANNING FORREDUNDANCY DESIGN

本系統採兩個節點的容錯移轉叢集設計，故在硬體規劃上有兩部 CMFT 伺服器以及一部實體連接至兩部 CMFT 伺服器的共用的儲存裝置，但是同時間僅能有一部 CMFT 伺服器能存取該儲存裝置。這二台 CMFT 伺服器分別設為主動伺服器（節點一）及備援伺服器（節點二），當節點一失效時，節點二將接管成為主動伺服器，在節點一復原後將重新接管成為主要伺服器。圖 **2-34** 說明連接到儲存裝置的兩個節點容錯移轉叢集。

儲存裝置配合 CMFT 伺服器備援規劃，亦為備援設計；其內含雙主動、熱抽換式 RAID 控制器、雙電源及 RAID5 磁碟保護機制。詳細資料請參考 6.1.2 通訊多功能操作台儲存系統 CMFT Storage System

The CMFT adopts two-node failover cluster design; therefore, there are two CMFT servers and a shared storage that is physically connected to the two CMFT servers, although the storage is only accessed by one CMFT server at a time.The two CMFT servers will be set up as the active server (node 1) and the standby server (node 2). When node 1 is failed, node 2 will take over and become main server. But node 1 will become active server after recovery. The diagram **2-34** shows a two-node failover cluster connected to a storage unit.

The Share storage also adopted redundancy design to coordinate with CMFT Server redundancy planning. It contains dual active, hot-swappable RAID controllers and power suppliers, and RAID 5 disk protection mechanism. Please refer to for detailed information.6.1.2 通訊多功能操作台儲存系統 CMFT Storage System

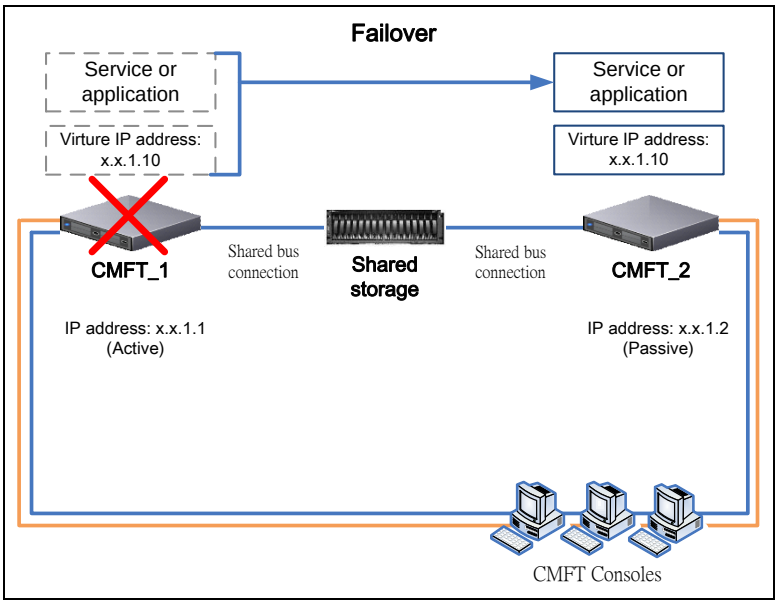

圖 2-34: 容錯移轉叢集架構圖

Figure2-34:Failover Cluster Architecture

2.8.1.2 備援切換 REDUNDANCYSWITCH-OVER

在容錯移轉叢集內的備援伺服器定期地傳送 Heartbeat 請求給主動伺服器，若經過 3 次的重送主動伺服器皆無回應，則備援伺服器會接管成為主動伺服器。下文將說明備援切換的過程。

In the failover cluster, the standby server periodically sent a heartbeat request to active server, if the active server does not respond for number of times, then the standby server will take over as the active server. The process of redundancy switching will be described in follows.

(1) 備援切換前 Before switch-over

在正常情況下，CMFT_1 為主動伺服器，CMFT_2 為備援伺服器，CMFT_1 取得對外通訊的虛擬 IP。下圖說明備援切換前的叢集伺服器情況：

Under normal circumstances, CMFT_1 is as the active server, CMFT_2 as a standby server, and CMFT_1 obtains IP address which is used to communicate with outside. The following figure illustratesthe situation of cluster servers before switch-over:

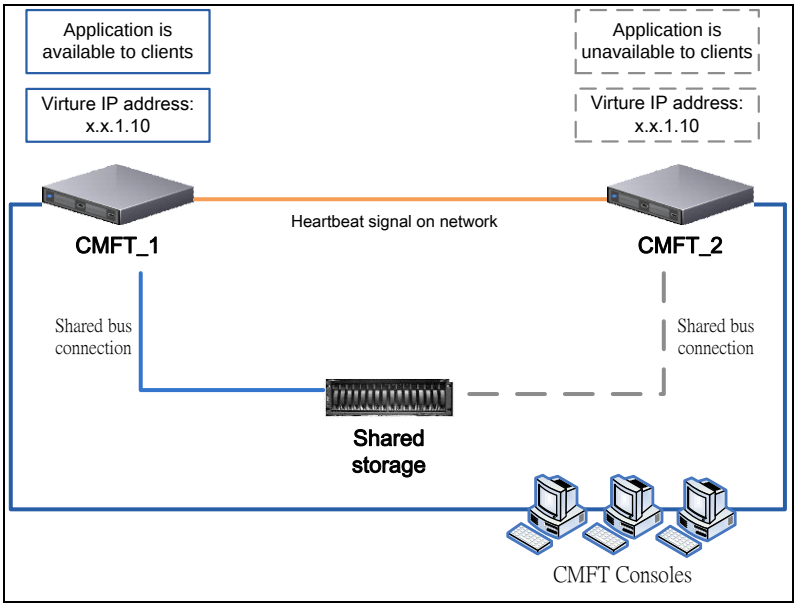

圖 2-35: 容錯移轉前

Figure2-35:Before Failover

(2) 偵測失效 Failure Detected

當備援伺服器沒有收到 Heartbeat 回應時，將視主動伺服器為失效，下圖說明偵測到主動伺服器的情況：

When the standby server does not receive the respond from active server, it will treat the active server as failure, the following figure illustratesthe situation of active server failure detected:

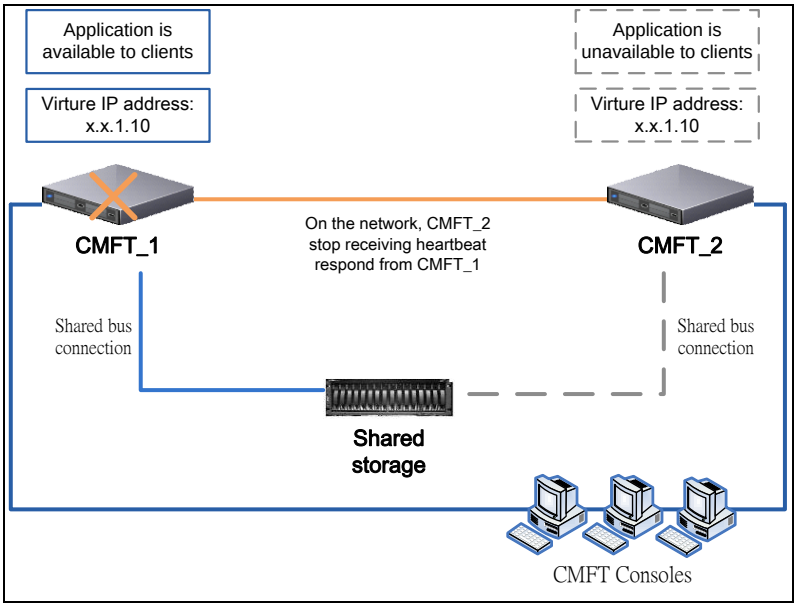

圖 2-36: 偵測失效狀況

Figure2-36:Detecting Failure Situation

(3) 備援切換後 After switch-over

當主動伺服器為失效，備援伺服器將接管成為主要伺服器，CMFT_2 為主動伺服器，CMFT_2 取得對外通訊的虛擬 IP，下圖說明備援切換後的情況：

When the active server is failure, the standby server will take over as an active server, CMFT_2 is as the active server and obtains IP address which is used to communicate with outside. The following figure illustratesthe situation of failover:

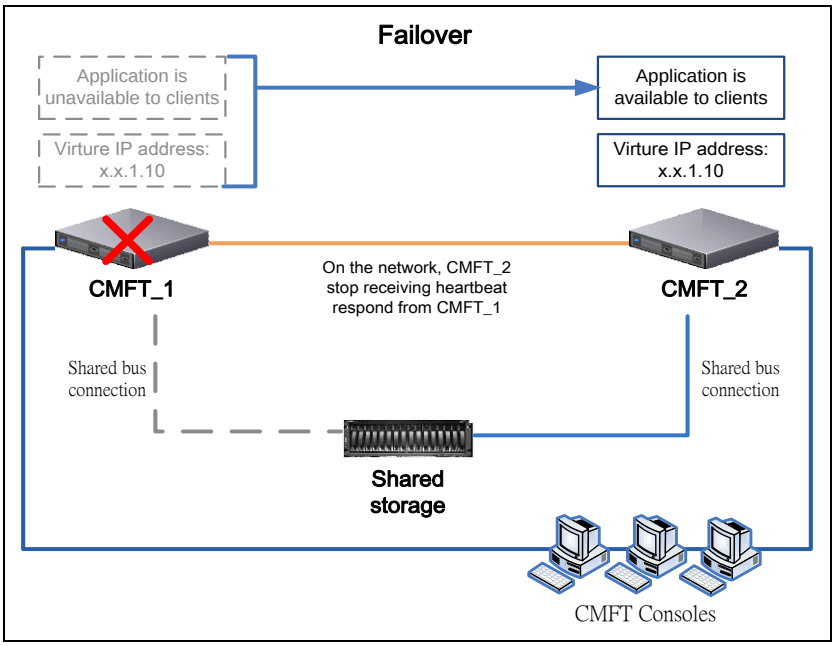

圖 2-37: 偵測失效狀況

Figure2-37:Detecting Failure Situation

2.8.2 備援行控中心系統設計 SYSTEM DESIGN IN ROCC

備援行控中心與行控中心的系統軟體架構設計完全相同，然而在硬體架構設計上因扮演角色不同而有不同的架構設計。

The system software design architecture in OCC and ROCC are identical, but the hardware architecture design for playing different roles and have different architecture.

2.8.2.1 系統架構 SYSTEM ARCHITECTURE

圖 **2-38** 展現備援行控中心 CMFT 硬體與網路架構。

Figure**2-38**shows the architecture of the Redundant OCC CMFT hardware and network.

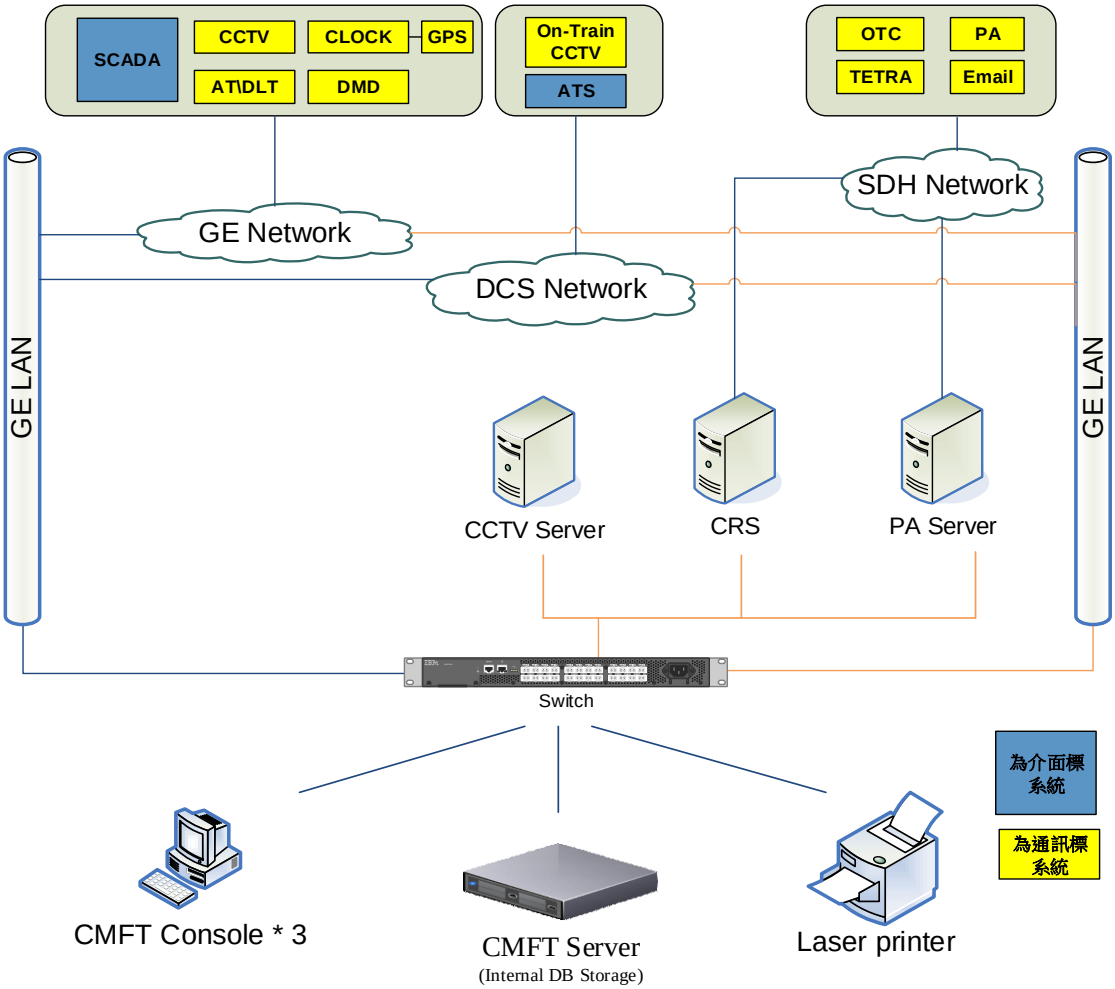

圖 2-38: 備援行控中心 CMFT 硬體與網路架構圖

Figure2-38:ROCC CMFT Hardware & Network Architecture

備援行動中心的設備清單與數量請參考「通訊多功能操作台 - 設備清單」文件。

The equipment list and the number of equipment in ROCC please refer to "Communications Multi-Function Terminal - Equipment List" document.

2.8.2.2 切換說明 SWITCH-OVER DESCRIPTION

當緊急狀況發生時，以手動完成通訊系統從行控中心切換至備援行控中心的切換程序。本程序只有在行控中心的異常錯誤發生和之後行控中心設備完完全全地關機時，才去實行。下圖(**2-39**)記述轉換流程圖簡明地描述轉換程序以及所需的時間。

The Communication System switch-over process from OCC to ROCCwill be done manually during emergency situation. It will only be carried out under catastrophic failure of the OCC and after the OCC is completely shut down. The following flow diagram (**2-39**) provided briefly describes the procedures and necessary time for the switch-over.

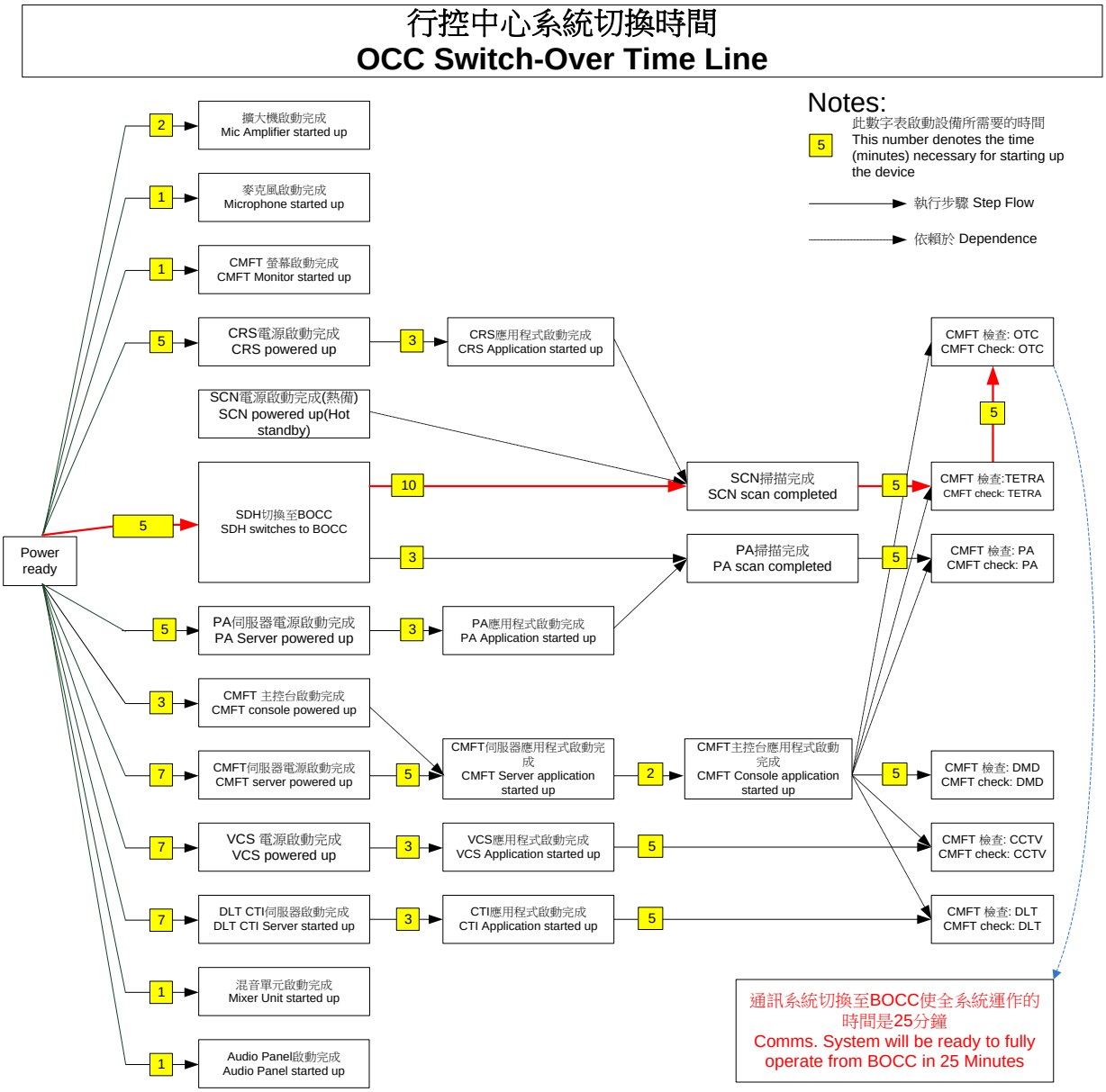

圖 2-39: 行控中心系統切換時間圖

Figure2-39:OCC System Switch-Over Time Line Diagram

2.9 降級營運 FALL-BACK OPERATION

CMFT 伺服器設計採用互為備援形式，系統能自動從營運主機切換到待機中之備援主機。當 CMFT 營運主機發生系統操作故障，且備援主機亦無法正常操作使用時，會進入下述『降級模式』。

當處於降級模式時，CMFT 主控台針對子系統的通訊功能可以維持部分運作。降級營運時 CMFT 主控台功能的影響與降級設備列表如下：

CMFT Server has adopted a bidirectional failover design. The system is able to switch the Active Server to the standby server automatically. When the active server is malfunctioned and the backup server is not function properly, it will go into the following fall-back mode.

CMFT console can only provide with partially operated communication functions of the subsystem.The following table lists the fall-back operation impacts of CMFT consoles and the fall-back equipments.

表 2-12: CMFT 降級營運模式與降級設備

Table 2-12:CMFT Fall-Back Operation mode and equipments

子系統 Subsystem	降級模式說明 Fall-Back Mode Description	CMFT 主控台功能 CMFT Console Functions	降級設備 Fall-Back Equipment	維持運作 Remain Operating
直線電話 DLT	直線電話通話功能可正常執行，僅 CMFT 操作台無法顯示狀態。 Talk function of DLT system can work normally, just CMFT console can not display the status of the DLT	行控中心播出或轉接直線電話 Dial Call or Transfer from OCC.	直線電話。 DLT。	是 Yes
		行控中心接聽含三方直線電話 Receive Call and Confrence Call at OCC		是 Yes
		直線電話操作內容顯示與紀錄。 Displayand Record Incoming Call Status		否 No
閉路電視 CCTV	根據#1~#14 牆最後一次設定的播放清單持續進行輪播，但無法再進行清單異動、攝影機鎖定，亦無法提供車站告警事件連動攝影功能。	指定監控螢幕對應的電視牆 Assign the Wall-Mounted Monitor To CMFT Monitor	無。 None	否 No
		變更或鎖定牆上監視器影像 Change playlist or Lock the video on Wall-Mounted Monitor.		否 No

子系統 Subsystem	降級模式說明 Fall-Back Mode Description	CMFT 主控台功能 CMFT Console Functions	降級設備 Fall-Back Equipment	維持運作 Remain Operating
	#15~16 將會輪播目前"有通電"可呼叫的所有列車上的攝影機，但無法進行攝影機鎖定，亦無法提供列車事件連動攝影功能。 According to the last playlist , Wall-Mounted Screens of # 1 ~ # 14 keep the rotation, but CMFT Console Can't Alter the playlist,Can't Lock the Camera, Can't correspond Alarm Event Locking. The #15 ~ #16 of Wall-Mounted Screen will play all cameras video circulating of all actived train. But can't lock the camera and can't provide alarm event locking.	歷史影像調閱 Access history video	無。各車站的 PAO 仍舊可以調閱、下載、以及告警連動監控 None in OCC. Access、Download history video 、Operate Speed Dome Camera , And Alarm Monitor function at each station	否 No
		歷史影像下載 Download history video		否 No
		PTZ 操作 Operate Speed Dome Camera		否 No
		車站連動攝影 Alarm Monitor at Station		否 No
		列車連動攝影 On -Train Interlocking Monitor	無。 None	否 No
		牆上監視器顯示 Display the cameras on Wall-Mounted Monitor		是 Yes
廣播 PA	僅能針對所有的車站進行廣播，無法指定車站廣播。 It can only broadcast to all stations, stations can not be	預錄語音廣播 Pre-Recorded Broadcast	廣播語音面盤 PA Audio Panel.	否 No
		即時語音廣播 Live Broadcast.		是(限全線車站) Yes(All stations only)

子系統 Subsystem	降級模式說明 Fall-Back Mode Description	CMFT 主控台功能 CMFT Console Functions	降級設備 Fall-Back Equipment	維持運作 Remain Operating
	specified.	廣播排程編輯 Edit Scheduled Broadcast		否 No
		變更排程廣播 Alter Scheduled Broadcast		否 No
		排程廣播 Scheduled Broadcast		否 No
點矩陣顯示及旅客導覽資訊 DMD&PGI	CMFT 操作台無法進行任何操控。但各車站會持續最後設定的排程訊息和非排程時段的政令宣導 CMFT Console can't perform any control for DCU server of each station. But the DCU server would keep to trigger the message by the last scheduled setting and decrees message.	列車到站資訊顯示 Display Train Arrival Information.	無 None.	否 No
		即時預錄訊息顯示 Instant Pre-Recorded Message Display		否 No
		即時手動訊息顯示 Instant Manual Message Display.		否 No
		訊息排程編輯與下載 Scheduled Message Edit and Download.		否 No
		開啟/關閉車站顯示器 Activate/Shutdown Display Unit.		否 No
		點矩陣排成訊息顯示 Scheduled Message Display		是 Yes
OTC OTC	行控中心的 TETRA 派遣台提供無線電通話服務，沒有預錄語音功能，無法進行預錄語音播放，但口語逛播以及所有無線電功能皆不受限。 The TETRA	車上預錄語音廣播 On-Train Pre-Recorded Broadcast	TETRA 派遣台。 TETRA Dispatcher	否 No
		車上即時語音廣播 On-Train Live Broadcast		是 Yes
		服務對講機通訊 Service Intercom		是 Yes
		旅客緊急通訊 Passenger Emergency Intercom		是 Yes

子系統 Subsystem	降級模式說明 Fall-Back Mode Description	CMFT 主控台功能 CMFT Console Functions	降級設備 Fall-Back Equipment	維持運作 Remain Operating
	dispatching of the OCC provides radio call service, including the communication between the mobile phone and the train. Because there is no pre-recorded voice function, pre-recorded voice playback is not available, but the oral broadcast and all radio functions are not limited.	啟動旅客 PI Monitor Passenger Movement		是 Yes
		車載旅客資訊訊息播放 Onboard PID Message Display		是 Yes
數位無線電派遣台 TETRA Dispatcher	無線電系統可正常執行，僅無法獲得 ATS 的列車資訊。TETRA system can work normally, just Miss the Train information from ATS	個別呼叫 Individual Call	TETRA 派遣台。 TETRA Dispatcher	是 Yes
		群組呼叫 Group Call		是 Yes
		發送短訊 SDS		是 Yes
		列車位置顯示 Trains Location Display		是 Yes

2.10 系統維護 SYSTEM MAINTENANCE

在通訊設備房中的一台 CMFT Console 將提供開發軟體，供維護人員修改、編輯 CMFT 之操作環境，可以進行功能如下：

One of CMFT console in CER can provide with software development tool that maintenance staff use to create or maintain operating environment. Operational functions are as follows:

- CMFT 系統參數修改:

使用者與主控台的增加、移除與權限變更，修改告警等級與告警方式。

- CMFT 自訂群組參數增修:

  CMFT 系統使用的車站、列車、攝影機快選群組的增加、移除與變更。

- DLT 電話簿增修 :

  電話號碼列表增修增加、移除與變更說明。

- DMD 設備配置與參數增修:

  修改字型與顏色、播放方式、移動速度、顯示器顯示模式。

- PA 預錄廣播設定

  預錄廣播修改與群組分類設定。

- DMD 預錄訊息設定

  預錄廣播新增、修改與群組分類設定。

- 場站平面圖修定(CCTV 的電子地圖同步):

  CCTV 修改場站平面圖與或變更攝影機配置後、CMFT 在每日營運前，自動自 CCTV 系統取得最新設定內容，供操作使用。

- CMFT System Parameter Modification

  Add, remove and change User authority and Console.

  Equipment Parameter Modification, and modify the alarm level and alarm mode.

- CMFT Custom Parameters Enhancement

  Add, remove and change CMFT custom Group of Station, Train, CCTV, Tetra phone book.

- DLT Phone Book Enhancement:

  List of telephone numbers to add, remove, and change the description.

- DMD Allocation and Parameter Modification

  Change font type and color, playback type, movement speed, DU mode

- PA PreMessage Setting

  Edit、and Group Operation for PreMessage

- DMD PreMessage Setting

  Add、Edit、and Group Operation for PreMessage

- Station equipment’s quantitation and allocation locations Modification.(Sync E-Map Setting from CCTV)

  After CCTV system has changed camera’s allocation, CMFT will automatically update the newest setting from CCTV System before daily operation start every day

3 操作功能 OPERATIONALFUNCTION

任一台 CMFT 主控台都具有相同的功能，能進行操作下列通訊系統設備，包含了直線電話 (DLT)、廣播 (PA)、閉路電視 (CCTV) 、列車通訊(OTC) 、無線電通訊(TETRA)和點矩陣顯示器 (DMD)，本文將說明這些系統設備在 CMFT 主控台上的操作流程。

Each CMFT console will be provided with the same functionalities which can process the operation of equipment for the following subsystems, include Direct Line Telephone (DLT), Public Address (PA), Closed Circuit Television (CCTV), On Train Communication (OTC), TETRA and Dot Matrix Display (DMD). The operation flow of the equipment of these subsystems will be described in this section.

Please referto appendix 10 for operation screen and brief description.
有關操作畫面及簡易說明，請參考附件 10。

3.1 直線電話 DIRECT LINE TELEPHONE

CMFT 控制台人機介面軟體提供直線電話的目前通話狀態顯示功能，操作者必須直接操作直線電話機來進行電話播出與接聽之操作。

CMFT Console HMI software provides functions to display the current operational status of Direct Line Telephone, the operator must directly operate the Direct Line Telephone to perform dial-out and answer operations.

直線電話系統提供電腦電話整合電腦簡稱 CTI 中的話務分配器功能，可以設定每一個席位直線電話的接電來電範圍，根據話務分配器的篩選，當直線電話來電時相關設定席位的電話才會響鈴。

Through DLT system provide the dispatcher function from the computer telephone integrated computer (CTI), DLT can set the dispensing of the incoming calls for the OCC's seats by the dispenser setting, when a direct telephone call, the phone that is assigned to this call will ring.

.

當所有席位都滿線時，或者被指配接聽的電話在固定時間內未接聽，來電將會轉入等待佇列裡。DLT 系統提供 20 通來電可以暫存於等待佇列中，若有第 21 通來電則直接進入忙線。

When all seats are on phone state, or the assigned phone is not answered within a fixed time, the call will be transferred to the waiting queue. DLT System provide 20 waiting calls space in the waiting Queue, When the 21st call, it would be passed directly into the Busy Tone

當等候佇列中有電話等候中，電腦電話整合電腦的個人來電助理(TRAFFIC DISPENSER)將偵測若是 OCC 中有可以接聽電話的席位，將從等候佇列中提取來電，進行群響呼叫，直到有人接聽該電話或該電話發起者掛斷電話。

When the queue is not empty, TRAFFIC DISPENSER will keep to detect whether any seats telephone in the OCC is available, and retrieve the first coming call from the waiting queue to make a group ringing When the queue is not empty, TRAFFIC DISPENSER will keep to detect whether any seats telephone in the OCC is available, and retrieve the first coming call from the waiting queue to make a group ringing.

CMFT 主控台上的直線電話操作功能包括：

Direct Line Telephone operational function on CMFT Console includes:

(1) 由行控中心撥出去電 Dial Call From OCC

(2) 由行控中心接聽來電 Receive Call at OCC

(3) 接聽忙線時等待佇列中的來電 Receive Call When Busy

(4) 轉接來電 Transfer Call From OCC

(5) 多方通話 Confrence Call

直線電話機有六種通話狀態：

There are 6 call states for DLT telephone sets.

- 掛線 Free
- 接聽 Off-hook
- 撥號 Dial
- 通話 Talk
- 忙線 Busy
- 保留 Hold

在 CMFT console 畫面中的來電記錄，將指明不同的狀態。當有一個新來電，話機會響鈴並在畫面上顯示詳細的來電內容。來電內容將會以發話端 ID 與資料庫進行核對，其包含通話狀態、發話端 ID、來電時間和來電位置描述等資訊，讓直線電話作為緊急用途與安全考量的特性，方便讓操作員掌握直線電話通話資訊。

Different states will be indicated in the call list on the CMFT Console. When there is an incoming call, the telephone set will ring and the caller details will be displayed. The caller details will include the status of the call, the ID of the caller phone set, the time of the call and the description of the caller. The description of the call will be mapped from the Database with the ID of the caller phone set. For characteristics of the emergency purposes and the security considerations make it easier for the operator to grasp the DLT call information.

3.1.1 直線電話操作與狀態流程表

表 3-1: 行控中心 CMFT 主控台操作員撥號時的操作

Table 3-1: Operation Procedures for the calls initialling by OCC operator

由行控中心主控台撥出直線電話 **Dial DLT Call from OCC**			
Step	**DLT at OCC**	**DLT at field**	**CMFT Console**
1	拿起話筒 Lift the handset.		變更話機狀態為接聽 Change the call state to "Off-hook".
2	撥 4 個號碼 Press the 4 digits number in the keypad of DLT Telephone.		
3	聽到震鈴音 Ringback Tone is heard.		顯示受話端 ID, 資料 Display called ID and called party description.
4		緊急電話響鈴 The DLT Telephone rings.	
5		拿起話筒 Lift the handset.	變更話機狀態為通話 Change the call state to "Talk".
6	交談開始 Conversation begins.		
7	使用話筒掛斷電話 Terminate call by replacing the handset.	掛斷話筒 Hang up the handset.	變更話機狀態為掛線 Change the call state to "Free".

表 3-2: 行控中心操作員收到來電時的操作程序

Table 3-2:Operation Procedures for the calls receiving by OCC operator

行控中心主控台接聽來電 **Receive Call from OCC**			
Step	**DLT at OCC**	**DLT at field**	**CMFT Console**
1		拿起話筒 Lift the handset.	
2		自動撥號指定席位 The call is automatically dialing to the specific DLT Telephone.	

行控中心主控台接聽來電 Receive Call from OCC			
Step	**DLT at OCC**	**DLT at field**	**CMFT Console**
3		聽到鈴響 Ringback Tone is heard.	
4	電話振鈴 DLT Telephone rings.		顯示發話端 ID, 資料於於本機列，狀態為來電中。 Display caller ID and caller description on the current line and state is “Call in”.
5	拿起話筒 Lift the handset.	開始交談 Conversation begins.	將來電資訊來電狀態變更為通話中 Change the call state to "Talk".
6	使用話筒掛斷電話 Terminate call by replacing the handset.	掛斷話筒 Hang up the handset.	變更話機狀態為掛線 Change the call state to "Free".

表 3-3: 行控中心操作員於忙線中收到來電且等候佇列少於 20 通電話時的操作程序

Table 3-3: Operation Procedures for the calls receiving by OCC operator when the status is busy and the waiting calls is less than 20 calls.

忙線時來電 Receive Call When Busy			
Step	**DLT at OCC**	**DLT at field**	**CMFT Console**
1	電話通話中 DLT is busy.	拿起話筒，自動撥號指定席位 Lift the handset. The call is automatically dialing to the specified DLT Telephone.	
2	電話通話中 DLT is busy.	聽到鈴響 Ringback Tone is heard.	
3	指定席位忙線中, 等候佇		顯示發話端 ID, 資料於於

忙線時來電 Receive Call When Busy			
Step	**DLT at OCC**	**DLT at field**	**CMFT Console**
4	列,的電話少於 20 通，轉接來電至等候佇列 Specified DLT is busy. Transfer the incoming call to queue that is less than 20 calls for waiting 此時 OCC 若有非通話中的席位電話將進行群響震鈴 If there is any idle telephone, every available seats will get the ringing order by the group ring.		佇列中 Display caller ID and caller description on the waiting queue.
5	任一席位拿起話筒 Any seat Lift the handset.	開始交談 Conversation begins.	將來電資訊從佇列中移至接通話列中並變更話機狀態為通話 Move the caller information on waiting queue to talking list, and change the call state to "Talk".
6	使用話筒掛斷電話 Terminate call by replacing the handset	掛斷話筒 Hang up the handset.	變更話機狀態為掛線 Change the call state to "Free".

表 3-4: 行控中心操作員於忙線中收到來電且等候佇列大於 20 通電話時的操作程序

Table 3-4: Operation Procedures for the calls receiving by OCC operator when the status is busy and the waiting calls is more than 20 calls.

忙線時來電 Receive Call When Busy			
Step	**DLT at OCC**	**DLT at field**	**CMFT Console**
1	電話通話中 DLT is busy.	拿起話筒，自動撥號指定席位 Lift the handset. The call is automatically dialing to the specified	

忙線時來電 Receive Call When Busy			
Step	**DLT at OCC**	**DLT at field**	**CMFT Console**
2	指定席位忙線中，等候佇列,的電話已滿 20 通 Specified DLT is busy. The Waiting Queue is full by 20 calls waiting	DLT Telephone. 聽到忙線音電話掛電 Ring Busy Tone is heard.	將滿線後的來電資訊紀錄於告警與事件紀錄中 Record the caller information on Alarm and Record

表 3-5: 行控中心操作員將接聽中的電話進行轉接

Table 3-5:Operation Procedures for transfer calls.

行控中心主控台接聽來電 Receive Call from OCC			
Step	**DLT at OCC**	**DLT at field**	**CMFT Console**
1	接通電話 Talk with the DLT.	交談中 Conversation begins.	顯示發話端 ID, 目前狀態為保留中 Display caller ID and Information. The state is on “Talk”
2	按下轉接按鈕保留此通電話 Push the transfer button and keep this connection line.	該通來電電話將進入保留狀態 The coming call will be changed to a hold tone.	顯示發話端 ID, 目前狀態為通話中 Display caller ID and Information. The state is hold.
3	撥 4 個號碼 Press the 4 digits number in the keypad of DLT Telephone.		
4	聽到震鈴音 Ringback Tone is heard.		顯示受話端 ID, 資料狀態為播號中。 Display called ID and called party description and state is “Call out”.
5	按下連線按鈕，則保留中		CMFT 主控台顯示兩通電

行控中心主控台接聽來電 **Receive Call from OCC**			
Step	**DLT at OCC**	**DLT at field**	**CMFT Console**
	電話與該通電話的進行通話連線 Push the connect button and transfer the hold call to the waiting call		話轉接中 CMFT console shows two call are both in transfer.
6	使用話筒掛斷電話 Terminate call by replacing the handset.	掛斷話筒 Hang up the handset.	清除目前使用列表 Clear the Current table.
7			CMFT 主控台將記錄此轉接過程於操作紀錄中 CMFT console will record the transfer operation in log

表 3-6: 行控中心操作員進行多方會談的操作程序

Table 3-6:Operation Procedures for Conference calls by OCC operator

行控中心主控台接聽來電 **Receive Call from OCC**			
Step	**DLT at OCC**	**DLT at field**	**CMFT Console**
1		拿起話筒 Lift the handset.	
2		自動撥號指定席位 The call is automatically dialing to the specific DLT Telephone.	
3		聽到鈴響 Ringback Tone is heard.	
4	電話振鈴 DLT Telephone rings.		顯示發話端 ID, 資料於目前列表，狀態為來電 Display caller ID and caller description on the current table and the caller state is ”Call in”.

行控中心主控台接聽來電 Receive Call from OCC			
Step	**DLT at OCC**	**DLT at field**	**CMFT Console**
5	拿起話筒 Lift the handset.	開始交談 Conversation begins.	變更話機狀態為通話 Change the call state to "Talk".
6	按下會議按鈕保留此通電話 Push the conference button and keep this connection line.	該通來電電話將進入保留狀態 The coming call will be changed to a hold line.	CMFT 主控台顯示保留中 CMFT console shows the call is “Hold”.
4	撥 4 個號碼 Press the 4 digits number in the keypad of DLT Telephone.		
5	聽到震鈴音 Ringback Tone is heard.	電話響鈴 The DLT Telephone rings	顯示發話端 ID, 資料於目前列表，狀態為撥號 Display caller ID and caller description on the current table and the caller state is ”Call out”.
6		拿起話筒 Lift the handset.	
7	交談開始 Conversation begins.		變更話機狀態為通話 Change the call state to "Talk".
8		按下連線按鈕，則保留中電話與該通電話的進行通話連線 Push the connect button and join the hold call to the confrence call.	
9	多方交談開始 Confrence Conversation begins.		將來電資訊從電話中變更話機狀態為多方通話 Change the calls state to "Confrence Talk". CMFT console shows

行控中心主控台接聽來電 Receive Call from OCC			
Step	**DLT at OCC**	**DLT at field**	**CMFT Console**
10	使用話筒掛斷電話 Terminate call by replacing the handset.	掛斷話筒 Hang up the handset.	two call are both in Confrence. 變更話機狀態為掛線 Change the call state to "Free".

3.2 閉路電視 CLOSED CIRCUIT TELEVISION

在行控中心內共有 16 台壁架式彩色監視器電視牆，每部監視器之監視影像可以設定為全畫面或四分割方式顯示，操作員可透過 CMFT 控制台人機介面軟體將進行以下有關閉路電視之操作功能，以監控各車站、機廠及列車上狀態。

There are total 16 wall-mounted color monitors in OCC, Every monitorsupportsFull screen or 4-split screen. Operators can operate CMFT Console HMI software to perform the following operational functions about CCTV to monitor stations, depots and trains status.

(1) 監看牆上監視器設定 Set Monitoring of Wall-mounted Monitor

(2) 變更牆上監視器影像清單與播放方式 Modify wall-mounted monitor playlist and mode

(3) 調閱與下載歷史影像 Access and Download Historical Video Image

(4) PTZ 攝影機控制設定 Speed Dome Camera Operation

即時影像與歷史影像 Real Time and Historical Image：

- 即時影像 Real Time Image：

  顯示於電視牆，及監看電視牆的 CCTV 螢幕。

  或者用於 PTZ 攝影機調整時的即時影像

  Display on wall-mounted color monitors and CCTV console monitor screen.

  Or the PTZ Camrea Setting On CMFT Console Monitors

- 歷史影像 Historical Image：

CMFT 螢幕用來調閱歷史影像與下載，歷史影像訊號來源為車站、機廠或行控中心的 NVR。

CMFT monitor screen is used for operators to access and download video image. The source video signals originate from station, depots and OCC NVR.

3.2.1 監看牆上監視器設定 MONITORING OF WALL-MOUNTED MONITOR SETTING

操作員能在通訊多功能操作台上選擇其中一個牆上監視器已播放的影像訊號，將所選擇的牆上監視器影像訊號同步顯示在主控台上的 CCTV 顯示器。

The operator can choose the video signal being displayed on one of the wall-mounted monitors on the CMFT console, let the video signal on the selected wall-mounted monitor simultaneously displayed on the CCTV monitor of CMFT console.

CMFT 主控台監看牆上監視器設定操作流程說明

To Set Monitoring of wall-mounted monitor Setting on CMFT console operation flow description

1. 操作者從畫面上選擇牆上監視器號碼。
2. 若成功，CMFT 主控台第二個螢幕將顯示所選擇牆上監視器影像。

1. An Operator chooses the number of a wall-mounted monitor on the CMFT console.
2. If success, the second screen of CMFT console will display the video image of the chosen wall-mounted monitor.

3.2.2 變更牆上監視器影像清單與播放方式 MODIFY WALL-MOUNTED MONITOR PLAYLIST AND MODE

操作員也能管理控制牆上監視器播放的影像訊號，譬如：選擇影像來源、掃瞄順序、停留時間、手動模式或自動循序模式。

The operator can also manage the video signal displayed on the wall-mounted monitors, e.g. video source selection, scanning sequence, dwell time, manual selection or sequential scanning.

CMFT 人機介面軟體依據牆上監視器用途將對影像訊號來源選擇有所限制：

CMFT HMI software will limit the operator to the selection for source video signal based on the purpose of the wall-mounted monitor：

監視器編號	影像訊號來源

Monitor Number	Video Signal Source
1 ~ 12	車站 Stations
13 ~ 14	機廠(包含測試軌與測試軌上的列車) Depots(including Test Track and the train on Test Track)
15 ~ 16	列車 Trains

CMFT 主控台變更牆上監視器影像操作流程說明

Modify wall-mounted monitor playlist and mode operation flow description

1. 操作者從主畫面上選擇牆上監視器號碼。
2. 當選擇#1~12 牆，攝影機來源機提供所有車站相關攝影機；當選擇#13~14 牆，攝影機來源為機廠，包含測試軌與測試軌上的列車；當選擇#15~16 牆，攝影機來源為所有可擷取到攝影機的列車。
3. 操作者從跳出視窗中輸入設定參數，包括：分割數量(1 或 4)、1 或 4 個影像訊號、影像掃瞄順序以及跳撥時間，然後按"確認"按鈕確認修改。
4. CMFT 主控台將下指令給 NVR 主機修改牆上監視器的播放清單與方式。

1. An Operator chooses the number of a wall-mounted monitor on the CMFT console.
2. when the operator chooses # 1 ~ 12 wall, the camera source machine provides all the station-related cameras; when the # 13 ~ 14 wall is selected, the camera source is the factory, which contains the test rail and the train on the test rail; when the # 15 ~ 16 wall is selected, the camera source is the all camera from actived train on network.
3. Operator input the configuration parameters from the popup window, includes: number of split (1 or 4), 1 or 4 video signal, video scan sequence and drill time, and then press "Confirm" to confirm the update.
4. CMFT console will make the order to modify the playlist and mode.

3.2.3 歷史影像調閱與下載 VIDEO IMAGE ACCESS AND DOWNLOAD

CMFT 主控台提供操作員調閱及下載歷史影像之功能，操作員可選擇攝影機與時間播放歷史影像及下載歷史影像資料。

CMFT console provides operator functionalities to access and download the historical video image, operators can choose the camera and record date to play and download the historical video data.

The operator can also manage the video signal displayed on the wall-mounted monitors, e.g. video source selection, scanning sequence, dwell time, manual selection or sequential scanning.

調閱歷史影像操作流程說明

Access historical video image operation flow description

1. 操作者從畫面上按”調閱歷史影像”按鈕。
2. 跳出歷史影像調閱視窗，操作者選擇攝影機及日期以調閱影像。
3. 操作者按”播放”開始播放歷史影像。
4. 若操作者按”停止”，則停止播放。跳至步驟 3。
5. 若影像播放完畢，則停止播放。
6. 操作者按”下載”選擇下載歷史影像。
7. 跳出歷史影像下載視窗，操作者選擇存檔路徑及時間區間。
8. 操作者按”下載”開始下載歷史影像。

1. An Operator chooses press “Access” button on the CMFT console.
2. A historical video access window is popped up, and operator chooses the camera and the record date to access the video data.
3. Operator presses “Play” button to start playing the video.
4. If operator presses “Stop” button, then stop playing. Go to step 3.
5. If finished the video playback, then stop playing.
6. Operator presses “Download” button choosing to download the video
7. A video download window is popped up, and operator inputs the path and time period to save downloaded video data
8. Operator presses “Download” button to start downloading the video

3.2.4 SPEED DOME CAMERA 操作

操作人員可以透過 PTZ 功能來操作 Speed Dome Camera；透過選擇的 PTZ 攝影機，操作人員可以透過 CMFT 來遙控遠方攝影機的上下左右與鏡頭。

The operator uses CMFT to control the PTZ functions of the Speed Dome Camera. PTZ cameras allow operator to pan, tilt, and zoom remotely.

圖說明 Speed dome camera 的操作流程。

CMFT 主控台控制 Speed Dome Camera 操作流程說明

Speed dome camera operation flow description

1. 操作者從畫面上按”Speed Dome Camera”按鈕。
2. 顯示可遙控的攝影機資料，操作者選擇 Speed Dome Camera 取得影像資料。

3. 跳出 Speed Dome Camera 影像與控制選項。
4. 操作者開始使用 Speed Dome Camera。

1. An Operator chooses press “Speed Dome Camera” button on the CMFT console.
2. A speed dome camera list window is popped up, and operator chooses the camera to access the video data.
3. A video control window is popped up, display the realtime video image and control functions.
4. Operator start to control Speed Dome Camera.

3.2.5 列車連動與鎖定 ON-TRAIN INTERLOCKING MONITOR

當發生下列情況時，列車閉路電視系統的連動功能將被觸發。

1. 站間停車
2. 列車偵煙器作動
3. 拉下緊急疏散裝置
4. 異常車門開啟
5. 車載控制器連結失敗
6. 車門內部把手被拉下
7. 車門功能障礙
8. 障礙物偵測異常
9. 脫軌檢測器偵測異常
10. 乘客按下緊急對講機
11. 司機員按下與行控通訊功能
12. 車廂 PI 動態啟動

(1) 顯示：

在列車觸發連動監看時，原則上列車對講機事件(1~9 項)影像顯示於 15 號牆上監視器，來自 ATS 列車事件(10~12 項)影像顯示於 16 號牆上監視器。若該電視牆有四個以上的列車事件將以輪播方式顯示。

(2) 操作：

操作員可以開啟列車觸發事件畫面或從#15.#16 牆，選擇事件來固定攝影機影像，或解除鎖定狀態。

(3) 解除：

操作員可以透過解除按鈕，將事件從連動監看中解除。且同時告警部分將自動執行回應流程(可關閉閃爍與音效)，回應人員為按下解除按鈕的操作員。當該電視牆沒有任何事件存在時，將回復手動或預設的輪播清單。

On-train CCTV system interlocking function will be triggered when below mentioned event.

1. Train speed = 0 and train is in between two stations
2. Fire detection onboard
3. EED pulled
4. Abnormal door opening
5. CC connection lost
6. DIH/DEH Pulled
7. Vehicle Door Obstructed
8. Obstacle Detetctor Activated
9. Derailment Detector Activated
10. Emergency Intercom used by passengers
11. Driver push the communication button with OCC
12. Actived PI to monitor the voice from train

(1) Display:

The vedio related the event from train's(1~9 items) intercom triggerd will display on #15. Above 10~11 items, the data from ATS, the the vedio related the events will display on #16. If there are more than four train triggered interlocking function. CCTV will be carousel display these images

(2) Operate:

Operator can open on-train interlocking event screen or Instant image monitoring for #15.#16 screen to fixed selected camera image or release the fixed status.

(3) Dismiss:

Operator can click the dismiss button to remove the selected camera from carousel list. And at the same time alarm will do a ack-flow (Close the flash and alarm sound) by the operator who push the Dismiss button.

When there is no event in the video wall, a manual or dufault carousel list will be returned.

3.3 廣播(車站)PUBLIC ADDRESS(STATION)

CMFT 控制台人機介面軟體將提供以下有關車站廣播之操作功能：

CMFT Console HMI software will provide the following operational functions about station PA:

1. 預錄語音廣播Pre-recorded broadcast
2. 即時語音廣播Live broadcast
3. 廣播排程編輯Broadcast schedule Setting

CMFT 允許操作員依下列選擇廣播目的地進行語音播送：

CMFT allows the operator to select broadcast destinations by the following options in the application for the broadcast:

- 任一車站（以及主變電站）one station（BSS）
- 全部車站（以及主變電站）all stations（BSS）
- 任選多個車站（以及主變電站）進行群組廣播Any combination of stations（BSS）for group broadcast

車站廣播音源的優先順序說明表如下：

The table of priority of each broadcasting source in the station is as below:

表 3-7: 車站廣播優先順序

Table 3-7:Station Broadcasting Priorities

優先位階 Priority level	廣播音源 Broadcasting sources
1	火災期間之緊急疏散廣播(操作者經由消防廣播主機 or 消防廣播主機搖控盤) During the broadcast of the fire emergency evacuation (Operator can broadcast through Fire Alarm Unit or fire alarm remote unit)
2	火警警報廣播 The broadcast of fire alarm
3	列車離站音廣播 The broadcast of train departure tone
4	PAO 的語音廣播 The general broadcast from the audio broadcast of PAO.
5	由行控中心對車站的無限次數廣播(緊急廣播) The emergy broadcast from OCC to station.(unlimited time)
6	由行控中心對車站的有次數廣播(一般廣播) The general broadcast from OCC to station.(0~99 times)
7	排程廣播(自動廣播)Scheduled broadcast(Automatic Broadcast)

若是 CMFT 收到廣播中斷訊息，CMFT Console 會在畫面上提示廣播備中斷訊息，透過中斷提示訊息，行控人員可以決定是否重新播放該訊息。

If CMFT receive PA interrupted signal from PA system, CMFT Console will show PA interrupted, to re-broadcast this message will be decided by Operator.

車站消防廣播主機狀態：

當車站消防廣播主機作動時，將傳送即時狀態給行控中心，將在 CMFT Console

上顯示，提示操作員。

Status of Fire PA control equipment activates:

When Fire PA Control equipment activates, the real-time status message will be send to OCC CMFT, and CMFT console will show inform message to operators.

3.3.1 預錄語音廣播 PRE-RECORDED BROADCAST

當操作員從廣播訊息選擇區塊中選擇一個預錄語音，這語音標題將顯示在操作員的工作站畫面上。透過按下播放按鈕開始進行該語句廣播。操作員也能按暫停按鈕或終止按鈕來暫停或終止播放預錄語音。

When an operator selects a pre-recorded message from the message selection box, the pre-defined title of the announcement will be displayed on the operator console. The operator can start playing the announcement by pressing the play button. The operator can also pause or stop the pre-recorded message announcement by pressing the corresponding buttons.

廣播 - 預錄語音廣播操作流程說明

PA – pre-recorded broadcast operation flow description

1. 操作員從位置表列中選取欲傳送目的位置（可為單一車站、全部車站或群組車站）。
2. 若所選擇車站的 PA 使用中，警示操作員。
   (a) 若操作員取消廣播並重新選擇其他車站，跳至步驟一。
   (b) 否則，繼續下一步驟。
3. 操作員選擇一欲廣播的預錄訊息以及播放次數為 1~99 次(一般廣播)或無限次(緊急廣播)。
4. 若有任一個目標車站語音通道連結失敗，畫面將警示該車站連結失敗，並且提供重試與播放按鈕。
5. 若目標車站的語音通道第一次即全部建立成功，則語音直接開始播放，若有任一'失敗的車站，需要等待操作員按"播放"按鈕，才能開始進行廣播。
6. 撥放預錄語音。
7. 操作員可以利用停止 (■)、暫停 (⏸)、播放(▶)等按鈕進行語音操作。
8. 若語音播放完畢或按下停止 (■)，將提供結束按鈕，供操作員進行結束操作流程。

1. Operator chooses the destination stations. (can be on station, all stations or any combination of stations.)

2. If the selected station's PA is in use, prompt alert to notify operator.
   (a) If operator cancels the broadcast and re-choose another station, go to step 1.
   (b) Else, continue.
3. Operator chooses a pre-recorded message and 1 to 99 times(general) or unlimited times(emergency) for broadcast.
4. If any of the target stations have failed to establish to the voice channel, the screen will warn the station to fail and provide the retry and play button.
5. If voice channel of the targets is established successfully at the first time, the broadcast would play immediately. If any failure of the station, you need to wait for the operator press the "play" button to start broadcasting.
6. Playback audio for pre-recorded message.
7. The operator can use the stop (■), pause (⏸), play(▶) buttons for voice operation.
8. If the voice is finished or pressed (■), the end button will be provided for the operator to finish the operation.

3.3.2 即時語音廣播 LIVE BROADCAST

操作員也能選擇從任一主控台配備的廣播麥克風進行即時廣播。然後按下麥克風上 PTT 按鈕對所選擇的區域進行廣播。

The operator can also choose to perform live broadcast from the PA microphone installed at each CMFT console. The operator can then press the PTT button on the microphone and perform the broadcast to the selected location.

廣播–即時廣播操作流程說明

PA – live broadcast operation flow description

1. 操作員從位置表列中選取欲傳送目的位置（可為單一車站、全部車站或群組車站）。
2. 若所選擇車站的 PA 使用中，警示操作員。
   (a) 若操作員取消廣播並重新選擇其他車站，跳至步驟一。
   (b) 否則，繼續下一步驟。
3. 操作員選擇即時廣播。
4. 若有任一個目標車站語音通道連結失敗，畫面將警示該車站連結失敗，並且提供重試與播放按鈕。

5. 若目標車站的語音通道第一次即全部建立成功，則直接進行即時口語廣播流程，若有任一失敗的車站，需要等待操作員按”播放”按鈕，才能開始進行即時口語廣播流程。
6. 操作員按 PTT 按鈕開始進行口語廣播。
7. 使用者按”停止廣播”按鈕以停止廣播。

1. Operator chooses the destination stations. (can be on station, all stations or any combination of stations.)
2. If the selected station’s PA is in use, prompt alert to notify operator.
   (a) If operator cancels the broadcast and re-choose another station, go to step 1.
   (b) Else, continue.
3. Operator chooses real-time broadcast and times of playing.
4. If any of the target stations have failed to establish to the voice channel, the screen will warn the station to fail and provide the retry and play button..
5. If voice channel of the targets is established successfully at the first time, the oral broadcast process would be set up immediately, if any failure of the station, you need to wait for the operator press the "play" button to start oral broadcast process.
6. The operator presses the PTT button to start the oral broadcast.
7. Operator presses “Stop PA” button to stop PA broadcast.

3.3.3 廣播排程編輯 BROADCAST SCHEDULE EDIT

CMFT 提供廣播排程編輯功能讓操作者可以指定時間對指定車站進行廣播。CMFT 伺服器將掃瞄廣播排程資料表並於指定時間對指定車站進行廣播。

CMFT provides broadcast schedule edit function which allows operators to designate specific time and specific station to broadcast. CMFT server will scan the PA schedule table and will broadcast to the designated station at the specific time.

3.3.3.1 廣播 – 樣板排程編輯操作流程說明

PA –Template schedule editing operation flow description

1. 操作員選擇一欲廣播的預錄訊息。
2. 操作員從位置表列中選取欲廣播的位置（可為單一車站、全部車站或群組車站）。
3. 操作員編輯該樣板排程的開始與結束時間，以及時間內的播放次數(1~99 次)，預設為無限次。

4. 若已完成排程編輯，按”確認”按鈕，更新排程資料。

1. Operator chooses a pre-recorded message for broadcast.
2. Operator chooses the destination stations. (one station, all stations or any combination of stations.)
3. Operator edits the start and end times, of the template schedule, as well as the number of times of play(1 to 99 times) , the default play times is unlimited.
4. If finished schedule editing, operator presses “Confirm” button to update the schedule data.

3.3.3.2 廣播 – 當日排程編輯操作流程說明

PA –Daily schedule editing operation flow description

1. 操作員選擇今天欲加入的樣板，或從前七日排程中複製相同排程。
2. 若已完成排程編輯，按”確認”按鈕，更新排程資料。

1. The operator chooses the template to add to schedule, or replicates the same schedule from the previous seven days.
2. If finished schedule editing, operator presses “Confirm” button to update the schedule data.

3.3.4 廣播時段設定 BROADCAST DAILY PARTITION SETTING

為了符合環保噪音法規，且能在不同條件下達成廣播效果，CMFT 提供可以針對不同時間進行廣播時段音量等級設定。

In order to comply with environmental noise regulations, and to avoid the broadcast effect in different conditions i, CMFT provide the function to distinghish different time for the broadcast volume level settings.

廣播時段設定分成以下三種：

1. 尖峰時段。
2. 離峰時段。
3. 夜間時段。

The broadcast time setting is divided into the following three types::

1. Peak Time.
2. Off-Peak Time.
3. Night Time.

廣播時段設定流程說明

Broadcast section setting operation flow description

1. 操作員選擇要設定的車站，與設定的周間(星期一至星期日)。
2. 選擇要設定的時段與匹配的時間區間。
3. 發送設定通訊協定給廣播伺服器。
4. CMFT 伺服器接收廣播伺服器設定結果並且顯示於主控台上。
5. 可以選擇套用全車站會指定車站設定。再依序對廣播伺服器發送設定要求。

1. The operator chooses the station to be set, with the set week (Monday to Sunday).
2. Select the time range for the target time section
3. Send the request to the broadcast server.
4. The CMFT server receives the broadcast server setup result and appears on the console.
5. Operator can copy the setting of certain station to apply all station or designated station. And then to send set requirements to the broadcast server for each station.

3.3.5 自動廣播 AUTOMATIC BROADCAST

特殊情況下，如列車過站不停，CMFT 會依據 ATS 傳送的資訊，發出自動廣播訊息通知旅客，本功能為內部定義無操作畫面。

In special situations, like when train is bypassing a station, the CMFT will send an automatic broadcast message to stations based on ATS informations. This function should be defined by program setting, we didn't provide the way that operation can edit the definition.

自動廣播的優先權與排程廣播相同。

以下的訊息有較高的優先權：

1. 車站消防主機作動時；
2. 車站 PAO 進行廣播時；
3. CMFT 主控台廣播時。

以上情形，自動廣播將不會被執行。

The priority of automatic broadcast messages will be the same as scheduled

broadcast messages.

The following type of messages will have higher priority:

1. Fire alarm broadcast in station;
2. PA broadcast from PAO in the same station as automatic broadcast;
3. PA broadcast from the CMFT consoles;

In these cases, Automatic broadcast won't be activated.

3.4 點矩陣顯示器 DOT MATRIX DISPLAY

操作功能 Function：

通訊多功能操作台整合點矩陣顯示器的操作功能如下：

CMFT integrates the operational functions for DMD are as follows:

1. 顯示預錄訊息 Display pre-recorded message
2. 顯示手動輸入即時訊息 Display manual input real-time message
3. 訊息排程編輯與下載 Scheduled message edit and download
4.設定顯示器顯示模式 Display mode Setting

優先順序 Priority：

CMFT 送給點矩陣顯示器即時訊息或預錄訊息時，可以設定訊息等級：

When CMFT sends a real time message to DMD, the message level can be set:

- 緊急訊息 Emergency Message
- 一般訊息 General Message
- 政令宣導或廣告排程訊息 Advertising Scheduled Message

緊急訊息發出後，CMFT 需手動停止點矩陣顯示器的緊急訊息播放。

After sendingthemessageCMFT should stop DMD urgent message broadcast manually

綠能政策：

操作員可以在 CMFT 主控台改變當日的營運時間(可設定為：起-迄時間或全日營運)；當到達設定的營運時間，CMFT 主控台將主動要求 DMD 系統開啟或關閉節能，讓 DMD 關閉或開啟車站顯示器，以配合綠能政策。該營運時間將顯示在明顯的位置，並讓管理員或主任控制員可以依當日營運需求調整，該設定值將一直持續，直到營運時間再被調整。

為防止誤操作，在設定的營運時段範圍內，CMFT 與 DMD 將不接受 DMD 關閉顯示器之指令。

Green Environmental Protection Policy:

The operator can change the daily opening hours by setting up the start and end time or a 24 hours service. When a predetermined set-up time has beenreached, CMFT will automatically send a request to DMD system to turn on or off the Power Save on a DMD. By following the Policy of Green Environmental Protection, it closes the DMD display. The daily opening hours will be displayed in an obvious location, so that the administrator or operator can adjust it to meet daily operation requirements. The original daily opening hours settings is kept until the next daily opening hours adjustment.

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To void operationalerror produced due to faulty operation, CMFT and DMD will not accept any display shutdown instructions within setup opening hours.

車站顯示器(DU)群組定義如下：

The DU groups for each station are defined as follows:

- 群組一 Group 1 – (PU)上行月台 Up Platform
- 群組二 Group 2 – (PD)下行月台 Down Platform
- 群組三 Group 3 – (CU)車站大廳(上行月台) Concourse (UP Platform)
- 群組四 Group 4 – (CD)車站大廳(下行月台) Concourse (DOWN Platform)
- 群組五 Group 5 – (CG)車站大廳(政令宣導訊息) Concourse (Government Announcement)
- 群組六 Group 6 –全部顯示器 All DU of a station

操作員可以選擇被要求的區域，可能是所有車站、群組車站、單一車站、一個車站中一顯示器群組來傳送和顯示該訊息到適當的點矩陣顯示器上。

The operator can choose the required location, which can be either all stations, multiple stations, a station 、a DU group in a station、a married pair or multiple married pairs to send the message to the corresponding dot matrix display for displaying the message.

3.4.1 預錄訊息顯示 PRE-RECORDED MESSAGE DISPLAY

操作流程說明

operation flow description

1. 操作員從預錄訊息表列上選取預錄訊息。
2. 操作員從位置表列中選取欲傳送目的位置（可為單一車站、全部車站或群組車站…等，如 Y9 上行月台）。
3. 操作員按”傳送”按鈕，開始傳送訊息至顯示器。
4. 通知操作員訊息傳結果。

1. Operator chooses a pre-recorded message from the message list.
2. Operator chooses the destination location. (can be on station, all stations or any combination of stations...etc. ex. Y9 up platform.)
3. Operator presses “Send” button to perform sending message to selected DMD.
4. Prompt result of message sent to inform operator.

3.4.2 手動輸入即時訊息顯示 MANUAL INPUT REAL-TIME MESSAGE DISPLAY

操作流程說明

operation flow description

1. 操作員於訊息編輯區輸入要顯示訊息內容。
2. 操作員從位置表列中選取欲傳送目的位置（可為單一車站、全部車站或群組車站…等，如 Y9 上行月台）。
3. 操作員按”傳送”按鈕，開始傳送訊息至顯示器。
4. 通知操作員訊息傳送結果。

1. Operator types the message to be displayed in the text area.
2. Operator chooses the destination location. (can be on station, all stations or any combination of stations...etc. ex. Y9 up platform.)
3. Operator presses “Send” button to perform sending message to selected DMD.
4. Prompt result of Message Sent to inform operator.

3.4.3 訊息排程編輯與下載 SCHEDULED MESSAGE EDIT AND DOWNLOAD

CMFT 提供操作者對車站點矩陣顯示器進行訊息排程編輯與排程下載功能，使車站點矩陣顯示器能依時間自動顯示排程訊息，以達到政令宣導、乘客須知以及商業廣告服務之目的。

CMFT provides operators about DMD functionalities to edit and download scheduled messages to stations, so that the station DMD can automatically display the scheduled message according to the schedule to achieve the purpose of governmental policy campaign, passenger reminder, commercial ads, etc.

操作流程說明

operation flow description

1. 操作員按”新增”以新增一筆訊息排程。
2. 操作員輸入排程名稱。
3. 操作員從位置表列中選取欲廣播的位置（可為單一車站、全部車站或群組車站）。
4. 操作員從預錄訊息表列中選擇一預錄排程訊息。
5. 操作員編輯該訊息的排程時間。
6. 若要編輯下一個訊息排程，跳至步驟 4。
7. 若已完成排程編輯，按”確認”按鈕，更新排程資料。
8. 操作員按”下載”將該排程下載至目的位置。

1. Operator presses “New” button to add a new scheduled message.
2. Operator inputs the name of the new scheduled message.
3. Operator chooses the destination stations. (can be on station, all stations or any combination of stations.)
4. Operator chooses a pre-defined scheduled message from the pre-defined message list.
5. Operator edits the schedule time for the selected message.
6. If schedule editing not finished, go to step 5.
7. If finished schedule editing, operator presses “Confirm” button to update the schedule data.
8. Operator presses “Download” button to download the scheduled table to the selected destinations.

3.4.4 設定顯示器顯示模式 DISPLAY MODE SETTING

CMFT 軟體提供畫面設定月台或大廳顯示器的顯示行為，包含顏色、移動方向，移動速度以及每個顯示器切割的行數。

CMFT software provides operation screen to set the DMD display mode on platform or hall, including color, moving direction, movement speed and the number of rows per monitor.

操作流程說明

Operation flow description

1. 操作員選擇要設定的車站。
2. 操作員選擇要定義的 DMD 所在位置，月台或大廳。

3. 設定該顯示器的顯示行為。
4. 大廳的顯示器可以設定為兩列文字顯示上下月台，或者一列文字顯示政令宣導。
5. 設定完成後按下儲存後，此模式將設定在 CMFT 資料庫中

1. The operator selects the station to be set.
2. The operator selects the location, the DMD in platform or hall will be defined.
3. Set the display behavior of the monitor.
4. The display mode on the hall can be set to two columns of text display for being assigned to up and down track, or a column of text shows the decree.
5. After saving the settings, the mode will be set in the CMFT database.

3.5 列車通訊設備 OTC

通訊多功能操作台整合列車通訊設備的功能如下，詳細操作設計將在本章節中描述。

CMFT integrates the functions of OTC are as follows, detailed operational designed will be described in this section.

1. 車上預錄語音廣播 On-Train Pre-recorded Broadcast
2. 車上即時語音廣播 On-Train Live Broadcast
3. 服務對講機通訊 Service Intercom
4. 旅客緊急通訊 Passenger Emergency Intercom
5. 動態啟動旅客緊急通訊 Dynamic Activated Passenger Emergency Intercom
6. 車載旅客資訊訊息播放 Onboard PID Message Playback

其中，CMFT 主控台進行旅客緊急通訊或動態啟動旅客緊急通訊時，該列車的即時影像，將加入 CCTV 的列車監視螢幕輪播顯示。

When CMFT console is used to conduct emergency call and dynamic activated passenger Intercom, the real time images will display on CCTV monitor screen as well.

操作員能依不同列車項目組合選擇進行廣播。

The operator can select making announcement to trains by choosing different combination.

- 單一列車 one train
- 所有列車 all trains
- 群組列車 Any combination of trains

3.5.1 車上預錄語音廣播 ON-TRAIN PRE-RECORDED BROADCAST

當操作員從廣播訊息選擇區塊中選擇一個預錄語音，這語音標題將顯示在操作員的工作站畫面上。透過按下播放按鈕開始進行該語句廣播。操作員也能按暫停按鈕或終止按鈕來暫停或終止播放預錄語音。

When an operator selects a pre-recorded message from the message selection box, the pre-defined title of the announcement will be displayed on the operator console. The operator can start playing the announcement by pressing the play button. The operator can also pause or stop the pre-recorded message announcement by pressing the corresponding buttons.

OTC –預錄語音廣播操作流程說明

OTC – pre-recorded broadcast operation flow description

1. 操作員從位置表列中選取欲傳送目的列車（如列車 A）。
2. 操作員從預錄訊息表列上選取預錄訊息。
3. 操作員按”開始廣播”按鈕，開始進行廣播。
4. 撥放預錄語音。
5. 若使用者按”停止廣播”按鈕以停止廣播，則結束此操作流程。
6. 若語音播放完畢，結束此操作流程。

1. Operator chooses the destination train (e.g. train A) from the train list.
2. Operator chooses a pre-recorded message for broadcast from the message list.
3. Operator presses “Start PA” button to start PA broadcast.
4. Playback audio for pre-recorded message.
5. If operator presses “Stop PA” button to stop PA broadcast, then end of this operation procedure.
6. If pre-recorded message playback complete, then end of this operation procedure.

3.5.2 車上即時語音廣播 ON-TRAIN LIVE BROADCAST

當操作員從廣播訊息選擇區塊中選擇進行即時廣播。然後按下開始即時語音廣播鈕對所選擇的區域進行廣播。

When an operator chooseslive broadcast from the message selection box,the operator can start the live broadcast to the selected areas by pressing the “Start” button.

OTC –即時語音廣播操作流程說明

OTC – live broadcast operation flow description

1. 操作員從位置表列中選取欲傳送目的列車位置（如列車 A）。
2. 操作員選擇即時廣播。
3. 操作員按”開始廣播”按鈕，開始進行廣播。
4. 操作員按 PTT 按鈕開始進行廣播。
5. 使用者按”停止廣播”按鈕以停止廣播。

1. Operator chooses the destination train (e.g. train A) from the train list.
2. Operator chooses live broadcast.
3. Operator presses “Start PA” button to start PA broadcast.
4. Operator presses the PTT button on the microphone and performs the broadcast to the selected location.
5. Operator presses “Stop PA” button to stop PA broadcast.

3.5.3 服務對講機通訊 SERVICE INTERCOM

當駕駛員於車上啟動通訊控制盤時，駕駛員可以使用服務對講機，要求與行控中心通訊，這個要求顯示在 CMFT console 畫面上的列車通訊佇列，操作員可以從等待佇列中知道等待接聽的列車識別碼，然後接聽電話並與駕駛員通話。

When the driver is activated the TRCP in the train, the driver may request SI intercom with OCC, this request will be displayed on the train communication queue of CMFT console screen, and the operator can see the train IDs of waiting for answer from the waiting queue, and then answer the call and communication with the driver.

駕駛員通訊操作流程說明

Driver intercom operation flow description

1. 駕駛員按 SI 按鈕要求與行控中心通訊。
2. 該通訊要求將被加到列車通訊等待佇列。
3. 未在通話的 CMFT 主控台列車通訊鈴聲響起。
4. 操作員按”接聽”按鈕，開始進行與駕駛員通話。
5. SI 通話狀態顯示於每個 CMFT Console 畫面上。

1. Driver presses SI button to request communication with OCC.
2. The communication request from driver will be added to OTC waiting list.
3. CMFT console rings on which TETRA phone is available.
4. Operator presses “Answer” button to start talking to driver.
5. SI status shows on each CMFT console.

3.5.4 旅客緊急通訊 PASSENGER EMERGENCY INTERCOM

當車上旅客要求緊急通訊時，可按下"旅客緊急通訊"按鈕與控制人員通話。旅客緊急通訊將直接送到行控中心，等待操作員接聽；若是車上通訊控制盤被駕駛員啟動，則旅客緊急通訊將等待駕駛員接聽，駕駛員接聽的動作將傳送至行控中心記錄，若 15 秒內駕駛員未接聽，該 PI 將轉發給行控中心，由行控中心接聽。

"When passengers on train request emergency intercom with operator, they can press the “Passenger Emergency Intercom” button and communication with operator. The emergency call is forward to OCC and waits for the OCC operator to answer .But when communication control panel in train is activated by the driver, emergency call waits for the driver to answer. OCC keep tracks of received phone call by taking a log file. If the driver does not answer the phone within 15 seconds, emergency call is forward to OCC.

旅客緊急通訊操作流程說明

Passenger Emergency Intercom operation flow description

1. 旅客按 PI 按鈕要求與行控中心通訊。
2. TROU 傳送 PI 要求到 CMFT(若駕駛員啟動車上通訊控制盤，此 PI 將優先等候駕駛員接聽。)
3. 該通訊要求將被加到列車通訊等待佇列。
4. 設定的 CMFT 主控台列車通訊鈴聲響起。
5. 操作員按"接聽"按鈕，開始進行與旅客通話。
6. PI 通話狀態顯示於 CMFT Console 畫面上。

1. Passenger presses PI button to request communication with OCC.
2. TROU sent PI request to CMFT (If driver activated TRCP on train, the PI request will waiting driver to answer in first priority).
3. The communication request from driver will be added to OTC waiting list.
4. CMFT console rings on which TETRA phone is available.
5. Operator presses “Answer” button to start talking to passengers.
6. PI status shows on each CMFT console.

3.5.5 動態啟動旅客緊急通訊 DYNAMIC PASSENGER EMERGENCY INTERCOM

OCC 操作員可透過啟動 PI 的收音設備來檢視車上旅客的動態。

Operater can monitor the passenger movement by the PI equipment’s function.

動態啟動旅客緊急通訊操作流程說明

Dynamic Activated Passenger Emergency Intercom operation flow description

1. 操作員從位置表列中選取欲傳送目的列車位置（如列車 A）。
2. 操作員按”啟動 PI”按鈕，開始進行列車旅客動態收音。
3. PI 啟動通話狀態顯示於 CMFT Console 畫面上。

1. Operator chooses the destination train (ex. train A) from the train list.
2. Operator presses “Activated PI” button to start monitoring passenger movement on the selected train.
3. PI Monitoring status shows on CMFT console.

3.5.6 車載旅客資訊顯示器訊息顯示 ONBOARD PID MESSAGE DISPLAY

CMFT 應用軟體允許操作員對車載旅客資訊顯示器進行訊息播放。

CMFT application software allows operator to perform message playback to onboard PID.

操作員可依不同區域項目組合選擇進行訊息顯示。

Operator can perform message display by choosing any various combinations of trains.

- 單一列車 one train
- 所有列車 all trains
- 群組列車 Any combination of trains

優先順序 Priority：

CMFT 送給車載旅客資訊顯示器即時訊息或預錄訊息時，可以設定訊息優先等級：

When CMFT sends a real time message to DMD, the message level can be set:

- 緊急訊息 Emergency Message
- 一般訊息 General Message
- 政令宣導 Decrees Message

操作員能選擇播放預錄訊息或輸入即時訊息，然後選擇播放次數後按”播放”按鈕開始播放。系統將持續重複此訊息播放，直到達到設定播放次數或按下終止播放按鈕。

The operator can choose to play pre-recorded message or input instant message, and select the number of plays and press “Play” button to start playback. The system will continue to repeat the message playback until the number of plays reaches the operator setup value or operator press “Terminate” button.

車載 PID 顯示預錄或即時訊息操作流程說明

Onboard PID display pre-recorded message operation flow description

1. 操作員從位置表列中選取欲傳送目的列車（單一列車，所有列車或群組列車）。
2. 操作員從預錄訊息表列上選取預錄訊息或輸入即時訊息。
3. 操作員輸入訊息播放次數。（如，播放一次）
4. 操作員按”傳送”按鈕，開始傳送訊息至列車旅客資訊顯示器。

1. Operator chooses the destination train (can be one train, all trains or any combination of trains) from the train list.
2. Operator chooses a pre-recorded message from the pre-recorded message list or types the message in the text area
3. Operator inputs times for PID message display. (e.g. play once.)
4. Operator presses “Send” button to perform sending message to selected PIDs of trains.

3.6 數位無線電派遣台 TETRA DISPATCHER

通訊多功能操作台將提供以下的數位無線電派遣台日常操作功能，詳細操作設計將於本章節中描述。

CMFT will provide the following daily operating functions for TETRA dispatcher, detailed operational designed will be described in this sections.

1. 個別呼叫 Individual Call
2. 群組呼叫 Group Call
3. 短訊 Short Data

3.6.1 個別呼叫 INDIVIDUAL CALL

個別呼叫乃指使用全雙工或半雙工通話模式與指定用戶通話

TETRA –行控中心撥出個別呼叫操作流程說明

TETRA – Dial out an individual call from OCC operation flow description

1. 操作員在畫面上輸入 TETRA 電話號碼或從 TETRA 電話簿選擇電話號碼。

2. 操作員按”撥號”按鈕開始撥號，TETRA 開始建立語音通道。
3. 若無法撥通，則顯示訊息通知操作員並結束此流程。
4. 若逾時無人接聽，則顯示訊息通知操作員並結束此流程。
5. CMFT 畫面上顯示被呼叫方的手機識別碼及通話狀況。
6. 操作員與被呼叫方開始對話。

1. Operator enters TETRA phone number or chooses phone number form phone book.
2. Operator presses “Dial” button to dial out an individual call, TETRA start to build the voice channel.
3. If the voice channel build failed, then alert the operator and end of this operation procedure.
4. If nobody answer the call and timeout, then alert the operator and end of this operation procedure.
5. Caller ID and status of the call will be displayed on each CMFT console.
6. Operator begins conversation with called party.

3.6.2 群組呼叫 GROUP CALL

TETRA 系統提供使用者可依據需求進行通訊群組設定的功能，每個 CMFT 主控台也會依責任的不同加入不同的群組中。行控中心操作員可以在畫面上輸入群組號碼或開啟 TETRA 電話簿選擇通訊群組進行群組通話。

TETRA system provides the user the function to setup communication groups by requirement, each CMFT console will be added to the different groups according to the different responsibilities. OCC operator can enter the group call number or choose group call number from TETRA phone book on the console screen to perform a group call

TETRA –行控中心撥出群組呼叫操作流程說明

TETRA – Dial out a group call from OCC operation flow description

1. 操作員在畫面上輸入 TETRA 群組號碼或從 TETRA 電話簿選擇群組號碼。
2. 操作員按”撥號”按鈕開始撥號，TETRA 開始建立語音通道。
3. 若無法撥通，則顯示訊息通知操作員並結束此流程。
4. 若有人接聽，則加入群組通話。
5. CMFT 畫面上顯示被呼叫方的手機識別碼及通話狀況。

1. Operator enters TETRA group call phone number or chooses group call phone number form phone book.

2. Operator presses “Dial” button to dial out a group call, TETRA start to build the voice channel.
3. If the voice channel build failed, then alert the operator and end of this operation procedure.
4. If somebody in the group answered the call, then he joined into the communication group.
5. Caller ID and status of the call will be displayed on each CMFT console.

3.6.3 短訊 SDS MESSAGE

行控中心操作員可以操作 CMFT 畫面對手機及車機發送及接收短訊。

OCC operator can operate CMFT console to send and receive SDS messages on the Cellular phone and On-train radio

TETRA –行控中心發出短訊操作流程說明

TETRA – Send a SDS message from OCC operation flow description

1. 操作員在畫面上輸入 TETRA 電話號碼或從 TETRA 電話簿選擇電話號碼。（可為單通或群組號碼）
2. 操作員按”發送”按鈕開始撥號，TETRA 開始發送短訊。
3. 若發送失敗，則顯示訊息通知操作員，並導引到障礙排除畫面。
4. 若發送成功，則顯示成功訊息通知操作員。

1. Operator enters TETRA a phone number or chooses a phone number form phone book.(the phone number can be a single call number or group call number)
2. Operator presses “Send” button starting to dial the phone number, TETRA start to send the SDS message.
3. If TETRA sent the SDS message failed, then alert the operator and end of this operation procedure and redirect to troubleshooting page.
4. If sent the SDS message completely, then prompt “send complete” to the operator.

3.7 系統相關操作 SYSTEM FUNCTION

3.7.1 主機驗證和帳號登入 LOGIN

主控員需要輸入 CMFT 身分認證資料，檢核成功才可以開始使用 CMFT 功能。

Operators must enter CMFT identity authentication information check successfully before they can begin to use CMFT functions.

登入操作流程說明

Login from OCC operation flow description

1. 操作員開啟 CMFT 軟體登入畫面即進行主機位址登入驗證。
2. 操作員輸入帳號密碼後，按下確定。
3. 若主機位址或帳號密碼沒有認證成功將顯示失敗訊息與原因。
4. 若兩者皆驗證成功，將根據主機和帳號權限開通與顯示 CMFT 主控台畫面。

1. When operator setup up the login screen of CMFT Console, the software would do the authentication for host IP login authentication.
2. The operator should input the account password, press OK.
3. If the host address or account password is illegal, the failure message and reason will be displayed.
4. If both are valid, will be based on the host and account permissions to open and display CMFT console function screen.

3.7.2 再確認機制 RECONFIRMATION MECHANISM

重要的操作功能的再確認機制，可以避免人為的誤操作，以及系統保護。再確認機制啟動時，系統將要求主控員再次輸入密碼。此功能保護的項目包含：

The important operating functions have reconfirm mechanism to avoid human misuse and system protection. System will require the operator to enter the password again to proceeding reconfirm mechanism. The reconfirm mechanism items includes:

a. 變更系統設定(主控台設定、列車語音通訊、群組與電話簿、不雅字)
b. 新增或刪除主控台或使用者
c. 變更主控台或使用者的權限
d. 變更告警設定(告警等級、告警類型)
e. 變更點矩陣設定(ATS 訊息、預錄訊息、訊息排程、顯示模式)
f. 變更廣播設定(預錄語音、語音排程、播放設備)
g. 變更本日營運時間
h. 傳送訊息給點矩陣顯示器播放
i. 傳送訊息給車載旅客資訊顯示器播放
j. 歷史影像調閱、儲存歷史影像、球型攝影機操作
k. 操作記錄查詢

a. Change system settings(Console Setting, PI, Group, Indecent words)
b. Add or delete console/user.
c. Change the authority of console/user.
d. Change alarm settings (alarm level, alarm type)

e. Change DMD settings (ATS Message、Predefine Message、DMD Schedule、Display Mode)
f. Change PA settings (Prerecord Audio、PA Schedule、Playback console)
g. Change operational time of a day
h. Sending message to DMD
i. Sending message to PIDS
j. Historical video playback, Historical video download, PTZ control
k. Operation log search

再確認機制啟動時，主控員必須完成再確認機制來繼續 CMFT 功能的操作；再確認動作：

1. 檢核：主控員可以輸入密碼後按下確認進行身分檢核；
2. 取消：或是按下取消，來放棄操作重要的功能，回到 CMFT 主控台畫面。

If reconfirm mechanism activated, operator have to complete reconfirm mechanism to continue operating of CMFT. Actions of reconfirm mechanism:

1. Authentication: Operator can enter password to check user identity to continue important function operating.
2. Cancel: or press cancel to abort important function operating, and back to CMFT functional screen.

3.7.3 主控台與人員權限設定

通訊多功能操作台系統設定如下：

1. 主控台新增修改與權限配置。
2. 角色新增修改與權限配置。
3. 帳號角色新增修改與權限配置。
4. 車站群組設定。
5. 列車群組設定。
6. 無線電群組設定
7. 直線電話簿。
8. 車站攝影機範本設定。

The communication multi-function console system is set as follows:

1. To Add, Edit and Delete a console configuration and permissions.
2. Role modification and permission configuration.
3. To Add, Edit and Delete a account role to add changes configuration and permissions.

4. Station group settings.
5. Train group settings.
6. Radio group settings.
7. DLT book settings.
8. Station camera model settings.

有關更多的細節，請參考附件 10。

For more details, please refer appendix 10.

操作流程說明

Login from OCC operation flow description

1. 根據不同功能進行畫面新增、編輯或刪除。
2. 按下確認按鈕後將進行身分驗證。
3. 若是身分驗證成功資料將被更新並且通知相關前後台模組。
4. 若是驗證失敗所有修改的內容將被還原。
1. According to the different functions, to add, edit or delete.
2. Press the confirmation button to perform identity verification.
3. If the identity verification success, data will be updated and notify the relevant module.
4. If the validation fails, all the modified content will be restored.

3.7.4 告警查詢與匯出 SEARCH AND EXPORT ALERTS

CMFT 顯示各子系統告警，使用一致的欄位記錄，其欄位如下：

Every CMFT command from operations will be logged and can be searchable. The log contain following columns.

- 事件時間 Event time
- 確認人員 Operator
- 通訊系統別 SubSystem
- 設備代號 Equipment Code
- 告警類別 Alarm Type
- 告警代碼 Alarm Code
- 告警等級 Alarm Level
- 告警描述 Alarm Description
- ACK/NAK ACK/NAK

搜尋的條件可以使用以上述的條件來做複合搜尋

The search conditions can be complex from above conditions

告警的匯出，使用逗號分隔值 (CSV, Comma Separated Values) 格式儲存，此 CSV 格式檔案可使用大部份市面上之試算軟體開啟。

The export format adapts CVS (Comma Separated Values) file type. This type can be used most spreadsheet software on the market

3.7.5 操作記錄與查詢 OPERATION LOG AND SEARCH

CMFT 主控員的操作指令，都將被記錄且可以透過搜尋來調閱操作記錄；操作記錄的內容包含：

Every CMFT command from operations will be logged and can be searchable. The log contain following columns.

- 事件時間 Event time
- 登入使用者 CMFT Operator
- 操作主控台 CMFT Console
- 操作系統種類 System Type
- 指令目標 Command Target
- 指令內容 Command Content

搜尋的條件可用以上的條件來做複合搜尋

The search conditions can be complex from above conditions.

3.7.6 登出 LOGOUT

當主控員離開席位或結束工作時，必須登出 CMFT，保護系統安全。

登出 CMFT 系統後，將保持在 CMFT 登入畫面，供主控員再次登入或讓不同的主控員登入。

When operate leaves the seat or the end of the work, operator must log out CMFT to protect system security.

After logout CMFT system, it will remain in CMFT login screen and waiting for operator to login again.

4 系統代碼說明 SYSTEM CODE DESCRIPTION

下文將說明代碼所代表通訊多功能操作台設備之規則。

The rule of an ID code for representing CMFT equipment is shown as follows.

4.1 設備編碼 EQUIPMENT NUMBERING

設備編碼分成 3 個部分：區域代碼、產品編號與流水號碼。

Equipment Numbering is divided into three parts: there are Area Code, Part Number and Serial Number.

Area code				Part Number					Serial number		
1st Digit	2nd Digit	3rd Digit		PBS code	1st Digit	2nd Digit	3rd Digit		1st Digit	2nd Digit	3rd Digit
X_1	X_2	X_3	-	Y_1	Y_2	Y_3	Y_4	-	K_1	K_2	K_3

4.1.1 區域代碼 AREA CODE

Area code		
1st Digit	2nd Digit	3rd Digit
X_1	X_2	X_3

位置代碼有三個欄位指示設備的位置，敘述如下：

Three boxes of location code identify the location of equipment as follows:

表 4-1: 區域代碼對照表

Table 4-1: AreaCode Table

Area code 區域代碼			Location 位置	Remark 備註
1st Digit	2nd Digit	3rd digit		
Y	0	6	Y6 車站 Y6 station	
Y	0	7	Y7 車站 Y7 station	
Y	0	8	Y8 車站 Y8 station	
Y	0	9	Y9 車站 Y9 station	
Y	1	0	Y10 車站 Y10 station	
Y	1	1	Y11 車站	

Area code 區域代碼			Location 位置	Remark 備註
1st Digit	2nd Digit	3rd digit		
			Y11 station	
Y	1	2	Y12 車站 Y12 station	
Y	1	3	Y13 車站 Y13 station	
Y	1	4	Y14 車站 Y14 station	
Y	1	5	Y15 車站 Y15 station	
Y	1	6	Y16 車站 Y16 station	
Y	1	7	Y17 車站 Y17 station	
Y	1	8	Y18 車站 Y18 station	
Y	1	9	Y19 車站 Y19 station	
S	D	C	行控中心 OCC	南機廠行控中心 OCC in South Depot
Y	S	C	備援行控中心 ROCC	Y17 車站備援行控中心 ROCC at Y17 Statioin
S	D	E	南機廠 South Depot	南機廠設備房 South Depot Equipment room
S	D	B	南機廠主變電站 BSS in South Depot	南機廠主變電站 South Depot Bulk Sub-station
Y	F	B	Y15 車站主變電站 BSS near Y15 Station	Y15 車站主變電站 Bulk sub-station at Y15 station

4.1.2 產品編號 PART NUMBER

Part Number			
PBS code	1st Digit	2nd Digit	3rd Digit
Y_1	Y_2	Y_3	Y_4

產品編號有四個欄位指示設備的種類，敘述如下：

Four boxes of Part Number identifies the type of equipment as follows:

表 4-2: 產品編號對照表

Table4-2:PartNumber Table

Part number 產品編號				Equipment and/or location 設備型號及/或對應位置	Remark 備註
1st Digit	2nd Digit	3rd digit	4th digit		
4 ("4"為通訊系統專用的代碼) proprietary code of Communication System is "4"	M	S	R	CMFT 伺服器 CMFT Server	
	M	W	S	CMFT 主控台 CMFT Console	
	M	W	M	CMFT 主控台螢幕 CMFT Console Monitor	
	M	R	D	儲存系統 Storage System	
	M	S	H	第二層交換器 L2 Switch	
	M	P	R	網路印表機 Network Printer	

4.1.3 設備流水號 EQUIPMENT SERIAL NUMBER

Serial number		
1st Digit	2nd Digit	3rd Digit
K_1	K_2	K_3

最後三個欄位指示設備的流水編號，依字母順序排序。

The last three boxes show the equipment serial number in an alphabetical order.

例如：位於 OCC CMFT 主控台表示如下：

For example, the CMFT console located in OCC will be represented as follow.

Area Code				Part Number					Serial Number		
1st Digit	2nd Digit	3rd Digit		1st Digit	2nd Digit	3rd Digit	4th Digit		1st Digit	2nd Digit	3rd Digit
S	D	C	_	4	M	W	S	_	0	0	1

4.2 纜線標籤與編碼 CABLE MARKER AND NUMBERING

纜線標籤與編碼將運用在圖說的繪製，以明確標定系統纜線。下文將對本系統的規劃做簡單的說明，實際的纜線標籤與編碼規劃。

Cable labels and codes used will be used in the drawing to calibrate system cable clearly. A simple description of the actual cable marker and numbering plan of the system will be shown as below:

Area code				PBS code				Sequential counter				EM susceptibility	
1st Digit	2nd Digit	3rd Digit		1st Digit	2nd Digit	3rd Digit		1st Digit	2nd Digit	3rd Digit		1st Digit	2nd Digit
A	B	C	-	D	E	F	-	G	H	I	-	L	M

4.2.1 區域代碼 AREA CODE

Area code		
1st Digit	2nd Digit	3rd Digit
X_1	X_2	X_3

位置代碼有三個欄位指示設備的位置，敘述如下：

Three boxes of location code identify the location of equipment as follows:

表 4-3: 區域代碼對照表

Table 4-3: AreaCode Table

Area code 區域代碼			Location 位置	Remark 備註
1st Digit	2nd Digit	3rd digit		
Y	0	6	Y6 車站 Y6 station	
Y	0	7	Y7 車站 Y7 station	
Y	0	8	Y8 車站 Y8 station	
Y	0	9	Y9 車站 Y9 station	
Y	1	0	Y10 車站 Y10 station	
Y	1	1	Y11 車站 Y11 station	
Y	1	2	Y12 車站 Y12 station	
Y	1	3	Y13 車站 Y13 station	
Y	1	4	Y14 車站 Y14 station	

Area code 區域代碼			Location 位置	Remark 備註
1st Digit	2nd Digit	3rd digit		
Y	1	5	Y15 車站 Y15 station	
Y	1	6	Y16 車站 Y16 station	
Y	1	7	Y17 車站 Y17 station	
Y	1	8	Y18 車站 Y18 station	
Y	1	9	Y19 車站 Y19 station	
S	D	C	行控中心 OCC	南機廠行控中心 OCC in South Depot
Y	S	C	備援行控中心 ROCC	Y17 車站備援行控中心 ROCC at Y17 Statioin
S	D	E	南機廠 South Depot	南機廠設備房 South Depot Equipment room
S	D	B	南機廠主變電站 BSS in South Depot	南機廠主變電站 South Depot Bulk Sub-station
Y	F	B	Y15 車站主變電站 BSS near Y15 Station	Y15 車站主變電站 Bulk sub-station at Y15 station

4.2.2 PBS 代碼 PBS CODE

PBS code		
1st Digit	2nd Digit	3rd Digit
D	E	F

對通訊系統來說，代碼”D”的值永遠為“4”，為通訊系統專用的代碼。

For Communication system, the volume of code “D” is always “4”, that is proprietary code of Communication System.

代碼”E”及”F”對應如下: Code “E” and “F” corresponding as follows:

表 4-4: PBS 代碼對照表

Table 4-4: PBSCode Table

系統碼 System Code	系統名稱 System Name
PA	廣播系統 **Public Address System**
DL	直線電話 Direct Line Telephone
AT	自動電話 Automatic Telephone System
DP	點矩陣顯示器與旅客資訊系統 DMD and Passenger Guide Information System
EM	電子郵件 E-mail System
CK	時鐘系統 Clock System
CM	通訊系統多功能操作台 Communications Multi Function Terminal
FO	通訊光纖傳輸系統 Communication Fiber Optical Transmission System
TV	閉路電視 Closed Circuit TV
OC	列車通訊 On Train Communication
DR	數位無線電系統 Digital Radio System
PS	電力 Power supply
CA	電纜 Cable

4.2.3 循序計數 SEQUENTIAL COUNTER

Sequential counter		
1st Digit	2nd Digit	3rd Digit
G	H	I

G、H、I 為循序計數從 001 至 999。

G, H and I means sequential counter from 001 to 999.

4.2.4 電磁敏感性 EM SUSCEPTIBILITY

EM susceptibility	
1st Digit	2nd Digit
L	M

電磁敏感性參考 TC1-60012 通訊系統 -電磁干擾／電磁相容控制計畫，提供 EMI/EMC 干擾防治設計概念。

電磁敏感性區分及電纜性質可分為以下幾種：

HS 高敏感性:通訊纜線與高壓電力纜線佈設於同一個電纜架時，通訊纜線需佈設於金屬管內以遮蔽外部電磁感應。

MS 中敏感性:通訊纜線與低壓電力纜線佈設於同一個電纜架時，通訊纜線需採用有遮蔽保護之纜線。

LS 低敏感性:通訊話纜、數據電纜、軌旁通訊話纜、網路電纜、同軸電纜、廣播電纜、低壓電力電纜等纜線，佈設於專屬的通訊系統或低壓電力系統的電纜架。

NS 無敏感性:光纖電纜。

電磁敏感性編碼格式依據 TC1-02004 鑑別與追蹤文件第 7.1 章節識別準則之規定辦理。

EMS reference to TC1-60012 Communications - EMI/EMC Control Plan and provides EMI/EMC interference prevention design criteria.

EMS to distinguish and cable properties can be divided into the following categories:

High susceptibility: communication cable and high-voltage power cable laid in the same cable tray, the communication cable must be laid within the metal tube to shelter the external electromagnetic induction.

Middle susceptibility: the communication cable and low-voltage power cable laid in the same cable tray, the communication cable requires the use of the shelter for protection of cable.

Low susceptibility: the Telephone cable、Data cable、Wayside cable、Network cable、Coaxial cable、PA cable、Low-Voltage power cable and other cables, be laid in a dedicated communication system or low voltage power system cable tray.

No susceptibility: Fiber cable。

The coding template of electromagnetic susceptibility is based on the identification criteria at the Section 7.1 of the TC1-02004 Identification and Traceability document.

舉例來說，行控中心通訊設備房 CMFT 中之 OCC L2 switch 連接至通訊光纖傳輸系統的 GE 交換器之通訊纜線，其纜線編碼將如下所示:

For example, a data cable from OCC L2 switch of CMFT to GE switch of FOT System, the cable code will be coded as follows:

Area code				PBS code				Sequential counter				EM susceptibility	
1st Digit	2nd Digit	3rd Digit		1st Digit	2nd Digit	3rd Digit		1st Digit	2nd Digit	3rd Digit		1st Digit	2nd Digit
S	D	C	-	4	C	M	-	0	0	1	-	L	S

5 通訊多功能操作台系統設備清單 CMFT SYSTEM EQUIPMENT LIST

以下章節將說明點通訊多功能操作台系統設備安裝地點，包括說明型號和設備的數量,將用表格之方式列出。

The following section summarizes the equipment of the DMD and PGIS System in different location. The list table will include the description, the model and the quantity of the equipment.

5.1 通訊多功能操作台系統設備清單總表 CMFT SYSTEM EQUIPMENT SUMMARY LIST

表 5-1: 通訊多功能操作台系統設備清單總表

Table 5-1: CMFT System Equipment Summary List

項目 Item	設備 Equipment	型號 Model	數量 Quantity		總計 Total	備註 Remark
			OCC	ROCC		
1	CMFT 伺服器 CMFT server	Lenovo x3650 M5	2	1	3	
2	儲存系統 Storage System	Lenovo Storwise V3700	1	-	1	
3	CMFT 主控台 CMFT console	ASUS WS660T	7	3	10	
4	CMFT 主控台顯示器 CMFT Console Monitor	Nextech OPN NTM215C0BBNSG	7	3	10	
5	終端伺服器 Terminal Server	Moxa IMC-21-S-SC	1	-	1	
6	網路印表機 Network Printer	HP LaserJet Enterprise 700 M712dn Printer	1	1	2	
7	網路交換器 Network Switch	Alcatel-Lucent OmniSwitch 6450-24	2	1	3	
8	媒體轉換器 Media Convertor	IMC-21-S-SC	4		4	
9	CMFT 伺服器作業系統 CMFT Server Operating System	Windows Server 2012	2	1	3	
10	CMFT 伺服器資料庫軟體 CMFT Server Database Software	Microsoft SQL Server 2016	2	1	3	
11	CMFT 主控台作業系統 CMFT Console Operating System	Windows 10	7	3	10	

5.2 行控中心 OCC

本章節清單表中的設備，未來採購時如有停產將以優規或同規產品替代

In the Section, the list of equipments in the table, the equioment will be replaced the higher or same specifications product if the product has been phased out in the future procurement.

表 5-2: 行控中心設備清單表

Table 5-2: OCC Equipment List Table

項目 Item	設備 Equipment	型號 Model	數量 Quantity	地點 Location	備註 Remark
1	CMFT 伺服器 CMFT Server	Lenovo x3650 M5	2	通訊設備房 CER	原 IBM System x3650 M3 已停產更新設備型號如左,其規格型錄請參閱 6.1.1 通訊多功能操作台伺服器 CMFT Server The original model, IBM System x3650 M3, has been phased out and the updated device model is shown on the left.Specifications are described in 6.1.1 通訊多功能操作台伺服器 CMFT Server
2	儲存系統 Storage System	Lenovo Storwise V3700	1	通訊設備房 CER	原 IBM System Storage DS3512 Express 已停產更新設備型號如左,其規格型錄請參閱 6.1.2 通訊多功能操作台儲存系統 CMFT Storage System The original model, IBM System Storage DS3512 Express, has been phased out and the updated device model is shown on the left.Specifications are described in6.1.2 通訊多功能操作台儲存系統 CMFT Storage System
3	CMFT 主控台(鍵盤與滑鼠) CMFT Console(Includingkeyboard and mouse)	ASUS WS660T	7	行控中心 OCC	原 HP Compaq 6200 Pro Desktop Tower 已停產更新設備型號如左,其規格型錄請參閱 6.1.3 通訊多功能操作主控台 CMFT Console The original model, HP Compaq 6200 Pro Desktop Tower Express, has been phased out and the updated device model is shown on the left.Specifications are

					described in6.1.3 通訊多功能操作主控台 CMFT Console
4	CMFT 主控台顯示器 CMFT Console Monitor	Nextech OPN NTM215C0BBNSG	7	行控中心 OCC	原 Nextech OPN 22WC0BU30B 已停產更新設備型號如左,其規格型錄請參閱 0 通訊多功能操作主控台顯示器 CMFT Console **MONITOR**
5	終端伺服器 Terminal Server	Moxa IMC-21-S-SC	1	通訊設備房 CER	
6	網路印表機 Network Printer	HP LaserJet Enterprise 700 M712dn Printer	1	行控中心 OCC	原 HP LaserJet 5200n 已停產更新設備型號如左,其規格型錄請參閱 6.1.6 網路印表機 Network Printer
7	網路交換器 Network Switch	Alcatel-Lucent OmniSwitch 6450-24	2	通訊設備房 CER	原 Alcatel-Lucent OmniSwitch 6400-24 已停產更新設備型號如左,其規格型錄請參閱 6.1.4 網路交換器 Network Switch
8	媒體轉換器 Media Convertor	IMC-21-S-SC	4	通訊設備房 CER	
9	CMFT 伺服器作業系統 CMFT Server Operating System	Windows Server 2012 R2	2	通訊設備房 CMFT 伺服器 CER CMFT Server	
10	CMFT 伺服器資料庫軟體 CMFT Server Database	Microsoft SQL Server 2016	2	通訊設備房 CMFT 伺服器 CER CMFT Server	
11	CMFT 主控台作業系統 CMFT Console Operating System	Windows 10	7	行控中心 CMFT 主控台 OCC CMFT Console	

5.3 備援行控中心 ROCC

本章節清單表中的設備，未來採購時如有停產將以優規或同規產品替代

In the Section, the list of equipments in the table, the equioment will be replaced the higher or same specifications product if the product has been phased out in the future procurement

表 5-3: 備援行控中心設備清單表

Table 5-3: ROCC Equipment List Table

項目 Item	設備 Equipment	型號 Model	數量 Quantity	地點 Location	備註 Remark
1	CMFT 伺服器 CMFT Server	Lenovo x3650 M5	1	通訊設備房 CER	原 IBM System x3650 M3 已停產更新設備型號如左,其規格型錄請參閱 6.1.1 通訊多功能操作台伺服器 CMFT Server The original model, IBM System x3650 M3, has been phased out and the updated device model is shown on the left.Specifications are described in 6.1.1 通訊多功能操作台伺服器 CMFT Server
2	CMFT 主控台(鍵盤與滑鼠) CMFT Console(Including keyboard and mouse)	ASUS WS660T	3	行控中心 ROCC	原 HP Compaq 6200 Pro Desktop Tower 已停產更新設備型號如左,其規格型錄請參閱 6.1.3 通訊多功能操作主控台 CMFT Console The original model, HP Compaq 6200 Pro Desktop Tower Express, has been phased out and the updated device model is shown on the left.Specifications are described in 6.1.3 通訊多功能操作主控台 CMFT Console
3	CMFT 主控台顯示器 CMFT Console Monitor	Nextech OPN NTM215C0BBNSG	3	備援行控中心 ROCC	原 Nextech OPN 22WC0BU30B 已停產更新設備型號如左,其規格型錄請參閱 0 通訊多功能操作主控台顯示器 CMFT Console **MONITOR**

					The original model,Nextech OPN 22WC0BU30B, has been phased out and the updated device model is shown on the left.Specifications are described in0 通訊多功能操作主控台顯示器 CMFT Console **MONITOR**
4	網路印表機 Network Printer	HP LaserJet Enterprise 700 M712dn Printer	1	備援行控中心 ROCC	原 HP LaserJet 5200n 已停產更新設備型號如左,其規格型錄請參閱 6.1.6 網路印表機 Network Printer The original model, HP LaserJet 5200n, has been phased out and the updated device model is shown on the left.Specifications are described in 6.1.6 網路印表機 Network Printer
5	網路交換器 Network Switch	Alcatel-Lucent OmniSwitch 6450-24	1	通訊設備房 CER	原 Alcatel-Lucent OmniSwitch 6400-24 已停產更新設備型號如左,其規格型錄請參閱 6.1.4 網路交換器 Network Switch
6	CMFT 伺服器作業系統 CMFT Server Operating System	Windows Server 2012 R2	1	通訊設備房 CMFT 伺服器 CER CMFT Server	
7	CMFT 伺服器資料庫軟體 CMFT Server Database	Microsoft SQL Server 2016	1	通訊設備房 CMFT 伺服器 CER CMFT Server	
8	CMFT 主控台作業系統 CMFT Console Operating System	Windows 10	3	備援行控中心 CMFT 主控台 ROCC CMFT Console	

6 設備規格資料 EQUIPMENT DATA SHEET

6.1 通訊多功能操作台系統設備 CMFT SYSTEM EQUIPMENT

6.1.1 通訊多功能操作台伺服器 CMFT SERVER

產品規格 Product Specifications	
模組 Model	Lenovo System x3650 M5
中央處理器 Central Process Unit	Intel Xeon E5-2620 v4
作業系統 Operation System	Windows Server 2012 R2
記憶體 Memory	32GB
硬碟容量 Hard Disk Capacity	600GB*4
光碟機 DVD-ROM	DVD-ROM
網路裝置 Network Device	2 Ethernet port 10/100/1000 Mbps (RJ-45)
電源供應器 Power Supply	460W ATX Power Source
連接埠 Connect Port	1 serials port, 4 USB ports, 2 VGA
環境規格 Environmental Specifications	- Operating Temperature: 10°C to 35°C - Humidity: 20% to 80%
支援機櫃	2U, 19-inch, industry-standard rack

通訊多功能操作台伺服器規格型錄如附件一。

CMFT Server specifications are described in appendix 1.

6.1.2 通訊多功能操作台儲存系統 CMFT STORAGE SYSTEM

產品規格 Product Specifications	
模組 Model	Lenovo Storwise V3700
RAID 控制器 RAID controller	Dual active, hot-swappable controllers.
快取記憶體 Cache	4 GB cache per controller
主機介面 Host interface	Four 8 Gbps FC 4 ports
驅動介面 Host interface	Two 8 Gbps FC 4 drive expansion ports
支援最大磁碟數 Maximum drives supported	Up to 240 drives
RAID 等級 RAID Level	0, 1, 3, 5, 6, 10
環境規格 Environmental Specifications	- Operating Temperature: 10°C to 35°C - Humidity: 20% to 80%
支援機櫃 Rack support	2U, 19-inch, industry-standard rack

通訊多功能操作台儲存系統規格型錄如附件二。

CMFT Storage System specifications are described in appendix 2.

6.1.3 通訊多功能操作主控台 CMFT CONSOLE

產品規格 Product Specifications	
模組 Model	ASUS WS660T
中央處理單元 Central Process Unit	Intel® Core™ I7-6600
作業系統 Operation System	Windows 10 Professional Edition 64
記憶體 Memory	16G ECC DDR4-2133 NON-ECC
硬碟容量 Hard Disk Capacity	1TB
光碟機 DVD-ROM	1 x SuperMulti DVD
圖形介面卡 Graphic Card	Build-in Intel HD 2000
網路裝置 Network Device	1 Ethernet port 10/100/1000 Mbps (RJ-45)
連接埠 Connect Port	1 serials port,10 USB ports, 1 PS/2 keyboard, 1 PS/2 mouse, 1 VGA 1 HDMI, 1DisplayPort,1 DVI-D,
電源 Power	500W 80+

通訊多功能操作主控台規格型錄如附件三。

CMFT Console specifications are described in appendix 3.

6.1.4 網路交換器 NETWORK SWITCH

產品規格 Product Specifications	
模組 Model	Alcatel-Lucent OmniSwitch 6450-24
物理介面 Physical Interfaces	3 Gigabit Module Slots •20 x 10/100/1000 ports •4 x 1Gigabit Combo ports •2 x 10 Gigabit Stacking ports Internal AC power supply
性能 Performance	Switching Capacity: 128 Gbps Switching Throughput: 95.3 Mpps Stacking Capacity: 40 Gbps
L2 特點 L2 Features	• Up to 16,000 MACs • Up to 4000 VLANs • Ring Rapid Spanning Tree Protocol (RRSTP) optimized for ring topology to provide less than 100 ms convergence time • 802.1s Multiple Spanning Tree •Protocol for loop free topology and link redundancy • 802.1w Rapid Reconfiguration of Spanning Tree allows sub second failover to redundant link • Alcatel-Lucent per-VLAN spanning tree (1x1) • 802.1D Spanning Tree Protocol for loop free topology and link redundancy • Static and 802.3ad dynamic link aggregation that supports automatic configuration of link aggregates with other switches
QoS 特點 QoS Features	•Priority Queues: 8 queues per port •Traffic prioritization: Flow-based QoS with internal and external (a.k.a., re-marking) prioritization. •Bandwidth management: flowbased bandwidth management, ingress policing shaping and port-based egress shaping. •Queue management: Random EarlyDetect/Discard (RED), configurablede-queuing algorithm; Strict Priority,Weighted and Deficit Round Robin
體積 Mechanical	Dimensions (H x W x D): 44 x 440 x 270 mm (1RU)
工作環境 Environmental Specifications	- Operating Temperature: 0°C to 45°C - Humidity: 5% to 95% (Non-condensing)
電源規格 Power Specifications	Internal Power Supply: 90-220V AC

網路交換器詳細的設備規格，請參考附件四。

Network Switch specifications are described in appendix 4.

6.1.5 通訊多功能操作主控台顯示器 CMFT CONSOLE MONITOR

產品規格 Product Specifications	
模組 Model	Nextech OPN NTM215C0BBNSG
解析度 Display Resolution	1920 pixels (H) x 1080 lines (V)
觸控面板 Touch Panel	Surface Capacitive Type with RS232 or USB interface connector
輸入與輸出 I/O Connectors	◎DC power in 100v~240v ◎VGA in D-sub 15 pin.DVI ◎USB
消耗功率 Power Consumption	40 watt (max.), < 3 watt (stand by mode)
尺寸(寬*高*深) Dimension (W*H*D)	504.3mm * 299.6mm * 48.7mm
重量 Weight	7.5Kg
工作溫度	0℃ ~ 50℃
儲存溫度	-20℃ ~ 60℃
儲存濕度	80% Maximum

產品規格-顯式規格 Product Specifications-Panel Specification	
面板尺寸	21.5 吋
可視面積	477.64(H) x 268.11(V) 公釐
最大解析度	1920x 1080 像素
最大對比	1000:1
亮度	250 cd/m2 (標準)
反應時間	5 毫秒
顯示比例	16:9
專業認證	RoHS

產品規格-觸控系統 Product Specifications-Touch Screen System	
觸控面板	表面電容式 Surface Capacitive
表面硬度	≧ 7H

產品規格-觸控系統 Product Specifications-Touch Screen System	
觸控壽命	可達 1 億次以上
透光度	≧ 93%
控制卡介面	USB

通訊多功能操作主控台顯示器規格型錄如附件五。

CMFT Console Monitor specifications are described in appendix 5

6.1.6 網路印表機 NETWORK PRINTER

型號 Model	HP LaserJet Enterprise 700 M712dn Printer (CF236A)
打印速度 Print speeds	Up to 40 ppm
打印品質 黑白 (最佳) Print resolution	Up to 1200 x 1200 dpi
首頁輸出 黑白 (就緒) First page out	As fast as 10.5 sec
顯示屏 Control panel	2-in, 4-line LCD (color text and graphics)
打印技術 Print technology	Laser
雙面打印選項 Duplex print options	Automatic (standard)
墨盒數量 Print cartridges number	1 (black)
打印語言, 標準 Standard print languages	HP PCL 6, HP PCL 5, HP postscript 3 emulation, native PDF printing (v 1.4)
流動打印功能 Printer smart software features	HP ePrint, Apple AirPrint™, Mopria-certified
標準儲存裝置連接介面 Standard connectivity	2 Hi-Speed USB 2.0; 1 Hi-Speed USB 2.0 Device; 1 Gigabit Ethernet 10/100/1000 Base-T; 1 High-Speed USB 2.0 Easy Access Walkup Port; 1 Hardware Integration Pocket (HIP)
網絡就緒 Network ready	Standard (built-in Gigabit Ethernet)

記憶量/最大記憶量 Standard memory/Max memory	512MB/1GB
支援的介質重量 Media weight	Tray 1: 60 to 199 g/m²; Tray 2, 3: 60 to 120 g/m²
紙張處理 標準/輸入 Pager handling - Input	100-sheet multipurpose tray, 2 x 250-sheet input trays
紙張處理 標準/輸出 Pager handling - Ouput	250-sheet output bin
進紙匣容量, 標準 Tray capacity(standard)	3
進紙匣容量, 最高 Tray capacity(max)	6
支援的網路協定 Supported network protocols	IPv4/IPv6: Apple Bonjour Compatible (Mac OS v10.2.4 or higher), SNMPv1/v2c/v3, HTTP, HTTPS, FTP, TFTP, Port 9100, LPD, WS Discovery, IPP, Secure-IPP, IPsec/Firewall; IPv6: DHCPv6, MLDv1, ICMPv6; IPv4: Auto-IP, SLP, Telnet, IGMPv2, BOOTP/DHCP, WINS, IP Direct Mode, WS Print
紙張規格 (公制) Supported media sizes	Tray 1, 2: A3; A4; A5; B4 (JIS); B5 (JIS); Tray 3: A3; A4; A5; B4 (JIS); B5 (JIS)
紙材類型 Media type	Paper (color, letterhead, light, plain, preprinted, prepunched, recycled, rough, tough paper), bond, cardstock, envelope, labels, transparency, vellum
硬碟 Hard disk	Standard, 8 GB Solid State Drive (SSD)
功耗資料 Power consumption	786 watts (Printing), 22.1 watts (Ready), 6.1 watts (Sleep), 0.21 watts (Off)
電源要求 Power	110-volt input voltage: 110 to 127 VAC (+/- 10%), 50/60 Hz (+/- 2 Hz); 220-volt input voltage: 220 to 240 VAC (+/- 10%), 50/60 Hz (+/- 2 Hz)

網路印表機規格型錄如附件六。

Network Printer specifications are described in appendix 6

6.1.7 終端伺服器 TERMINAL SERVER

產品規格 Product Specifications	
模組 Model	Moxa IMC-21-S-SC
網路連接埠數量 Number of Network Ports	2 (2 IPs)
網路設備 Network Device	10/100 Mbps, auto MDI/MDIX (8-pin RJ45)
串列埠數量 Number of Serial Ports	8
串列訊號 Serial Signals	RS-422：Tx+，Tx-，Rx+，Rx-，GND RS-485-4w：Tx+，Tx-，Rx+，Rx-，GND RS-485-2w：Data+，Data-，GND
同位檢查 Parity	None, Even, Odd, Space, Mark
接收資料 Data Bits	5, 6, 7, 8
停止位元 Stop Bit	1, 1.5, 2
流量控制 Flow control	RTS/CTS, DTR/DSR, XON/XOFF
通訊協定 Protocol	ICMP, IP, TCP, UDP, DHCP, BootP, Telnet, DNS, SNMP, HTTP, SMTP, SNTP
組態配置 Configuration	Web browser, telnet, console or Window utility
電源 Power Input	100 to 240 VAC, 47 to 63 Hz
消耗功率 Power Consumption	235 mA @ 100 VAC, 145 mA @ 240 VAC

終端伺服器規格型錄如附件七。

Terminal Server specifications are described in appendix 7.

6.1.8 媒體轉換器 MEDIA CONVERTER

產品規格 Product Specifications	
模組 Model	IMC-21-S-SC
外殼 Housing	Plastic, IP30 protection
體積 Dimensions	25 x 109 x 97 mm (0.98 x 4.29 x 3.82 in)
重量 Weight	125 g
安裝方式 Installation	DIN-Rail mounting
工作溫度 Operating Temperature	-10 to 60°C (14 to 140°F)
儲存溫度 Storage Temperature	-40 to 70°C (-40 to 158°F)
工作溼度 Ambient Relative Humidity	5 to 95% (non-condensing)
輸入電壓 Input Voltage	12 to 48 VDC and 18 to 30 VAC
輸入電流 Input Current	150 mA @ 24 VDC
連接 Connection	Removable 3-contact terminal block
過載電流保護 Overload Current Protection	1.1 A
反極性保護 Reverse Polarity Protection	Present
安全規範 Safety	UL 508
電磁兼容 EMC	CE, FCC
電磁干擾 EMI	FCC Part 15 Subpart B Class A, EN 55022 Class A
電磁耐受性 EMS	EN 61000-4-2 (ESD) Level 3, EN 61000-4-3 (RS) Level 2, EN 61000-4-4 (EFT) Level 2,

	EN 61000-4-5 (Surge) Level 2, EN 61000-4-6 (CS) Level 2, EN 61000-4-8 (PFMF) Level 1
環境試驗:衝擊 Shock	IEC 60068-2-27
環境試驗:自由跌落 Freefall	IEC 60068-2-32
環境試驗:震動 Vibration	IEC 60068-2-6
綠色產品認證 Green Product	RoHS, CRoHS, WEEE

媒體轉換器規格型錄如附件八。

Media Converter specifications are described in appendix 8.

6.1.9 CCTV 液晶顯示器 CCTV LCD MONITOR

CCTV 液晶顯示器是閉路電視子系統的設備之一。CCTV 液晶顯示器詳細的設備規格，請參考“TC1-69201 閉路電視系統 - 細部設計: 20.17 CMFT CCTV 螢幕”文件。

The CCTV LCD monitor is the equipment of CCTV System. Please refer to the document “TC1-69201 CCTV System - Detailed Design: 20.17 CMFT CCTV Monitor” for the detail equipment specification of CCTV LCD monitor.

6.1.10 廣播語音面板 PA AUDIO PANEL

廣播語音面板是廣播子系統的設備之一。廣播語音面板詳細的設備規格，請參考“TC1-61201 廣播系統 - 細部設計: 4.3 廣播語音面盤”文件。

The PA Audio Panel is the equipment of PA System. Please refer to the document “TC1-61201 PA System - Detailed Design: 4.3 PA Audio Panel” for the detail equipment specification of PA Audio Panel.

6.1.11 語音介面盒 TETRA AUDIO PANEL

語音介面盒是無線電系統的設備之一。語音介面盒詳細的設備規格，請參考“TC1-6B201 數位無線電系統 - 細部設計: 4.5.2.2 語音界面盒”“文件。

The TETRA Audio Panel is the equipment of PA System. Please refer to the document “TC1-6B201 Digital Radio System - Detailed Design: 4.5.2.2 Audio Panel” for the detail equipment specification of TETRA Audio Panel.

6.1.12 直線電話機 DLT TELEPHONE

直線電話是直線電話子系統的設備之一。直線電話詳細的設備規格，請參考“TC1-62205 自直線電話系統 - 設備規格”“文件。

The DLT is the equipment of AT/DLT System. Please refer to the document “TC1-62205 ADLT System Equipment Data Sheet” for the detail equipment specification of DLT Telephone.

6.1.13 桌上電話機 DESKTOP TELEPHONE

桌上電話是自動電話子系統的設備之一。桌上電話詳細的設備規格，請參考“TC1-63205 自動線電話系統 - 設備規格”“文件。

The AT is the equipment of AT/DLT System. Please refer to the document “TC1-63205 AT System Equipment Data Sheet” for the detail equipment specification of Desktop Telephone.

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