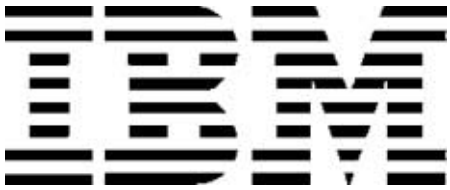
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Nways RouteSwitch Users Release Notes Version 2.1.3

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Revision History

Release	Revision	Date	Description of Changes
2.1	A	10/15/96	FCS Release of 2.1 Nways RouteSwitch and Nways Ethernet RouteSwitch
2.1.2	B	11/8/96	FCS Release with Token Ring fixes identified since last controlled release.
2.1.3	C	12/2/96	General Availability Release

1. Introduction

This release note covers the basic feature set supported, known limitations, bugs and known work-arounds for Nways RouteSwitch Version 2.1.3 software. Please read this document in its entirety as it contains important operational aspects that may impact your network.

2. 2.1.3 Feature Set Supported

Hardware and software features supported with the release 2.1.3 are the following:

Hardware:

Nways RouteSwitch:

- IBM 8274 Nways LAN RouteSwitch Model 513 (5 Slot 13.2 Gbps Backplane) F/C 7149, 7150, 0013
- IBM 8274 Nways LAN RouteSwitch Power Supply PS5-250 F/C 7141
- IBM 8274 Nways LAN RouteSwitch Model 913 (9 Slot 13.2 Gbps Backplane) F/C 7147, 7146
- IBM 8274 Nways LAN RouteSwitch Power Supply PS9-500T F/C 7139
- MPM II-8/16MB F/C 8503, 8504
- ESM-U-6 Module F/C 7105, 6865
- ESM-AB-FL 10BaseFL Adapter Card for ESM-U-6 F/C 7103
  ESM-AB-T 10BaseT RJ-45 Adapter Card for ESM-U-6 F/C 7101
  ESM-AB-AT 10BaseT RJ-45 and AUI Adapter Card for ESM-U-6 F/C 7104
  ESM-AB-B 10Base2 Adapter Card for ESM-U6 F/C 7100
  ESM-AB-FL-S Single-mode 10BaseFL Adapter Card for ESM-U-6 F/C 7102
- ESM-F-8 10BaseFL 8 port Ethernet Module F/C 7106, 6866
- ESM-C-12 10BaseT RJ-45 12 port Ethernet Module F/C 7108, 6863

New Hardware in 2.1 Release*:

Nways RouteSwitch:

- ESM-AB-AFD Adapter board for Ethernet Universal Switching Module F/C 7099
- ESM-T-12 10BaseT, 50 Pin Telco Connectors, 12 port Ethernet Module F/C 7107, 6864
- ESM-100C-FD-1/2 One or two port Full Duplex 100Tx F/C 7096 / 7095, 6869, 6870
- ESM-100-FM-FD-1/2 One or two port 100BaseFx F/C 7094 / 7093,6871,6872
- ESM-100-FS-FD-1/2 One or two port 100BaseFx (SM) F/C 7092 / 7091, 6873, 7074
- ESM-100C-5 4 port shared 100BaseT + 1 Full Duplex 100BaseTx F/C 8722, 8723
- ESM-100CFM-5 4 port shared 100BaseTx + 1 Full Duplex 100BaseFx (MM) 8724, 8725
- ESM-100CFS-5 4 port shared 100BaseTx + 1 Full Duplex 100BaseFx (SM) 8726, 8727
- WSM-2/4/8-SC Two, Four or 8 Port WAN Switching Module, Universal Serial External DTE/DCE Wide Area Network Interface Daughter Card 8728, 8729
- ASM-E3-1/2 One or two port ATM 500Kbytes SRAM, 34 Mbps E3, BNC connectors F/C 7053 / 7054, 6891, 6892
- TSM-CD-6 Token Ring Device Port Module F/C 7088, 6876

*New hardware must be supported by version 2.1.3 MPM software. Nways RouteSwitch Network Manager applications must also be version 2.1 to support new hardware.

The following include modules which contain either HSM or HSM2* boards.

- ESM-100C-4 100BaseT Switching Module F/C 7098, 6867
- ESM-100C-8 100BaseT Switching Module F/C 7025, 6868

- ASM-155FM-1/2E Multi-mode ATM Module 2 Mbyte SRAM F/C 7086, 6878, 7084, 6880
- ASM-155FS-1/2E Single mode ATM Module 2 Mbyte F/C 7082, 6882, 7080, 6884
- ASM-155FM-1/2 Multimode .ATM Module 5 Mbyte F/C 7087, 6877, 7027, 6879
- ASM-155FS-1/2 Single Mode ATM Module .5 Mbyte F/C 7083, 7081, 6881, 6883
- ASM-155C-1/2 155 Mbps UTP 5, RJ45 connector F/C 7079, 7077, 6885, 6887
- ASM-155C-1/2E 155 Mbps UTP 5, RJ45 connectors 2 Mbytes F/C 7078, 7076, 6886, 6888
- ASM-DS3-2 ATM w/BNC connectors F/C 7052, 6890, 7051, 6889
- FSM-M-1/2 FDDI Module Multi-mode F/C 7055, 7056, 6893, 6894
- FSM-C-4/8 CDDI Module F/C 7057, 7058, 7075, 7026
- FSM-M-C FDDI/CDDI Module F/C 7028, 6895
- FSM-S-1/2 FDDI Single Mode submodule F/C 7060, 7061, 6896, 6897
- TSM-CD-6 Module (4Mbps or 16 Mbps) F/C 7088, 6876
- TSM-F-6 Module (16 Mbps only) F/C 7089, 6875

* Version 2.0.4 and subsequent releases support HSM2. See section 9 for additional information. Version 2.1.3 and previous software versions support HSM.

Nways Ethernet RouteSwitch:

- IBM 8273 Nways Ethernet RouteSwitch Model 10 F/C 7145
- IBM 8273 Nways Ethernet RouteSwitch Model 10E (Extended Memory) F/C 7144
- IBM 8273 Nways Ethernet RouteSwitch Model 10U (Universal) F/C 7143
- RESM-AB-FL 10BaseFL Adapter Card for the Model 10U F/C 7118
  RESM-AB-T 10BaseT Adapter Card for the Model 10U F/C 7116
  RESM-AB-AT 10BaseT RJ-45 and AUI Adapter Card for the Model 10U F/C 7119
  RESM-AB-B 10Base2 Adapter Card for the Model 10U F/C 7115
  RESM-AB-FL-S 10BaseFL Adapter Card for the Model 10U F/C 7117
- RFSM-S-1 FDDI submodule. One DAS port. F/C 7130
- RASM-DS3-1 DS3 submodule. One port, 45 Mbps, BNC connectors F/C 7124
- RFSM-M-1 FDDI submodule Multi-mode F/C 7131
- RFSM-C-4 CDDI submodule four CDDI ports F/C 7129
- RASM-155FM-1 ½ and 2 Mbyte ATM submodule-Multi-mode F/C 7128, 7127
- RASM-155-FS-1 ½ and 2 Mbyte ATM submodule- Single-mode F/C 7126, 7125

New Nways Ethernet RouteSwitch Hardware*:

- PESM-AB-AFD One full duplex AUI port for Model 10U F/C 7114
- PESM-100C-4 4 Port 100BaseT sub-module F/C 7123
- PESM-100C-FD-1 One 100BaseTx full duplex port sub-module F/C 7120
- PESM-100FM-FD-1 One 100BaseFx full duplex port sub-module (MM) F/C 7121
- PESM-100FS-FD-1 One 100BaseFx full duplex port sub-module (SM) F/C 7122

*New Nways Ethernet RouteSwitch hardware must be supported by version 2.1.3 Nways Ethernet RouteSwitch software. Nways RouteSwitch Network Manager applications must also be version 2.1 to support new hardware.

Software Major Features:

- RouteTracker including enhancements to Version 2.0.4
- Ethernet RMON (Groups: Ethernet Statistics, History Control, Ethernet History, Alarm and Event)
- IP Routing
- IPX Routing
- ATM Services
  Ethernet LAN Emulation Client

X-Lane with PVC's
RFC 1483 (LLC Encapsulation over ATM)
RFC 1577 (Classical IP over ATM)
Omni point to point bridging
VLAN Trunking over ATM

- ATM UNI 3.0/3.1
- PVCs and SVCs
- VLAN Trunking over FDDI
- Source Route Bridging
- Virtual Rings and Virtual Rings over Trunks (backbones)
- STM-1 Coded in accordance with ITU Ch. 4 of I.432 (Geneva July 1995)
- Flooding Limits
- 2K CAMS
- Adaptive MAC Learning Algorithm
- SVC/PVC Recovery Improvements
- SNMP Trap Support
- Hot Swap of like modules
- MPM Redundancy
- IPX Any-to-Any Switching
  LLC Output Option for Translations

New Software Major Features*:

- Frame Relay
- Duplicate MAC Support
- Multicast Virtual LAN's
- IEEE 802.10 VLAN Tagging over FDDI
- Router VLAN Management
- IPX Client Network Policy refinement
- Port Forwarding Policy
- Port Mirroring (10BaseT)
- Optional Token Ring Copy Bit Setting
- Banyan Vines Translations
- IPX Raw over FDDI
- IBM Token Ring Support Functional Address

New software features are only supported in version 2.1 Nways RouteSwitch and Nways Ethernet RouteSwitch software and are only supported by Nways RouteSwitch Network Manager Version 2.1 applications.

Note: For ATM interoperability testing results, please contact IBM Technical Support.

3. Technical Support Contacts

IBM Technical Support can be reached at **1-800-IBM-SERVE (426-7378)**.

4. General Instructions and Notes

1. If you are upgrading from Nways RouteSwitch Version 1.2 or later to 2.1.3 , you just need to download the 2.1.3 software and then reboot the Nways RouteSwitch - see Chapter 6, of the *Nways RouteSwitch User's Guide* for details on software downloading and configuration.

2. Nways RouteSwitch Version 2.1.3 requires 8 MB SIMM and 4 MB Flash are recommended. (See Section 9)

3. To perform Nways RouteSwitch and Nways Ethernet RouteSwitch (version 2.1.3) installation with floppy diskette(s) which is required on a PC follow these instructions:

   Using a PC, insert the first floppy, CD to the directory where software installation is to occur and type X:install (X = the drive letter for installation). Instructions are provided for the remainder of the installation.

4. Model 10 and Model 10U, version 1.0 require 8 MB SIMM and 2 MB Flash. It is recommended that Model 10E, version 2.1 be used when performing extended IP or IPX routing. Model 10E has a 16MB SIMM and 4 MB Flash.

5. Nways RouteSwitch Network Manager 2.1 is required for managing the new features contained in Nways RouteSwitch version 2.1.3 software. See Nways RouteSwitch Network Manager 2.1 release notes for Nways RouteSwitch Network Manager, RouteTracker, and RouteMonitor applications for more detail.

6. The MPM (management module) may be in slot 1 or 2.

7. A fully loaded (all slots occupied) unconfigured - or reconfigured - Model 500 may require 2 minutes to load the first time. A fully loaded Model 900 may require 5 minutes. Do not become alarmed during boot-time if you have logged in and start processing a command and find yourself locked out. The Nways RouteSwitch is still initializing the virtual port database. During this time no configuration changes should be made

8. If a PC is directly connected to the Nways RouteSwitch, the Nways RouteSwitch Spanning Tree will reconfigure when installed or rebooted (this is generally not a problem). However if a network layer protocol is started at boot time (via the autoexec.bat) of the PC and is dependent upon a connection (such as an IPX connection), then the network layer process will not be able to start until the Spanning Tree process has completed. In the event that the IPX client is unable to attach to its server the following steps may be used to solve the problem:

   c) If only 1 client is attached, the port type can be changed to optimize device switching using the modvp command. **This configuration will turn off spanning tree.**
   d) If the system constraints allow, the spanning tree forwarding timer can be changed to a lower value. This should not be done without careful consideration for the network needs of spanning tree.
   e) If necessary either the NETX or VLM commands can be re-entered. In some versions of NETX the driver is loaded regardless of whether a connection is made. When this occurs the driver must be unloaded then restarted. NETX version 3.32 and VLM version 1.20 were used in testing and do not require an unload between commands.

9. A modification to the aging timer for transparent bridging will only take place on newly learned entries. Any entries learned on the previous timer will time-out on that value. Once they time-out, and the entry is re-learned, the correct aging timer will be used.

10. The mpm.cmd file cannot be altered by any DOS editing because unrecognizable characters are added to the file. However, an on-line editor can be used.

11. Speeds on the console/modem ports of 19,200 or greater are not supported using the load command.

12. Only one Source Route Bridge Number can be assigned to a Group.

13. Hot swap of network interface modules is supported under the condition that the module is swapped with a like module. The command 'Swap' should be turned on before replacing any module. The MPM must be in the ready state prior to insertion. This can be determined by the color of the OK light on the MPM. The light should be blinking green. Any removal or insertion must be completed in a single removal and insertion operation. Partial removals or insertions can cause board and/or Nways RouteSwitch failure.

14. Please see the Hardware Compatibility Matrix in section 12.0 to verify your Nways RouteSwitch platform is compatible with Nways RouteSwitch software version 2.1.3.

15. Concurrent Bridging and Trunking of Group 1 is not supported on FDDI interface. In order to Trunk Group 1 on FDDI interface do the following:

    a. Create a new Group (crgp) and move the FDDI interface (ex. 2/1) to this new Group. This action moved the Bridge port of this interface to the new Group.

    b. You can now create a service and Trunk Group 1 on this interface. Ex: cas 2/1, service is Trunk, Group is 1.

    c. vi will display:

```
Group  Slot/Intf  Type/Inst/Srvc
  2      2/1       Brg/ 1/na
  1      2/1       Tnk/ 1/na
```

16. When changing the encapsulation type (e.g., 802.3 to Ethernet II), you must reset the physical port (either by pulling the physical cable out and pushing it back in or using the User Interface commands to disable and then enable port).

17. When downloading files using ftp , FAT filenames are changed to uppercase which makes files unreadable. The user must change filenames to lowercase. The following versions do not display this problem: WFWG of ftp version 32b, ChameleonNFS, and SUN's PCNFS.

18. Upon initial start-up (or after removal of mpm.cfg file) of a system with large numbers of physical ports, primarily the 9 slot chassis, the message: "File system compaction in progress....." may be seen. This is not a problem, unless it repeats indefinitely. This message may be seen from time to time if network management functions are occurring. One time is not a problem, immediate repetitions are a problem and if they occur contact IBM Technical support

19. Each group within the Nways RouteSwitch or Nways Ethernet RouteSwitch executes the IEEE 802.1d spanning tree algorithm. Spanning tree defines its bridge ID as the lowest MAC address of all the virtual ports attached to the given Group. If a virtual port is moved from "Group A" to "Group B", then a spanning tree reconfiguration may result. If 'Group A's" bridge ID is the MAC address of that virtual port, then its bridge ID must change. This will require a spanning tree reconfiguration. If the virtual port added to "Group B" has a MAC address lower than all other virtual ports attached to "Group B", a spanning tree reconfiguration must occur. If the user performs such port moves via a Telnet session, they will experience a temporary lockout (up to 30 seconds) in their session, if spanning tree reconfigures on the Group supporting their Telnet session.

20. Translations from source routing to transparent bridging are not supported (e.g. Token Ring source routing to Ethernet transparent).

21. A configuration file expansion is the operation of adding new configuration parameters to the current config file. In order to perform a configuration file expansion the following criteria must be met. There must be enough flash for the config file expansion. The required amount of free space on flash must be

the configuration file size plus 8192 bytes for each configuration. As a general rule 75000 bytes of flash memory should always be available. When using 2 Mbytes of flash on the MPM the total amount of used flash may not exceed 1.45 Mbytes; and when using 4 Mbytes it may not exceed 3.45 Mbytes. The *ls* command will identify how much flash is available. To conserve flash memory please remove any files that are not needed. For example, remove tsm.img if the Nways RouteSwitch does not have any token ring modules.

22. The MIB II traps cold start, linkdown and link up are not supported in this release. Comparable functionality is available through IBM traps. (PR 1195)

23. After removing or deleting a configuration file, the Nways Ethernet RouteSwitch or Nways RouteSwitch must be rebooted.

24. When using RouteTracker VLANs to segregate IPX servers, do not enable IPX routing at the Group level (the default VLAN contained in that group). In order to have the Nways RouteSwitch or Nways Ethernet RouteSwitch participate in IPX routing along with the server, IPX routing should be enabled on the RouteTracker VLAN.

25. Use of the "break" key on a terminal/PC will change the baud rate of the serial port connected to the Nways RouteSwitch. The baud rate will cycle to the next highest baud rate. When it gets to 38,400, it will cycle back to 1200 baud. The cycle is as follows: 9600 ⇒ 19200 ⇒ 38400 ⇒ 1200 ⇒ 9600.

26. When a port is in optimized device mode it will only transmit unicast traffic directed to that device and all broadcast and multicast traffic. It will not transmit any unknown unicast traffic. Therefore, as long as the MAC address is known, communication will exist. If the device is not heard from for 5 minutes, the MAC address will become unknown and communication will cease until the MAC station address is relearned. In most cases this will not be a problem because the device will transmit frames which will cause the MAC to be relearned. If there is a lapsed time, communication will not occur after the time-out and before relearning the MAC address. If client/server relationships exist on a fixed timer using optimized device ports the default time-out value should be altered such that the value is 1 minute greater than the server/client time-out. For example: If IPX server/clients are involved and the default watchdogs are 5 minutes apart, then the Nways RouteSwitch time-out value should be 6 minutes. This will ensure that the Nways RouteSwitch forwarding table will always have the end stations MAC address.

27. Do not attempt to run a UI command while the chassis state is changing. If this occurs a message will appear "please standby, chassis configuration changing.....". If, however, the "....." following the message do not discontinue after a maximum of 30 seconds, a module may be hung up. Type control-C to abort the message and attempt to determine the problem either by monitoring the module LEDs, or by using the slot command.

28. When a destination node is moved to a different location in RouteTracker VLAN, the source does not learn the new location until the destination node sends a packet.

29. If a token ring port is configured as source routed only (SR), then transparent frames received from the network (i.e. those not source routed) will be discarded. If user desires transparent frames to be received, they must configure the token ring port as source route transparent (SRT).

30. Do not use different software versions for image files. All image files must be at the same version. Mixing image file versions (e.g. 2.0.3 mpm.img and 2.1.3 for all other image files such as esm.img, fsm.img, etc.) can cause Config File corruption.

31. The flood limit that is applied by ESM code is approximate and can be ± 15%.

32. On a reboot from the UI command line, the system sends a warmStart Trap.

33. There is no limit on the number of times a TSM-CD-6 port can detect a difference in ring speed and reset itself. This may be a problem when more than one port in a ring has ring speed auto detect capability and the ports are configured at different speeds. Under these circumstances, it is important to know what the ring speed should be and to configure it explicitly. The default speed is 16 Mbps. In the future, a limit will be placed on the number of times a TSM-CD-6 port will detect ring speed and reset itself.

34. User Guide correction to Section 12-6. This section describes trap mask as two (2) word values with word 1 entered followed by word 0. Trap mask is now four (4) word values with the ordering consistent with the IBM trap mib (words 0-4).

35. User Guide correction to Section 12-8. This section is missing Frame Relay and manual mode trap mask from Table 12-2.

	Trap Type		Bit Position	Hex Value
FR	DLCI	CREATE	27	800 000
FR	DLCI	DELETE	28	1 000 000
FR	DLCI	UP	29	2 000 000
FR	DLCI	DOWN	30	4 000 000
	Manual Mode Forwarding		31	8 000 000

36. The Nways RouteSwitch User Guide enabling Multicast Claiming is incorrectly identified in Section 19, page 19-19. The command should be:

    bslLearnMcPkt

    The multicast claiming default is “off” if there are no RouteTracker rules enabled.

37. To disable flood limiting on a switch basis rather than a port-by-port basis user may edit file mpm.cmd and add at the end of the command file the following line: disableFloodLimiting = 1.

38. If a group is declared to be a Default Group for Frame Relay Virtual Circuit creation, then it cannot be deleted, even if it is not currently being used. Rmgp will display the message “Cannot delete”. Group has active entries.” **Work-around**: “frm slot/port” to remove the group as a Default and then rmgp. (PR 4549).

39. Vrouter port doesn't support FDDI-raw frame - when vrouter ports are configured as Ethernet 802.3 and FDDI port as FDDI-raw, FDDI-raw packets received on the other side of router are not routed.

40. SNA traffic on Token Ring and RouteTracker VLANs: If the user wants to configure RouteTracker vlans for SNA traffic based on DSAP/SSAP protocol rules, it is recommended that the user also configures port rules for ports that connect the Nways RouteSwitch to the server. The reason being that the servers normally will not generate traffic unless a client talks to it. But before the client initiates the SNA session, it sends out the "Duplicate MAC test" frames which carry the SNA dsap/ssap values. As a result, the client gets assigned to the SNA vlan and subsequent SNA traffic will not go out on the server port as that port is not still part of the SNA vlan.

5. IBM Support for Functional Address (IBM Spanning Tree)

1. The user can enable on a per Group basis the IBM spanning tree algorithm. This capability is provided by one of the menu items under the ‘stc [Group ID]’ command. When the user selects IBM spanning tree, the Nways RouteSwitch automatically sets the default values for maximum age, forward delay, and hello time (6, 4, and 2 seconds, respectively) as seen in the subsequent menu items. Unlike the IEEE spanning tree algorithm, in the IBM spanning tree algorithm these values are fixed. However, for

consistency in menu displays, IBM chose to not only display these values as in the IEEE spanning tree case but, in addition, enable the user to change them. In fact, the user should not change these values.

2. The default spanning tree algorithm for each Group is IEEE. If the user wishes to change spanning tree parameters on a per Group basis through use of the 'stc [Group ID]' command, at least 1 virtual port needs to be attached to the Group. An error message is displayed to this effect if the user selects the 'stc [Group ID]' command and there are no virtual ports attached to the specified Group.

3. When the user selects IBM spanning tree, additional default settings are carried out as follows:

   a. all virtual ports attached to the Group in question whose physical port is either 4Mb or 16MB token ring are initialized to use Functional rather than Group addresses;

   b. all virtual ports attached to the Group in question whose physical port is neither 4Mb nor 16Mb are set to manual forwarding mode; and,
   c. as additional virtual ports are attached to the given Group, rules a) and b) are applied.

      Virtual ports that are in manual forwarding state means that they are not participating in any flavor of spanning tree (neither IEEE nor IBM). Since this state occurs automatically as a result of rule b), IBM decided to forward any IEEE spanning tree frame received on such a port to all other virtual ports in the Group that are in manual forwarding state. This is to prevent a loop in the topology as a result of applying rule b) mechanically.

4. For a Group configured for IBM spanning tree, the user can override the default settings at his or her discretion. However, as a general rule, overriding the manual forwarding state to enable IEEE spanning tree on that port only is not recommended. The user is now running a "hybrid" of IBM and IEEE spanning tree within the same Group. This may have some unintended consequences, and, although not forbidden, is not recommended.

5. It appears that IBM SRT bridges send on token ring an IEEE-style BPDU with an STE RIF (0xC200). We do not support this mode of operation. The Nways RouteSwitch will neither process nor forward these frames.

6. Memory Requirements

Version 2.1.3 requires 8 Mbytes of DRAM. 4 Mbytes of Flash memory are available and recommended, but not required unless the Nways RouteSwitch contains all types of network interface modules. See the following table for the flash memory required for each module.

Filename*	Image Size (Bytes)	Module Type
mpm.img	1627980	MPM, MPM II
mpm.cmd	35	MPM, MPM II
mpm.cfg	32768	MPM, MPM II
asm.img	39001	ASM-155-F, ASM-155-C, ASM-DS3
asm2.img	39001	ASM-155-F, ASM-155-C, ASM-DS3
e12.img	31418	ESM 12, ESM-T-12, ES-F-8
esm.img	31353	ESM-8, ESM-U
fesm.img	28878	ESM-100-C
fesm2.img	28728	ESM-100-C
fsm.img	34197	FSM-M, FSM-S, FSM-C, FSM-M-C
fsm2.img	34197	FSM-M, FSM-S, FSM-C, FSM-M-C
tsm.img	30860	TSM-C-6, TSM-F-6
tsm2.img	30860	TSM-C-6, TSM-F-6
wsm2.img	39208	WSM-4-SC, WSM-8-SC
wsmdcser.img	28608	WSM-4-SC, WSM-8-SC
trbyr6.pga	11106	RO-6PORT-BYTEX, TSM-F-6
trbyrr.pga	11860	RI/RO BYTEX, TSM-F-6
trlobe.pga	8257	LOBE-802.5j, TSM-F-6
trstatn.pga	9462	STATION-802.5j, TSM-F-6
trsyr6.pga	7669	RO-6PORT-SYNOPTICS, TSM-F-6
trsyrr.pga	8919	RI/RO SYNOPTICS

- Filenames containing a “2” are required for HSM2, e.g. asm2.img is used on an ASM-155-F containing an HSM2.

Note: If the image size of the used files exceeds 1.45 Mbytes, the MPM must have 4 Mbytes of flash memory. Please remove (*rm* command) any Network Interface Module files that are not used to conserve flash memory usage. For example, if the token ring module (TSM) is not installed in the Nways RouteSwitch the tsm.img file may be removed.

7. MPM II Upgrade

Release 2.0 and greater requires 8 Mbytes of DRAM memory, therefore there is a memory upgrade available with this release for the MPM, the Model no. Is MPM-UK-8MB. This upgrade kit expands the Management Processor Module DRAM memory to 8 Mbytes, Flash to 4 Mbytes. The upgrade includes one 8 Mbyte SIMM, and 2 Mbytes Flash (4 chips) and installation instructions. Another upgrade kit Model no. 2M-FLA-UPGR only contains the Flash memory increase to 4 Mbytes. **For MPM upgrades IBM memory is required.**

8. HSM2 Modules

The HSM is the base switching intelligence for all IBM switching modules except for the 10BaseT switching modules. The HSM2 is an enhanced version of the original HSM, which provides improved performance, specifically for two way traffic.

HSM2 support requires software release 2.0.5. or later. If any modules in the chassis are equipped with HSM2’s , software release 2.0.5 or later must be loaded in the chassis’ MPM. Additionally, users transitioning from 1.x software also requires additional memory. The HSM2 requires images ending in the letter 2, (i.e. asm.2.img, fsm.2.img).

9. IP Address Formats

Release 2.1.3 will provide the user a more concise syntax to specify the dotted decimal format of a 32-bit IP address. The new syntax conforms to the traditional Internet interpretation. The rules are as follows:

i) a.b.c.d (a, b, c and d treated as 8 bits)
2) a.b.c (a and b treated as 8 bits; c treated as 16-bits)
3) a.b (a treated as 8 bits; b treated as 24 bits)
4) a (a treated as 32 bits)
5) a. (equivalent to a.0.0.0)
6) a.b. (equivalent to a.b.0.0)
7) a.b.c. (equivalent to a.b.c.0)

One can see the more concise syntax in the following 2 examples. The IP address 3.0.0.1 can now alternatively be expressed as 3.1 or 3..1 or 3...1; the IP subnet mask 255.255.0.0 can now alternatively be expressed as 255.255. or 255.255..

The following lists some of the commands where the user can employ this more concise syntax: ftp, telnet, crgp, modvl, ping, snmpc, and xlat.

10. ATM LANE

10.1 ATM LANE - Default Mode

No translations are performed on Ethernet frames.

FDDI and Token ring frames are either SNAP or LLC and are transmitted as such on ATM LANE with the exception of Banyan Vines Token ring and Banyan Vines FDDI frames which are translated to Ethertype on ATM LANE.

10.2 ATM LANE - Ethernet II Mode

IPX frames from FDDI, Token ring and Ethernet are translated to Ethertype on ATM LANE.

All other SNAP frames from FDDI, Token ring and Ethernet SNAP are translated to Ethertype on ATM LANE with the exception of Appletalk ARP SNAP frames from Token ring and FDDI which are left as SNAP on ATM LANE and Banyan Vines frames from FDDI which are translated to Ethertype on ATM LANE.

All other 802.2 frames from FDDI, Token ring and Ethernet are left as is except Banyan Vines frames from Token ring which are translated to Ethertype on ATM LANE.

All Ethernet Ethertype frames are left as is.

10.3 ATM LANE - SNAP Mode

All IPX frames are translated to or left as SNAP on ATM LANE.

All Ethertype and SNAP frames from Ethernet and SNAP frames from Token ring and FDDI are translated or left as SNAP on ATM LANE except for Banyan Vines from FDDI which are translated to Ethertype on ATM LANE.
All other LLC frames are left as is except Banyan Vines from Token ring which are sent as Ethertype.

10.4 ATM LANE - LLC Mode

IPX frames are translated to 802.2 LLC on ATM LANE.

All other SNAP frames from FDDI, Token ring and Ethernet SNAP are translated to Ethertype on ATM LANE with the exception of Appletalk ARP SNAP frames from Token ring and FDDI which are left as SNAP on ATM LANE and Banyan Vines frames from FDDI which are translated to Ethertype on ATM LANE.

All other LLC frames are left as is except Banyan Vines from Token ring which are sent as Ethertype.

11. Nways RouteSwitch Version 2.0.4, 2.0.5 and 2.1 Problem Resolution

The Nways RouteSwitch Version 2.0.4 Known Problems have been fixed in this release.

- RouteTracker does not work with source routing over ATM and FDDI. (PR 3004)
- Some IPX clients are unable to connect to certain IPX servers. If the network address of the IPX servers internal network differ only by one digit (e.g. A1, A3) routing through the Nways RouteSwitch is not possible when directed through differing paths. The IPX routing code effectively prevents the router from distinguishing routes to IPX server internal networks that differ only in the 2nd bit of the Network Address. This is generally only a problem with IPX server internal networks because internal network nodes always use the same node number 00 00 00 00 00 01. This can cause the Nways RouteSwitch to send packets destined for one server to another. The server that receives the traffic of both servers is dependent on traffic patterns and may change over time. (PR 3651)
- Using ATM/PTOP with SRT bridge, the largest frame size that is inserted in the LF bits of the RIF header is set as 516 Bytes instead of 4472 Bytes. (PR 3555)
- Cannot create service (trunk) on an FDDI single mode fiber port. (PR 3648)
- Cannot create an ATM connection if the Tx/Rx segment size is set to 4096 byte. (PR 3610)
- An Ethernet packet received over LANE will reset the Ethernet Network Interface module (ESM) if the packet size exceeds the maximum allowed by Ethernet. Fragmentation of the packet is not performed properly. (PR 3682)
- LANE can get into a state where the Nways RouteSwitch is unable to use the Data Direct while the other LEC is using the Data Direct. (PR 3699)
- MAC learned over LANE BUS is not aged out correctly (PR 3678)
- Unlearned Unicast packets are not always translated properly when sent to the LANE BUS. (PR 3116)
- RMON always returns zero for CRC alignment error. (PR 3754)
- Nways RouteSwitch Network Manager does not recognize HSM2 modules and therefore module does not show in slot. (PR 3472)
- After ATM Port End System ID is configured (ie LANE), the mpm.cfg is FTP'd to another Nways RouteSwitch. The End System ID will use ID created on previous Nways RouteSwitch. ID should be based upon current HSM hardware base-MAC-address. (PR 3581)
- Source learning internal memory problem. (PR 3887)
- Source learning unable to learn transparent bridge frame after it has been learned by source routing. (PR 3907)

- Source learning learns MAC from ATM LANE with BUS vci. If this occurs, no more packet from that MAC will go to source learning again for ATM LANE to relearn. (PR 3679)
- Insufficient internal memory for Source Learning. Some PC's cannot be learned because source learning rejects the packet with insufficient memory problem. (PR 3600) Default flood limits changed for ATM, TR and FDDI. (PR 3964)
- FDDI may not pass source routed frames in transparent bridge. (PR 3963)
- Traps do not support Model 913 and Model 513. (PR 3884)
- No MIB II dots table entries for 2nd TSM in chassis. (PR 3867)
- FDDI trunking groups may fail to time out after being deleted. (PR 3897)
- HSM2 end identifier is wrong if module is moved to another chassis. (PR 2583)
- Token Ring and Ethernet clients can not be part of the same VLAN and routed to a different VLAN. This is the case because IPX router ports are assigned an output type for transmission of routed frames. The problem is there is no checking on frame type for input frames to the router port, therefore only frames that match the output type will be interpreted correctly. (PR 2669)
- *vas* and *src* do not display the same instance number for the same service. (PR 2641)
- Commands *fwt* and *macinfo* may show different data than actual or the ones displayed. (PR 3324)
- No SNMP MIB variables are supported for signaling or ILMI status. (PR 2631)
- If the user needs to modify ATM physical port parameters using *map* command, it is **required** that the user answers "N" (default) to the question "reset all services on slot___port___. By answering no, the new parameter will not take effect until the switch is rebooted. Most parameters in this menu are modified very infrequently. (PR 2821)
- ATM network cards not supporting inverse ARP do not work with Nways RouteSwitch. (PR 2710)
- The *xfercancel* command has been removed from the software but is still displayed when the command list is requested from the secondary. (PR 3196)
- SNMPWALK cannot complete. (PR 3378)
- The 100BaseT module with extended memory (2 Mbytes) will not operate unless the 2K CAM is removed. (PR 3613)
- When changing a service from SVC to PVC the message "please enter a connection" appears when a connection already exists. There is no way to change a service from SVC to PVC. (PR 3516)
- Occasionally, when transferring configuration files from a workstation to the Nways RouteSwitch using FTP the transfer may not be completely successful. (PR 1715)
- FTP fails when using *user* command. (PR 1942)
- When the priority is set to 0x8000 the switch accepts it and displays it as 0 decimal in *stc*. (PR 1464)
- LANE ARP Cache displays false ARPRemote column, however, true reading is displayed on the console. (PR 2673)
- Source routing will not work if PTOP and trunking services are configured on the same ATM interface. (PR 3347)
- When the "mpm" command is used on the primary the mpm slot description does not describe which slot contains the primary. The same command on the secondary does display this information. (PR 3195)
- The "*mpmget*" command does not check for the availability of the file on the primary before it removes the requested file from the secondary. (PR 3209)
- MPM Redundancy is not fully supported for SNMP. (PR 2815)

The Nways RouteSwitch Version 2.0.5 Known Problems have been fixed in this release.

- TSM ports may hang under heavy traffic. (PR 4211)
- MPM memory leakage due to source routing traffic. (PR 4476)
- TSM-F-6 ports may not come up when the board is hot-swapped. (PR 4513)
- Flood limits not set correctly via SNMP. (PR 4515)

The Nways RouteSwitch Version 2.1.1 Known Problems have been fixed in this release.

- Unnecessary flooding on Nways Ethernet RouteSwitch (PR 4514)
- TSM copy bit off option has problem with HSM/2. (PR 4554)
- Frame Relay virtual port goes inactive when two VC's are configured and one is inactive. (PR 4362)
- TSM with HSM/2 performance is less than it should be when transferring files between clients and servers. The reason was due to the last packet of a burst was being held until the next packet of a new burst was sent. The latter occurred when the host asked for a reply because the last packet of a burst was missing. (PR 4612)
- TSM-CD-6 ring speed will not be saved using *tpcfg* if it matches the active speed. (PR 4426)
- TSM copy bit off option does not work properly. Spanning tree blocks the port erroneously. (PR 4588)
- When TSM-CD-6 detects ring speed error it changes the ring speed and resets the port. When the port successfully comes up occasionally other unconnected ports also appear to come up. (PR 4276)

The Nways RouteSwitch Versions 2.1.1 and 2.1.2 Known Problems have been fixed in this release.

- ATM trunking of source route packet puts RI twice into packet. This problem occurs when the user disables the bridge port and then creates a trunk service. (PR 2617)
- IPX eth2 clients lose connection when vrouter port is set to ethsnap. (PR 3980)
- Resetting the board at the map command does not reset the board. (PR 4270)
- Status of *syncctl* is not available. (PR 2615)
- Sending ATM 1483 as a vIPRouterFramingType disables CIP IP Router. (PR 2765)
- SNMP Port Mirroring table shows all the module types, not just the Ethernet. (PR 3977)
- *atmxProtocolType* command has invalid value for ASM-E3. (PR 4021)
- Renegotiation fails when disabling compression, while compression is running. (PR 4162)
- Inverse ARP response is lost with compression enabled. (PR 4163)
- When a system runs out of MAC addresses, a duplicate Vport is assigned for the same services. (PR 4242)
- Spanning Tree will send a topology change trap to NMS on a port that goes down and up even if there is no Spanning Tree bridge connected to that port. (PR 4309)
- TSM port will reset constantly if an IBM STP cable is connected, without connecting the cable to the MAU on the other end. (PR 4310).
- Port ring speed was set to 4 Mbps. SmartBits was set to 16 Mbps. When port speed was changed to 16 using tpvcfg, it never came up. (PR 4943)

12. Known Problems

The problems listed here include problems known at the time of the product's release. Any problems not discussed in this section should be brought to the attention of the IBM Technical Support organization as soon as possible. IBM Technical Support can be reached at **1-800-IBM-SERVE (426-7378)**.

12.1 User Interface and Known General Problems

Problem Report 284
When using the *fportc* command, a user can enter more than one assignment statement. If the user opts to use more than one assignment then there will be one prompt per assignment.

Work-around: NONE.

Problem Report 1607
fsck in bootstrap always runs at 9600 baud. Running at a baud rate other than 9600, removing a file, and power cycling during the compaction will cause permanent failure.

Work-around: NONE

Problem Report 1965
Statistics are not broken down for each group on an FDDI trunk port.

Work-around: NONE

Problem Report 2383
No ATM service or instance can be specified for Static MAC input.

Work-around: NONE

Problem Report 2600
Cannot change FDDI connection rejection policy via user interface.

Work-around: Use Nways RouteSwitch Network Manager

Problem Report 3034
When a new module is added into an empty slot, default encapsulations are not applied automatically, even after rebooting the Nways RouteSwitch.

Work-around: Use *swch* command to configure each port.

Problem Report 4464
When the UNI version is changed and the option to reset the board is chosen, the change does not become effective. User must reboot the switch to make a change in UNI take effect.

Work-around: Reboot the switch.

12.2 Known Router Problems

Problem Report 549/551 [previously PR 699]
Configuration of a Group without assigning any ports to the Group will result in the routing tables displaying the Group's IP network as being available.

Work-around: If the IP network appears in the routing table and is causing a problem with IP routing, the user can reboot the switch. When a reboot is performed, the correct configuration will be displayed in the routing tables.

Problem Report 4759
If many routes or servers are present and a system asks for all routes or servers at a high rate, IPX will consume all available memory. For 2000 servers, the maximum rate of requests is 1 request per ½ second. For 2000 routes the rate is 10 per second. The problem is the IPX router specification demands that if the time between requests is less than the time it takes to send all of the RIP or SAP updates then the switch will buffer the responses with no limit.

Work-around: Find the requesting box and reduce rate of requests.

Problem Report 3982
Token Ring IP Client looses connection when ip vrouter port is set to ethsnap(8)

Work-around: Do not use Ethernet snap encaps for ip vrouter port.

Problem Report 4122
ips stats are incorrect.

Work-around: NONE

12.3 Known Bridging Problems

Problem Report 2116
When using the *macinfo* command do not use the space bar to scroll down. Using the space bar will terminate the command.
Work-around: Use the enter key to scroll down.

Problem Report 1969
Misleading statistics for source routing token ring. Duplicate LAN ID's and duplicate segments are identified.
Work-around: NONE

Problem Report 553
Prompt is offset after VLAN display.
Work-around: NONE

Problem Report 3157
Macinfo may report more number of MACs than actual.
Work-around: NONE

Problem Report 4755
MAC addresses are shown in the macinfo table, but not in the fwt table.
Work-around: NONE

12.4 Known FDDI Problems

Problem Report 539
Trunk services cannot be removed once the FDDI board is removed.
Work-around: Remove all trunk services before removing the FDDI board.

12.5 Known ATM / LANE Problems

Problem Report 2332
When configuring an IPX router port for source routing, the IPX ping across a trunk port will not work.
Work-around: Disable source routing on router port

Problem Report 3266
ATM LEC default frame type does not accept a set command from SNMP.
Work-around: NONE

Problem Report 3338
LE_ARP entries age out incorrectly (up to 3 times the aging timer).
Work-around: NONE

Problem Report 4104
ATM may fail when the MPM is at 90% utilization and the network interface CAM is full.
Work-around: Ensure that CAM size is appropriate for the network.

Problem Report 4471

ILMI stack does not support UNI version auto-detection from the ATM switch. Nways RouteSwitch returns NO_SUCH_NAME to the *get* request for the UNI version in ILMI and most ATM switches will then default to UNI 3.0. As a side effect, if UNI 3.1 is used on the Nways RouteSwitch while the ATM switch defaults to UNI 3.0. Upper layer applications such as LANE will not be able to complete SVC setups due to UNI version mismatch. If this is not corrected LANE will keep on trying to join the ELAN and fail. This will cause memory to be used up and does not subsequently clear memory. Over time if the system is running in this mode all the memory of the Nways RouteSwitch may be used up.

Work-around: When using UNI 3.1 ensure the ATM switch is manually set to UNI 3.1 and do not relay on the auto-detection feature of the ATM switch.

Problem Report 4430
ATM UI display trunk numbers out of sequence. vi, cas, mas, and vas affected.

Work-around: NONE

Problem Report 4452
CIP group can be disabled even though CIP services exists.

Work-around: NONE

Problem Report 4579
If one value on a DS3/E3 configuration set is invalid, no other values are set

Work-around: NONE

Problem Report 4665
vseOpen: camMPMInsertMac fail on Loopback Config change.

Work-around: NONE

Problem Report 4684
Macinfo- multiple VLAN in trunk, only one has vci number, the rest are zero.

Work-around: NONE

Problem Report 4706
CIP over PVC, IP pings timeout over 4561 bytes.

Work-around: NONE

Problem Report 4730
Peak cell rates do not get initialized on an ATM-DS3 module if ATM-OC3 module was previously in the same slot

Work-around: NONE

Problem Report 4741
Disconnecting and reconnecting LECS on Cisco7000 causes some Elans never to rejoin.

Work-around: NONE

Problem Report 4754
Only 64 PMP connections can be opened simultaneously, limiting the ability to have more than 32 LANE services.

Work-around: NONE

12.6 Known SNMP Problems

Problem Report 3123
MIB object testInsertFunc returns no value on snmp query.

Work-around: NONE

Problem Report 3124
MIB Object dot5ChipSets returns no value to snmp query.
Work-around: NONE

Problem Report 3128
Snmp query on dot1dSr returns no value.
Work-around: NONE

Problem Report 3130
dot1dTpAgingTime has error response.
Work-around: NONE

Problem Report 4068
Setting FR Phys Ports Adm Status = Disabled has no effect on VPs.
Work-around: NONE

12.7 Known Token Ring Problems

Problem Report 4565
The 'tsc' command shows Token Ring cards that used to be in the chassis but were replaced by other types of cards.
Work-around: NONE

Problem Report 4732
The auto ring speed detection will switch between 4 and 16 Mbps four times maximum. After this maximum limit is reached, the port will not switch anymore but there is no indication that this limit has been reached.
Work-around: NONE

Problem Report 4925
A TSM-CD-6 port is configured as a lobe and set at 4 Mbps. A station running at 16 Mbps is connected to the port and the port comes up. Tpvc command shows it is open and speed is 4 Mbps and the rest of the ports configured on the same module to Auto. If user pulls one of the cables connected to port configured as auto, the port goes down, as well as the port configured for 4 Mbps also goes down.
Work-around: NONE

Problem Report 4944
Hot swapping of the dual mode token ring card will cause "Changed ring speed detection" messages to be displayed.
Work-around: NONE

12.8 Known Frame Relay Problems

Problem Report 3876
Frame relay port does not get initialized when hot swapped.
Work-around: NONE

Problem Report 4275
If 50 or more VCs are configured, all VCs become active and inactive constantly.
Work-around: Do not use more than 50 VCs on a single physical port.

Problem Report 4416

When PVC are looped back to itself, IP ping timeouts on the valid PVC.

Work-around: NONE

Problem Report 4803
After reboot, default routing service is not created when there is trunking services entry on the same Slot/Port. This problem occurs when user first configure default ROUTING service on a given port level, then configure the trunking services. After configure trunking services, user REMOVE the default ROUTING service on the same port. Reboot the switch, re-enter the default ROUTING service on the same port then reboot the switch one more time and at this time the problem occurs where the default routing service is not assigned.

Work-around: Use the CAS command to manually create individual ROUTING service per VC.

Problem Report 4870
Inverse arp debug msgs. are displayed.

Work-around: NONE

Problem Report 4920
Removing Frame Relay service removes vport from existing VLAN rules.

Work-around: Make sure the VLAN port rule does not include Frame Relay vport service before deleting the service. If the service is deleted, than the VLAN has to be removed and rebuilt.

12.9 Known RouteTracker Problems

Problem Report 3879
Autoencapsulation will not work properly if IPX server is down when IPX client boots up.

Work-around: Set the port to autoswitch.

12.10 Known 802.10 Problems

Problem Report 3952
Port translation defaults to the factory set up. Default should be to the fddidef set up.

Work-around: Use “swch” command for the desired 802.10 port setting.

12.11 Known Translation Problems

Problem Report 4191
IP Ethsnap client encapsulation are set to eth2/snap when autoencaps is on.

Work-around: NONE

12.12 Known MPM Redundancy Problems

Problem Report 4302
Remove and load in brand new mpm.cfg, configsync won't sync secondary.

Work-around: Perform the following commands:
mpmrm mpm.cfg
reboot (both primary and secondary)

Problem Report 4988
Command *takeover* does not always respond. It may take awhile before the original primary performs a reboot.

Work-around: Recommended not to use *takeover* command.

Problem Report 4989
New primary may give invalid block message when it takes over.
Work-around: Ignore error message.

Problem Report 4990
When the secondary MPM is becoming primary the following message may be received:
cmInit: Taking over as Master
Chassis mgr discovered Takeover (0x48bd9ca0) has a problem!
Nways RouteSwitch preparing for reboot.....rebooting.
Work-around: The takeover may take more than 90 seconds to occur.

12.13 Known VLAN Problems

Problem Report 4369
"modvl" gave vlRtrModify(3) router port failure.
Work-around: NONE

Problem Report 4837
Changed a VLAN from CIP to no CIP. System still believes that VLAN is CIP
Work-around: NONE

13. Hardware Compatibility Matrix

Below are matrices containing 1) Nways RouteSwitch Network Manager, Nways RouteSwitch, Nways Ethernet RouteSwitch Compatibility, and 2) Hardware revision levels with Nways RouteSwitch revision levels compatibility. It should be noted that all high-speed switching modules are comprised of an HSM motherboard and network interface daughter cards.

Network Management

	Software Release					
Product	**2.0.3**	**2.0.4**	**2.0.5**	**2.1.1**	**2.1.2**	**2.1.3**
Nways RouteSwitch Network Manager						
Rev. 2.0	x	x	x	x	x	
Rev. 2.0.3	x	x	x	x	x	
Rev. 2.1				x	x	x
RouteTracker						
Rev. 2.0						
Rev. 2.0.4 (not released)						
Rev. 2.0.6		x	x	No	No	x
Rev. 2.1		x	x	No	No	x
RouteMonitor						
Rev. 2.1						x

Nways RouteSwitch Hardware

	Software Release					
Product	**2.0.3**	**2.0.4**	**2.0.5**	**2.1.1**	**2.1.2**	**2.1.3**
MPM (P/N 05002600)	**DISCONTINUED**					
Rev. C (2.10)	x	x	x	x	x	x
Rev. D (2.11)	x	x	x	x	x	x
Rev. E (2.12)	x	x	x	x	x	x
Rev. F (2.13)	x	x	x	x	x	x
Rev. G (2.14)	x	x	x	x	x	x
Rev. H (2.15)	x	x	x	x	x	x
Rev. I (2.16)	x	x	x	x	x	x
Rev. J (2.17)	x	x	x	x	x	x
Rev. K (2.18)	x	x	x	x	x	x
Rev. L (2.19)	x**	x**	x**	x**	x**	x**
Rev. L1 (2.20)	x	x	x	x	x	x
MPM-II 8503, 8504 (P/N 05012006)						
Rev. C1 (2.02)	x**	x**	x**	x**	x**	x**
Rev. C2 (2.03)	x	x	x	x	x	x
Rev. C3 (2.04/3.04)	x	x	x	x	x	x
Rev. C4 (3.05)	x	x	x	x	x	x
Rev. C5 (3.06)	x	x	x	x	x	x
Rev. C6 (3.07)	x	x	x	x	x	x

	Software Release					
Product	**2.0.3**	**2.0.4**	**2.0.5**	**2.1.1**	**2.1.2**	**2.1.3**
Rev. C7(3.08)	x	x	x	x	x	x
ESM-C-8 (P/N 05001400)	**DISCONTINUED**					
Rev. A (1.06)						
Rev. B (1.07)						
Rev. C (1.08)						
Rev. D (1.09)	x	x	x	x	x	x
Rev. E (1.10)	x	x	x	x	x	x
Rev. F (1.11)	x**	x**	x**	x**	x**	x**
Rev. F1 (1.12)	x	x	x	x	x	x
ESM-U-6 7105, 6865 (P/N 05006706)						
Rev. A (1.01)						
Rev. B (1.02)						
Rev. C (1.03)	x	x	x	x	x	x
Rev. D (1.04)	x**	x**	x**	x**	x**	x**
Rev. E (1.05)	x	x	x	x	x	x
Rev. F (2.0)	x	x	x	x	x	x
Rev. F1 (2.01)	x	x	x	x	x	x
Rev. F2 (2.02)	x	x	x	x	x	x
ESM-C-12 7108, 6863 (P/N 05011206)						
Rev. A (never released)						
Rev. B. (never released)						
Rev. C. (never released)						
Rev. D (1.0)	x**	x**	x**	x**	x**	x**
Rev. D1 (4.01)	x	x	x	x	x	x
Rev. D2 (4.02)	x	x	x	x	x	x
Rev. D3 (4.03)	x	x	x	x	x	x
Rev. D4 (4.04)	x	x	x	x	x	x
Rev. E1 (5.01)	x	x	x	x	x	x
Rev. E2 (5.02)	x	x	x	x	x	x
ESM-T-12 7107, 6864 (P/N 050140-06)						
Rev. B (2.00)				x	x	x
ESM-F-8 (P/N 05011806)						
Rev. A (1.00)	x**	x**	x**	x**	x**	x**
Rev. A1 (1.01)	x	x	x	x	x	x
Rev. A2 (1.02)	x	x	x	x	x	x
Rev. A3 (1.03)	x	x	x	x	x	x
Rev. A4 (1.04)	x	x	x	x	x	x
Rev. B (2.00)	x	x	x	x	x	x
Rev. B1 (2.01)	x	x	x	x	x	x
Rev. B2 (2.02)	x	x	x	x	x	x
ESM-AB-AFD 7099 (P/N 05014406)						

	Software Release					
Product	**2.0.3**	**2.0.4**	**2.0.5**	**2.1.1**	**2.1.2**	**2.1.3**
Rev. A (1.00)				x	x	x
ESM-AB-FL 7103 (P/N 05008506)						
Rev. A						
Rev. B	x	x	x	x	x	x
Rev. C	x	x	x	x	x	x
Rev. D	x	x	x	x	x	x
Rev. E	x	x	x	x	x	x
ESM-AB-FL-S 7102 (P/N 05012306)						
Rev. A (1.00)	x	x	x	x	x	x
Rev. A1 (1.01)	x	x	x	x	x	x
ESM-AB-T 7101 (P/N 05009106)						
Rev. A	x	x	x	x	x	x
ESM-AB-B 7100 (P/N 05009706)						
Rev. A (never released)						
Rev. B	x	x	x	x	x	x
Rev. C	x	x	x	x	x	x
ESM-AB-AT 7104 (P/N 05007906)						
Rev. A (never released)						
Rev. B	x	x	x	x	x	x
HSM (P/N 05003106)	**DISCONTINUED**					
Rev. A (2.01) Rev. “B”						
Rev. B (2.02) “ “						
Rev. C (2.03) “ “						
Rev. D (2.04) “ “						
Rev. E (2.05) “ “	x	x	x	x	x	x
Rev. F (2.06) “ “	x	x	x	x	x	x
Rev. G (2.07) “ “	x	x	x	x	x	x
Rev. H (2.08) “ “	x	x	x	x	x	x
Rev. J (2.09) “ “	x	x	x	x	x	x
Rev. K (3.10)	x*	x*	x*	x*	x*	x*
Rev. L (3.11)	x**	x**	x**	x**	x**	x**
Rev. M (4.12)	x	x	x	x	x	x
Rev. M1 (4.13)	x	x	x	x	x	x
HSM2 (P/N 05011006)						
Rev. B. Initial Release						
Rev. C (3.00)		x**	x**	x**	x**	x**
Rev. D (4.00)		x	x	x	x	x
Rev. D1 (4.01)		x	x	x	x	x
Rev. D2 (4.02)		x	x	x	x	x
TSM Copper 7090, 6874 (P/N 05004906)						

	Software Release					
Product	**2.0.3**	**2.0.4**	**2.0.5**	**2.1.1**	**2.1.2**	**2.1.3**
Rev. A (1.01)	x	x	x	x	x	x
Rev. B (1.02)	x	x	x	x	x	x
Rev. C (1.03)	x	x	x	x	x	x
Rev. D (1.04)	x	x	x	x	x	x
Rev. D1 (4.01)	x	x	x	x	x	x
Rev. D2 (4.02)	x	x	x	x	x	x
Rev. D3 (4.03)	x	x	x	x	x	x
Rev. D4 (4.04)	x	x	x	x	x	x
TSM Fiber 7089, 6875 (P/N 05011106)						
Rev. A (1.01)	x	x	x	x	x	x
Rev. B. (2.00)	x	x	x	x	x	x
Rev. B1 (2.01)	x	x	x	x	x	x
Rev. B2 (2.02)	x	x	x	x	x	x
Rev. B3 (2.03)	x	x	x	x	x	x
TSM Dual Mode 7088, 6876 (P/N 05012106)						
Rev. A1 (1.01)				x	x	x
Rev. A2 (1.02)				x	x	x
ATM OC3 Daughter Card (P/N 05004400)	**DISCONTINUED**					
Rev. A (1.01)	x	x	x	x	x	x
Rev. B (1.02)	x	x	x	x	x	x
ATM OC3 Daughter Card Multimode, ½ MB SRAM 7086, 6878, 7084, 6880 (P/N 05011626)						
Rev. A (1.01)	x	x	x	x	x	x
ATM OC3 Daughter Card Multimode, 2 MB SRAM 7084, 6877, 7027, 6879 (P/N 05011624)						
Rev. A (1.01)	x	x	x	x	x	x
ATM OC3 Daughter Card Singlemode, 2 MB SRAM 7082, 6882, 7080, 6884 (P/N 05011625)						
Rev. A (1.01)	x	x	x	x	x	x
ATM OC3 Daughter Card Singlemode, ½ MB SRAM 7083, 7081, 6881, 6883 (P/N 05011627)						
Rev. A (1.01)	x	x	x	x	x	x
ATM DS3 Daughter Card 6890, 7052, 7051, 6889 (P/N 05010406)						
Rev. A1 (1.00)	x	x	x	x	x	x
Rev. B (2.00)	x	x	x	x	x	x

	Software Release					
Product	**2.0.3**	**2.0.4**	**2.0.5**	**2.1.1**	**2.1.2**	**2.1.3**
ATM E3 Daughter Card 7053,7054, 6891, 6892 (P/N 05010413)						
Rev.A (1.00)				x	x	x
Rev. A1 (1.01)				x	x	x
FSM Daughter Card (P/N 05003706)	**DISCONTINUED**					
Rev. A (1.01)						
Rev. B (1.02)						
Rev. C (1.03)	x	x	x	x	x	x
Rev. D (1.04)	x	x	x	x	x	x
Rev. E (1.05)	x***	x***	x***	x***	x***	x***
FSM Daughter Card Multimode 7055, 7056, 6893, 6894 (P/N 05010806)						
Rev. B. Initial release (2.02)						
Rev. C (2.03)	x***	x***	x***	x***	x***	x***
Rev. C1 (2.04)	x	x	x	x	x	x
FSM Daughter Card Singlemode 7060, 7061, 6896, 6897 (P/N 05010813)						
Rev. B Initial Release (2.00)	x	x	x	x	x	x
100BaseT Daughter Card 7098, 6867,7025, 6868 (P/N 05010906)						
Rev. A (never released)						
Rev. B (never released)						
Rev. C2 (3.02)	x	x	x	x	x	x
Rev. C3 (3.03)	x	x	x	x	x	x
Rev. C4 (3.04)	x	x	x	x	x	x
Rev. C5 (3.05)	x	x	x	x	x	x
Rev. C6 (3.06)	x	x	x	x	x	x
Rev. C7 (3.07)	x	x	x	x	x	x
Rev. C8 (3.08)	x	x	x	x	x	x
Rev. C9 (3.09)	x	x	x	x	x	x
Rev. C10 (3.10)	x	x	x	x	x	x
Rev. C11 (3.11)	x	x	x	x	x	x
ESM-100FM-FD 7093, 7094 6871, 6872 (P/N 050122-13)						
Rev. B (2.00)				x	x	x
ESM-100C-FD (P/N 050122-06)						
Rev. B (2.00)				x	x	x
Rev. B1 (2.01)				x	x	x

	Software Release					
Product	**2.0.3**	**2.0.4**	**2.0.5**	**2.1.1**	**2.1.2**	**2.1.3**
ESM-100FS-FD-1 7092, 7091, 6873, 7074 (P/N 050122-14)						
Rev. B (2.00)				x	x	x
FESM II 100BTX 8722, 8723 (P/N 050139-06)						
Rev. A (1.00)		x	x	x	x	x
Rev. A1 (1.01)		x	x	x	x	x
Rev. A2 (1.02)		x	x	x	x	x
Rev. A3 (1.03)		x	x	x	x	x
WSM-4/8-SC WAN 8728, 8729 (P/N 050117-06)						
Rev. A2 (1.02)				x	x	x
CDDI Daughter Card (P/N 05007306)						
Rev. A (1.01)	x	x	x	x	x	x
Rev. B (1.02)	x	x	x	x	x	x
Rev. C (1.03)	x	x	x	x	x	x
Rev. D (1.04)	x	x	x	x	x	x
Rev. E (1.05)	x***	x***	x***	x***	x***	x***

*All FSM-M-2 modules require REV K or greater HSM or any released HSM2.
** This revision and above is required for MPM redundancy.
*** This revision and above is required for Hot Swap.

Nways Ethernet RouteSwitch Hardware

	Nways Ethernet RouteSwitch Software				
Product	**2.0.4**	**2.0.5**	**2.1.1**	**2.1.2**	**2.1.3**
Model 10 7145 / Model 10E 7144 (P/N 05010306)					
Rev. C (never released)					
Rev. C1 (3.01)	x	x	x	x	x
Rev. C2 (3.02)	x	x	x	x	x
Rev. C3 (3.03)	x	x	x	x	x
Rev. C4 (3.04)	x	x	x	x	x
P/N 05015206 Rev. D (4.00)	x	x	x	x	x
Rev. D1 (4.01)	x	x	x	x	x
Model 10U 7143 (P/N 05013006)					
Rev. A (1.00)	x	x	x	x	x
Rev. A1 (1.01)	x	x	x	x	x
Rev. A2 (1.02)	x	x	x	x	x
Rev. A3 (1.03)	x	x	x	x	x
Rev. A4 (1.04)	x	x	x	x	x
Rev. A5 (1.05)	x	x	x	x	x
Rev. A6 (1.06)	x	x	x	x	x
Rev. A7 (1.07)	x	x	x	x	x
Rev. A8 (1.08)	x	x	x	x	x
RESM-AB-FL 7117 (P/N 05008506)					
Rev. A					
Rev. B	x	x	x	x	x
Rev. C	x	x	x	x	x
Rev. D	x	x	x	x	x
Rev. E	x	x	x	x	x
RESM-AB-T 7119 (P/N 05009106)					
Rev. A	x	x	x	x	x
RESM-AB-B 7116 (P/N 05009706)					
Rev. A (never released)					
Rev. B	x	x	x	x	x
Rev. C	x	x	x	x	x
RESM-AB-AT 7119 (P/N 05007906)					
Rev. A (never released)					
Rev. B	x	x	x	x	x
RASM Daughter Card 7128 P/N 05011626 (1/2 MB SRAM) MM					
Rev. A (1.01)	x	x	x	x	x
RASM Daughter Card 7126 P/N 05011627					

	Nways Ethernet RouteSwitch Software				
Product	**2.0.4**	**2.0.5**	**2.1.1**	**2.1.2**	**2.1.3**
(1/2 MB. SRAM) SM					
Rev. A (1.01)	x	x	x	x	x
RASM Daughter Card 7127 P/N 05011624 (2 MB SRAM) MM					
Rev. A (1.01)	x	x	x	x	x
RASM Daughter Card 7125 P/N 05011625 (2 MB SRAM) SM					
Rev. A (1.01)	x	x	x	x	x
RESM II 100BTX 7123 P/N 050139-06					
Rev. A2 (1.02)			x	x	x
Rev. A3 (1.03)			x	x	x
RESM-100FM-FD 7121 P/N 050122-13					
Rev. B (2.00)			x	x	x
RESM-100C-FD P/N 050122-06					
Rev. B (2.00)			x	x	x
PESM-100FS-FD-1 7122 P/N 050122-14					
Rev. B (2.00)			x	x	x
PFSM Daughter Card P/N 05003706 (MM only)	**DISCONTINUED**				
Rev. A (1.01)	x	x	x	x	x
Rev. B (1.02)	x	x	x	x	x
Rev. C (1.03)	x	x	x	x	x
Rev. D (1.04)	x	x	x	x	x
Rev. E (1.05)	x	x	x	x	x
PFSM Daughter Card 7131 P/N 05010806 (MM)					
Rev. B. Initial release (2.02)					
Rev. C (2.03)	x***	x***	x***	x***	x***
Rev. C1 (2.04)	x	x	x	x	x
PFSM Daughter Card 7130 P/N 05010813 (SM)					
Rev. B Initial Release (2.00)	x	x	x	x	x
PFSM Daughter Card UTP P/N 05007306					
Rev. E (1.05)	x	x	x	x	x