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◀||| *APPLICATION NOTE* |||▶

**Over an ATM Network, Conduct a 105 Responder Test  
from a Gateway (Class 4) Switch to a Local (Class 5) Switch**

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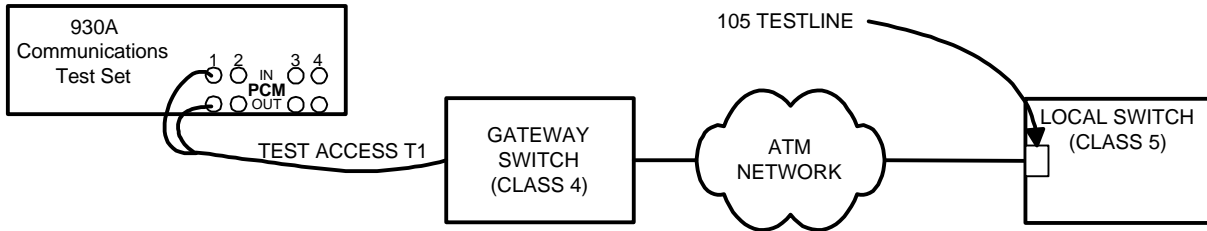
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## Introduction

This instruction assumes the 930A test access is at a T1 point, where the 930A terminates the full T1 (See **Figure 1**, below). It also assumes the DS0 circuit over which the test call is placed uses robbed-bit signaling, and employs wink-start signaling supervision and MF (or DTMF or Dial-Pulse) addressing. If the Test Access T1 does not support robbed-bit signaling, you will have to replace the far end "105" Testline with a Sage Model 356E Responder. This responder can be alternatively "seized" using a DTMF dial string.



**Figure 1** — 105 Responder VoATM Test Architecture

## Preparing the 930A for Automatic Logging of Test Results

By configuring the 930A Remote Control function for "Printer" mode, you can have it automatically print the ROTL/Responder test results to your PC.

1. Press the Option Menu button three (3) times to insure you completely back out of any other menu. Then, using the numeric keypad, enter "3", then press the grey "ENT" button. Your display should now look something like the example below:

```
REMOTE MODE:      OFF      SET-UP  EXIT
```

2. Repeatedly press Softkey 2 until you see "PRINTER". The display should now look like the illustration below:

```
REMOTE MODE:      PRINTER  SET-UP  EXIT
```

3. Press Softkey 3 (SET-UP). The display will change to one like the sample below:

```
SELECT  BAUD RT  PARITY  BIT#    EXIT
```

4. Press Softkey 1 (BAUD RT). The 930A will now display something like the illustration below:

```
SET BAUD RATE:    38400
```

5. Using the numeric keypad, enter the desired baud rate. You may enter 1200, 2400, 9600, 19200 or 38400. Users typically enter 9600, finding the speed quite adequate. Close out the baud rate entry by

pressing the grey "ENT" button located at the bottom right of the numeric keypad. Once you press the ENT button, the display will return to the initial selection screen, as shown below:

**SELECT    BAUD RT    PARITY    BIT#    EXIT**

6. Press Softkey 2 (PARITY). The 930A will display the parity options, as illustrated below:

**PARITY:                    NONE    EVEN    ODD**

7. Most users select "NONE"; however, you may press Softkey 2, 3 or 4 to select the desired parity mode. Once you have pressed the desired Softkey, you will be once again returned to the opening selection screen:

**SELECT    BAUD RT    PARITY    BIT#    EXIT**

8. Press Softkey 3 (BIT). The 930A will display choices for the number of data bits per character, as illustrated below:

**BITS PER CHARACTER:    7                    8**

9. Most users select "8"; you may make your selection by pressing Softkey 2 or 4. Once you have made your selection, the 930A moves on to display choices for the number of stop bits:

**STOP BITS:                    1            1-1/2    2**

10. Most users select "1"; you may make your selection by pressing Softkeys 2, 3 or 4. When you have made your selection, the 930A returns you to the opening selection screen:

**SELECT    BAUD RT    PARITY    BIT#    EXIT**

11. Press Softkey 4 (EXIT). The 930A will now display the opening "Remote Mode" screen:

**REMOTE MODE:            PRINTER    SET-UP    EXIT**

12. Press Softkey 4 (EXIT). The 930A will prompt you with the first of four successive questions before exiting the Remote Mode setup function. Your display should now look like the example below:

**PRINT    ERRORS?                    YES    NO**

13. If you press Softkey 3 (YES), the 930A will automatically "print" a time/date stamped 2-line report each time a detected PCM error occurs (No PCM, Frame Loss, Frame Error, Slip, Bipolar Violation,

Remote Alarm, Blue Alarm (ESF), CRC Error (ESF), or >15 Zeros). Press Softkey 3 (YES) or 4 (NO). The 930A will advance to the 2<sup>nd</sup> question, as illustrated below:

PRINT RECEIVED RECORDS? YES NO

14. This option has no effect except when using the Menu Option 4 (Digit Receiver) function. If you press Softkey 3 (YES), the 930A will automatically "print" the received string of digits in the form: "0123456789#\*ABCD REC#N HOLD DTMF". Press Softkey 3 (YES) or 4 (NO). If you select "NO", go to St because the 930A will skip the 3<sup>rd</sup> question, which is illustrated below:

PRINT DIGIT ANALYSIS? YES NO

15. This option has no effect except when using the Menu Option 4 (Digit Receiver) function. If you press Softkey 3 (YES), the 930A will automatically "print", for each digit, the frequency and amplitude of each MF or DTMF tone together with the Interdigit time, as well as up to two spurious tones. Dial Pulse digits are analyzed in terms of % Break, Pulses per second and Interdigit time. Press Softkey 3 (YES) or 4 (NO). The 930A will advance to the 4<sup>th</sup> question, as illustrated below:

PRINT WINK TIMING? YES NO

16. This option has no effect except when using the Menu Option 4 (Digit Receiver) or Menu Option 2 (Send Digit Sequences) functions. If you press Softkey 3 (YES), and the "Sequence" parameter in either function contains a "W" (Wink), the 930A will automatically "print" a time/date stamped report of the wink Guard and duration times. Press Softkey 3 (YES) or 4 (NO). Once you have made your selection, the 930A returns to the opening Remote Control display, as shown below:

OPTION MENU #: 3 REMOTE CONTROL

**Note:** When connecting a PC to the 930A remember to use a *straight-through*, NOT null-modem cable.

### ***Configuring the 930A to use a T1 Interface***

1. Repeatedly press the TRUNK TYPE button (top left black button on the front panel) until the red LED beside it illuminates. Note that three quick pushes of the Trunk Type button will force the 930A to this function, regardless of what menu it may have been in. You will see a display which may resemble the example below:

NORMAL LOOP BRIDGE CONTACT 2W 900

2. Repeatedly press the Down-Arrow (▼) button until you see a display like the one below:

OPTIONAL TYPES: PCM SF WIDEBAND

3. Press Softkey 2 (located directly under "PCM"). The display should now resemble the example below:

CH# 22    RECV-1    TERM    EXT CLK    SET-UP

4. If "TERM" is displayed above Softkey 2, go to Step 6. Otherwise, press Softkey 2. The display should now look like the one below:

SPAN: TERMINATE    MON-1    MON-1&2    D&I

5. Press Softkey 1 (TERMINATE). The display should now resemble the sample below:

CH# 22    RECV-1    TERM    EXT CLK    SET-UP

6. Press Softkey 4 (Set-Up). The display will change to look like the one below:

IMPEDANCE:            100 OHM            >1K OHM

7. Press Softkey 2 (100 Ohm). The display will now look like the illustration below:

FRAMING:    AUTO    D4/SF    ESF    SLC-96

8. If the access T1 employs D4/Superframe framing, press Softkey 2; if it uses Extended Superframe format, press Softkey 3. The display will change to look like the one below:

SIGNALING:    ROBBED-BIT    CLEAR-CHANNEL

9. Press Softkey 2 (Robbed-Bit). The display will now resemble the example below.

**Notes:**

1. If your 930A does not have Purchase Option 930A-69 (VF encoding Select), "μLAW" will not be displayed.
2. If the test access T1 isn't optioned for Robbed-Bit signaling (perhaps because supervision info is being carried over an SS7 network), the 930A won't be able to directly "seize" the telephone company "105" testline/responder at the far end, therefore it won't answer. In such cases you will have to replace the far end "105" Testline with a Sage Model 356E Responder. This responder can be alternatively "seized" using a DTMF dial string.

CODING:    uLAW    AMI    AUTO-B8    B8ZS

10. If your 930A does not display "μLAW", proceed to step 11. Otherwise, press Softkey 1 to toggle between "μLAW" and "aLAW". Note that μ-Law encode/decode is the type normally employed in North America.

- If the test access T1 is configured for AMI Line Coding, press Softkey 2 (AMI); if the T1 uses B8ZS Line Coding, press Softkey 4 (B8ZS). The 930A display should now change to look like the illustration below:

CHANNEL SEQUENCE: D3/D4      D1D      D2

- If the test access T1 uses standard sequential 1-through-24 channel numbering, press Softkey 2 (D3/D4). Otherwise, press the appropriate Softkey to select D1D or D2. Your display should now look like the example below:

S'VSN:      DEFINED      NORMAL      FXS      FXO

- Press Softkey 2 (Normal). The display should change to look like the one below:

CH# 22      RECV-1      TERM      EXT CLK      SET-UP

- Select the desired DS-0 channel by either using the Up (▲) and Down (▼) arrow keys, or directly enter the channel number using the 930A front panel numeric keypad. If you use the numeric keypad, complete the number entry by pressing the grey "ENT" button located at the bottom right of the numeric pad.

### ***Configuring the 930A ROTL/Responder Function (Menu Option 26)***

- Insure the 930A front panel On-/Off-Hook switch (often called the "hook switch") is in the On-Hook position.
- Press the Option Menu button three (3) times to insure you completely back out of any other menu. Then, using the numeric keypad, enter "26", then press the grey "ENT" button. Your display should now look like the example below:

ROTL/RESPONDER      TEST      SET-UP      RESULTS

- Press Softkey 3 (SETUP). The display should change to resemble the one shown below:

SET TLP:                      0 dB                      USER      -2 dB

- Press Softkey 2 (0 dB). Your display should now look like the illustration below:

TESTS:      LOSS      GAIN/SLOPE      NOISE      MORE

- Standard telephone company Type 105 Testlines support the following 2-way tests:
 

Loss	Loss, using 1004 Hz @ 0 dBm
Gain/Slope	Loss at 404 Hz, 1004 Hz and 2804 Hz @ -16 dBm
Noise (& Noise w/Tone)	Noise w/quiet term, noise w/holding tone (C-Notched)
ERL	Echo Return Loss
SRL	Singing Return Loss - Low
SRH	Singing Return Loss - High

The 930A supports the following additional 2-way tests, but at the far end, you must use a Sage Model 356E Responder or another 930A:

Frequency Sweep	Attenuation distortion at 16 frequencies
S/N	Signal-to-Noise Ratio
3K Flat	Noise using a 3 kHz Flat filter
P/AR	Peak-to-Average Ratio
Intermod	4-Tone Intermodulation Distortion
Jit Hi	Jitter - Hi
Jit Lo	Jitter -Lo
EDD	4-wire Envelope Delay
Imp/Hits	Phase hits, Gain hits, dropouts

To select a LOSS test, press Softkey 1. This will place highlighted dashes above the word "LOSS", indicating it has been selected. If you wish to also select a GAIN/SLOPE test, proceed to press Softkey 2. Likewise, you may press Softkey 3 to add the Noise tests to your selections.

6. Once you have made your desired selections from the above display, press Softkey 4 to see additional choices. Your displays should now look like the example below:

**TESTS:        ERL        SRL LO    SRL HI    MORE**

7. You may press Softkeys 1, 2 and/or 3 to make your test selections from this screen. Once you have selected the desired test(s), press Softkey 4 (More) to see additional test choices. The 930A display change to resemble the one below:

**TESTS:        FREQ SWP    S/N        3K FLAT    MORE**

8. If the far end "responder" is a Sage Model 356E Responder or another 930A Communications Test Set, you may use Softkeys 1, 2 and/or 3 to make additional test selections from this screen. Otherwise, press the Option Menu button and skip to Step 11. When you have completed your selections from this screen, Press Softkey 4. The 930A display should now look like the example below:

**TESTS:        P/AR        INTERMOD    JIT HI    MORE**

9. Use Softkeys 1, 2 and/or 3 to make additional test selections from this screen. When you have completed your selections from this screen, Press Softkey 4. The 930A display should now look like the example below:

**TESTS:        JIT LO        EDD        IMP/HITS    MORE**

10. Use Softkeys 1, 2 and/or 3 to make additional test selections from this screen. When you have completed your selections from this screen, Press Softkey 4. The 930A display should now look like the example below:

**ROTL/RESPONDER        TEST        SET-UP    RESULTS**

## Setting up the Wink-Start Dialing Sequence

This portion of the document describes how to tell the 930A what numbers to dial, and when to expect supervision winks during the dialing activity.

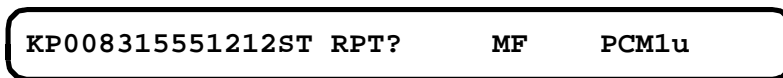
Let's presume you want the 930A to carry out the following dialing sequence in order to connect to the far end responder: Seize the circuit, wait for a wink-back from the switch, transmit the following MF digits [KP008315551212ST], wait for a second wink-back, transmit the following MF digits [KP4155551212ST] wait for a third wink-back, then initiate a test with the far end type "105" Testline. In shortened form the sequence is: [W] [KP008315551212ST] [W] [KP4155551212ST] [W] [105 Test]. The following steps guide you in setting up such a dialing sequence.

1. We must first store the desired digit strings into 930A Memory Registers. Press the Dial/Ring button (second button from the top, in the left side vertical row of buttons). The display should change to resemble the one below. [Note: If your 930A does not have Purchase Option 930A-69 (VF encoding Select), the "u" shown at the right of "PCM" will not be displayed.]



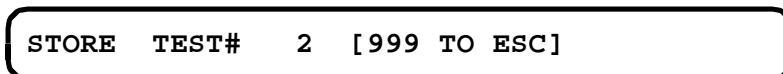
RPT? MF PCM1u

2. Repeatedly press Softkey 3 to cycle through DTMF, DP, MF; stop when you see "MF" displayed. Then, using the numeric keypad, enter the first digit string. Note that you can insert 1-second pauses by pressing the left-arrow button. The unit will accept up to 18 characters in the dial string. The 930A display should now look something like the example below:



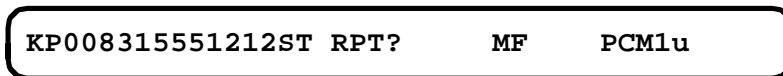
KP008315551212ST RPT? MF PCM1u

3. Store this number in the 930A's Memory Register one (1) by doing the following: Press the "STO" button located near the right side of the numeric keypad. The display should change to look something like the illustration below:



STORE TEST# 2 [999 TO ESC]

4. Using the numeric keypad, enter "1", then press the "ENT" button located near the bottom right of the numeric keypad. The 930A display should return to the Dial/Ring screen, as shown below:



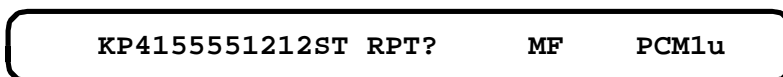
KP008315551212ST RPT? MF PCM1u

5. Now, clear the first digit string by press the grey "CLR" button located at the right of the numeric keypad. The display should look like the example below:



RPT? MF PCM1u

6. Using the numeric keypad, enter the second digit string. The display should now look something like the illustration below:



KP4155551212ST RPT? MF PCM1u



7. Store this number in the 930A's Memory Register two (2) by doing the following: Press the "STO" button located near the right side of the numeric keypad. The display should change to look like the illustration below:

STORE TEST# 2 [999 TO ESC]

8. Press the grey "ENT" button to store the string into Memory Register two. The display will revert back to its previous contents, as shown below:

KP4155551212ST RPT? MF PCM1u

9. Press the Option Menu button and, using the numeric keypad, enter "2" and press the Option Menu button again. The display should look like the example below:

OPTION MENU #: 2 SEND DIGIT SEQUENCES

10. Press any Softkey to enter into this function. The display will change to the one shown below:

AUTO REPEAT? YES NO

11. Press Softkey 4 (NO). The display will advance to the next screen, as illustrated below:

WINK OFF-HK MORE

12. Press Softkey 2 (WINK). The display will add a "W" just to the left of "WINK", as shown below:

W WINK OFF-HK MORE

13. Using the numeric keypad, enter a "1", then press the grey "ENT" key at the right of the pad. The display will add the "1" just to the right of the previously entered "W", as illustrated below:

W 1 WINK OFF-HK MORE

14. Press Softkey 2 (WINK). The display will add another "W" just to the right of the "1", as shown below:

W 1 W WINK OFF-HK MORE

15. Using the numeric keypad, enter a "2", then press the grey "ENT" key at the right of the pad. The display will add the "2" just to the right of the previously entered "W", as illustrated below:

W 1 W 2 WINK OFF-HK MORE

16. Press Softkey 2 (WINK). The display will add another "W" just to the right of the "2", as shown below:

W 1 W 2 W WINK OFF-HK MORE

17. Press Softkey 4 (MORE). The display will change to the sample below:

W 1 W 2 W PAUSE D-DIAL MORE

18. Again, press Softkey 4 (MORE). The display will now look like the one below:

W 1 W 2 W SEND TESTLINE EXIT

19. Press Softkey 3 (TESTLINE). The display will show:

TESTLINE: CPROG 102 105 MORE

20. Press Softkey 4 (105). The display will now look like the one below:

W 1 W 2 W T5 WINK OFF-HK MORE

21. At this point, if you have already configured the ROTL/Responder Function (Menu Option 26), and have the 930A connected to a circuit, it's ready to call the far end responder and execute the tests you selected. All you have to do is flip the "hook switch" Off-Hook. If you have prepared the 930A for automatic logging of ROTL/Responder test results, the results will be "printed" out the 930A serial port as each of the selected tests are completed. Once the series of tests is completed, the display will revert to the opening screen, as illustrated below. *When you see the display below, place the "hook switch" back On-Hook.*

ROTL/RESPONDER TEST SET-UP RESULTS

Below is a sample printout of ROTL/Responder test results. If you're not interested in wink timing data, don't answer "Yes" to the "Print Wink Timing?" prompt when configuring the 930A's Remote Mode printer option.

```
Thursday 09-16-99 20:30:39
CALL COMPLETION TIME: 1.8 SEC. 18:41
LOSS: NEAR +0.0 dB FAR +0.0 dB
SLOPE 404: NEAR +0.0 dB FAR +0.0 dB
SLOPE 1004: NEAR +0.0 dB FAR +0.0 dB
SLOPE 2804: NEAR +0.0 dB FAR +0.0 dB
NOISE: NEAR 7 dBrn FAR 15 dBrn
NOISE/TONE: NEAR 35 dBrn FAR 34 dBrn

Thursday 09-23-99 18:42:17

EVENT#1
W 1 W 2 W T5 216 msec GUARD
W 1 W 2 W T5 153 msec WINK

EVENT#2
W 1 W 2 W T5 194 msec GUARD
W 1 W 2 W T5 148 msec WINK

EVENT#3
W 1 W 2 W T5 183 msec GUARD
W 1 W 2 W T5 152 msec WINK
```

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