1. XCel Planning & Engineering Checklist

Ref: - XCel System Practice, Doc 010101, Sec 3

1. Engineer Loop with GoDigital Configur8r Program
2. Span Reach and Drop Reach properly engineered and documented
3. MDF and Powering cables available
4. OSP Cable Pre-Qualification Completed
5. Records Initiated

2. XCel OSP Cable Pre-Qualification Checklist

Ref: - XCel System Practice, Doc 010101, Sec 4.3

1. Measure the resistance of each cable span to verify cable records.
2. Verify the absence of all load coils on the loop.
3. Remove any long bridged taps nearest the remote end. No single bridge tap longer than 2 Kft. With a total combined distance no greater than 2.5 Kft.
4. Correct any cases of high noise from power influence.
5. Use a cable megger to properly stress test the cable pair. Pair should be tested at 500 Volts T-R and 250 Volts T-G and R-G.

   CAUTION

   Ensure proper procedures are followed when using a cable megger to avoid possible damage to plant, network equipment, and CPE.
6. Measure the loss of each span in both directions. Example: from C.O. to first STR and from first STR to CO.

   - XCel-8 Individual spans are limited by attenuation to 38.5 dB at 136 kHz.
   - XCel-12 Individual spans are limited by attenuation to 38.5 dB at 196 kHz. - XCel-4a Individual spans are limited by attenuation to 41.5 dB at 230 kHz

   Note: A span is defined as each section of cable between each GoDigital field element including the cable from the CTU to the first field element. An XCel System may be made up of a single span or multiple spans.

3. CENTRAL OFFICE XCel COT Shelves (19-Inch and 23-Inch)

Ref:
- **XCel System Practice, Doc 010101, Sec 5.1 – 5.3, and**
- **Inst. Note 010108, shipped with each shelf, and included in Appendix to System Practice**

1. Unpack the Shelf Hardware from the shipping package
2. Read/Review the XCel Multi-Service Shelf Installation Note in the Appendix of the up to date System Practice shipped with the Shelf
3. Mounting Flanges (for 19-inch Shelf Only)
4. Mount the Multi-Service Shelf in the selected relay rack using the four screws provided.
5. Attach the Multi-Service Shelf CHASSIS GROUND to the Rack
6. Connect 25 Pair AMP connectors
7. Secure the AMP Connectors to the Shelf with Tie-Wraps to the nylon Tie-Wrap anchors on each backplane connector.
8. Attach Timing reference (if required)
9. Contact Alarms. Wire wrap leads from office alarms to rear of shelf
10. Select a fusing option and install fuses in fuse panel (three options)
11. Attach the office ground to the “CO GND” terminal on the backplane power connector
12. Run A and B –48 Vdc office power cables from the fuse panel to the XCel Shelf
13. Optional Continuity Check using GoDigital XCel STREAKER Test Card.
14. Attach label for POS CIRCUIT ASSIGNMENT
15. Attach label for SHELF NO.
16. Install ACU Alarm Card
17. Shelf Installation is complete
18. Install CTUs per individual systems

4. REMOTE INSTALLATION of XCel COT Shelves (19-Inch and 23-Inch)

Ref: Section 9 of INST NOTE 010108, shipped with each shelf, and included in Appendix to System Practice

1. Unpack the Shelf Hardware from the Shipping Package
2. Review this INST NOTE
3. Pre-wire cables / pairs in Cabinet or RT, to Shelf Location
4. Chassis Ground
5. Connect the 25 Pair AMP Connectors
6. Secure the AMP Connectors to the Shelf with Tie-Wraps
7. Timing 1 Reference
8. Timing 2 Reference (Optional)
9. Digital Ground (Optional)
10. Bypass Pairs (Optional)
11. Contact Alarms
12. Mounting Flanges *(For 19-inch Shelf Only)*
13. Mount the XCel Multi-Service Shelf in the Relay Rack
14. "A" and "B" –48 Vdc Office Power Cabling
15. Continuity Check (Optional)
16. Attach label for POSITION CIRCUIT ASSIGNMENT
17. Attach label for SHELF NUMBER
18. Install Fuses in the Fuse Panel
19. Shelf Installation is Complete

5. ACU MOD H AD

Ref:
- **XCel System Practice, Doc 010101, Sec 5.4, and**
- **Inst. Note 010105, shipped with each ACU and included in Appendix to System Practice**

1. Unpack and Inspect the ACU MOD CB Alarm Card.
2. Verify and/or Adjust the ACU Switch Settings:

2.1 Set the ALARM THRESHOLD on the "SW3" switch on the card.

2.2 Set the EXTERNAL CLOCK SELECT on the "SW2" switch on the card.

2.3 Set EXTERNAL CLOCK CONFIGURATION on the "SW4" switch on the card.

2.4 Verify the 19'' or 23'' Multi-Service Shelf is properly installed and grounded.

3. Plug in the ACU to the Multi-Service Shelf

6. CTU MOD H 8P and CTU MOD H 12P

Ref: **- XCel System Practice, Doc 010101, Sec 5.5 and**
- Inst. Note 010106, shipped with each CTU and included in Appendix to System Practice

1. Verify that the loop has been designed in accordance with the GoDigital Configur8r™ System Design tool, with the proper loop span reach.
2. Unpack and Inspect the XCel CTU Card.
3. Verify the 19'' or 23'' Multi-Service Shelf is properly installed and grounded.
4. Verify or install the proper MDF protector.
5. Insert the CTU into the Multi-Service Shelf
6. The CTU will automatically link with XCel OSP units in the standard XCel linking process.

7. STR (544 & 784)

Ref: **- XCel System Practice, Doc 010101, Sec 5.7.3, and**
- Inst. Note 010024, shipped with each STR and included in Appendix to System Practice

1. Verify that the loop has been designed in accordance with the GoDigital Configur8r™ System Design tool, with the proper loop span reach.
2. Mount the STR housing to a pole, or other designated mounting location.
3. Ground the STR unit properly to an adequate local ground.
4. Connect the upstream DSL pair to the unit.
5. Connect the downstream DSL pair to the unit.
6. After the loop is completely built, apply power by seating the CTU in the Central Office.
7. The STR will automatically link in the standard XCel/GDSL linking process.

8. STR MOD (544 & 784)

Ref: **- XCel System Practice, Doc 010101, Sec 5.7.4, and**
- Inst. Note 010041, shipped with each STR MOD and included in Appendix to System Practice

1. Verify that the loop has been designed in accordance with the GoDigital Configur8r™ System Design tool, with the proper loop span reach, and drop requirements.
2. Prior to installing the STRM unit, verify that the capacity of the housing is in accordance with GoDigital recommended loading levels for heat dissipation.
3. Verify that the Housing is properly grounded to earth ground.
4. Verify the upstream and downstream DSL pairs for the slots that will support each STRM to be installed.
5. Verify that protectors have been installed in the housing for the upstream and downstream DSL pairs to be used.
6. Insert the STRM into the appropriate slot.
7. After the loop is completely built, apply power by seating the CTU in the Central Office.
8. The STRM will automatically link in the standard XCel/GDSL linking process.

9. STR LP (544 & 784)

Ref: **- XCel System Practice, Doc 010101, Sec 5.7.5, and**
- Inst. Note 010047, shipped with each STR LP and included in Appendix to System Practice

1. Verify that the loop has been designed in accordance with the GoDigital Configur8r™ System Design tool, with the proper loop span reach.
2. Mount the STR LP housing to a pole, or other designated mounting location.
3. Ground the STR LP unit properly to an adequate local ground.
4. Connect the upstream DSL pair to the unit.
5. Connect the downstream DSL pair to the unit.
6. Connect the –48 Volt DC power pair to the unit.
7. Apply power by turning on the –48VDC power supply to the unit.
8. After the loop is completely built, initiate linking by seating the CTU in the Central Office.
9. The STR LP will automatically link in the standard XCel/GDSL linking process.

10. ADR 4P & TAD 4P (544 & 784)

Ref: **- XCel System Practice, Doc 010101, Sec 5.7.6 and 5.7.7, and**
- Inst. Note 010023, shipped with each ADR and TAD and included in Appendix to System Practice

1. Verify that the loop has been designed in accordance with the GoDigital Configur8r™ System Design tool, with the proper loop span reach.
2. If EXTended drop units are used, verify the number and type of drops (LONG or SHORT) were correctly designated in the Configur8r.
3. Mount the ADR or TAD housing to a pole, or other designated location.
4. Ground the ADR or TAD unit properly to an adequate local ground.
5. Connect the upstream (ADR & TAD) DSL pair to the unit.
6. Connect the downstream (ADR only) DSL pair to the unit.
7. Connect the drops to the drop protector terminals. Zero to four drops as appropriate.
8. Select the lines to be dropped with the selector switches on the lid of the unit.
9. After the loop is completely built, apply power by seating the CTU in the Central Office.
10. The ADR or TAD will automatically link in the standard XCel/GDSL linking process.

11. RTU 8P 544

Ref:
- **XCel System Practice, Doc 010101, Sec 5.7.8, and**
- **Inst. Note 010107, shipped with each RTU 8P 544 with non-gel-filled protectors and included in Appendix to System Practice**
- **Inst. Note 010191, shipped with each RTU 8P 544 with gel-filled protectors and included in Appendix to System Practice**

1. Verify that the loop has been designed in accordance with the GoDigital Configur8r™ System Design tool, with the proper loop span reach.
2. If EXTended drop units are used, verify that the number of LONG and SHORT drops were correctly designated in the Configur8r, and the correct OSP unit is being used.
3. Mount the RTU housing to a pole, or other designated mounting location.
4. Ground the RTU unit properly to an adequate local ground.
5. Connect the upstream DSL pair to the RTU unit.
6. Connect the drops to the drop protector terminals. Zero to eight (0 to 8) drops as appropriate.
7. If ADRs are upstream in the loop, reconfirm that no conflict exists in the ADR channel selection for the specifically desired drops at the RTU.
8. After the loop is completely built, apply power by seating CTU in the C.O.
9. The RTU will automatically link in the standard XCel/GDSL linking process.

12. RTU 12P 784

Ref:
- **XCel System Practice, Doc 010101, Sec 5.7.8, and**
- **Inst. Note 010199, shipped with each RTU 12P and included in Appendix to System Practice**

1. Verify that the loop has been designed in accordance with the GoDigital Configur8r™ System Design tool, with the proper loop span reach.
2. Mount the RTU housing to a pole, or other designated mounting location.
3. Ground the RTU unit properly to an adequate local ground.
4. Connect the upstream DSL pair to the RTU unit.
5. Connect the drops to the drop protector terminals. Zero to twelve (0 to 12) drops as appropriate.
6. If ADRs are upstream in the loop, reconfirm that no conflict exists in the ADR channel selection for the specifically desired drops at the RTU.
7. After the loop is completely built, apply power by seating CTU in the C.O.
8. The RTU will automatically link in the standard XCel linking process.

13. CTU MOD H 4A

Ref: - XCel System Practice, Doc 010101, Sec 5.5 and
- Inst. Note 010170, shipped with each CTU 4A and included in Appendix to System Practice

1. Verify that the loop has been designed in accordance with the Configur8r™ design tool
2. Unpack and Inspect the XCel CTU Card.
3. Verify the 19'' or 23'' Multi-Service Shelf is properly installed and grounded.
4. Consult work order to verify proper pairs (up to four per CTU 4A) provisioned for INPUT of ADSL lines.
5. Consult work order to verify proper pair (one each) provisioned for OUTPUT of the GoDigital SHDSL line.
6. Verify or install the proper MDF protector.
7. Verify and/or set the DSLAM ADSL lines to be speed-limited to 1.536 Mbps.
8. Insert the CTU into the Multi-Service Shelf.
9. The CTU will automatically link with XCel OSP units in the standard XCel linking process.

14. STR 4A 1536

Ref: - XCel System Practice, Doc 010101, Sec 5.7.3, and
- Inst. Note 010177, shipped with each STR 4A and included in Appendix to System Practice

1. Verify that the loop has been designed in accordance with the GoDigital Configur8r™
2. Mount the STR housing to a pole, or other designated mounting location.
3. Ground the STR unit properly to an adequate local ground.
4. Connect the downstream DSL pair to the unit.
5. Connect the upstream DSL pair to the unit.
6. After the loop is completely built, apply power by seating the CTU in the Central Office.
7. The STR will automatically link in the standard XCel linking process.

15. RTU 4A 1536

Ref: - XCel System Practice, Doc 010101, Sec 5.7.8, and
- Inst. Note 010169, shipped with each RTU 4A and included in Appendix to System Practice

1. Verify that the loop has been designed in accordance with the GoDigital Configur8r™ System.
2. Mount the RTU housing to a pole, or other designated mounting location.
3. Ground the RTU unit properly to an adequate local ground.
4. Connect the upstream DSL pair to the RTU unit.
5. Consult the work order to verify the proper pairs for INPUT of POTS lines, and
   OUTPUT of ADSL or ADSL+POTS line connections.
6. (Optional) Connect the input POTS lines (#1 - #4) to the RTU to the labeled protectors for POTS
7. Connect the (#1 to 4) drops as appropriate to the ADSL drop protector terminals.
8. After the loop is completely built, apply power by seating the CTU in the Central Office.
9. The RTU will automatically link in the standard XCel linking process.

16. CarrierNode (Option A) SUMMARY:

Installed REAR ACCESS is Available: (Office-type installation)

Ref: - Inst. Note 010212, shipped with each CarrierNode Shelf, and included in Appendix to System Practice

A.1.	Unpack the CarrierNode Shelf Hardware from the shipping package.
A.2.	Read/Review this CarrierNode INST NOTE (Doc. # 010212).
A.3.	Pre-wire cables / pairs in Office, Cabinet or RT, to location where CarrierNode will be mounted.
A.4.	Mount the CarrierNode Shelf in selected cabinet or rack using the screws provided.
A.5.	Remove and Save the plastic SAFETY COVER from the back of the CarrierNode Shelf.
A.6.	Chassis Ground: Attach the CarrierNode Shelf CHASSIS GROUND to the Rack.
	Items A.7 though A.11, assume location is pre-wired, per STEP # A.3.
A.7.	XCel System DSL Pairs: Wire wrap three each (3 ea.) DSL pairs to the Shelf.
A.8.	DS1 Pair: Wire wrap one each (1 ea.) DS1 pair to the CarrierNode Shelf
A.9.	Contact Alarms: Wire wrap one to four (1-4) pairs from office alarms to rear of shelf.
A.10.	By-pass Pair: Wire wrap one (1 ea.) or two (2) By-pass Pair(s) to the CarrierNode Shelf.
A.11.	Replace the plastic SAFETY COVER onto the back of the CarrierNode Shelf.
A.12.	Fusing: Fuse the A (and optional B) power with 5 Amp fuses.
A.13.	-48V Power Cabling: Attach A and B –48 Vdc power cables from fuse panel to the Shelf
A.14.	Attach “C.O. ground, to the CarrierNode Shelf “CO GND”.
A.14.1	Attach –48Vdc battery A, to the CarrierNode Shelf “–48V Batt A”.
A.14.2	Attach battery return A, to the CarrierNode Shelf “Batt Ret A”.
A.14.3	Optional: Attach –48Vdc battery B, to the CarrierNode Shelf “–48V Batt B”.
A.14.4	Optional: Attach battery return b, to the CarrierNode Shelf “Batt Ret B”.
A.15.	Attach label for SHELF NUMBER and POS CIRCUIT ASSIGNMENT.
A.16.	CarrierNode Shelf Installation is Complete.

17. CarrierNode (Option C) SUMMARY:

Using CarrierNode FRONT ACCESS KIT (Optional) when NO REAR ACCESS is available (Typical Cabinet Installations):

Ref: - Inst. Note 010212, shipped with each CarrierNode Shelf, and included in Appendix to System Practice

C-1. Unpack the CarrierNode Shelf Hardware from the shipping package.

C-2. Unpack the FRONT ACCESS KIT Hardware from the shipping package.

C-3. Read this INST NOTE for CarrierNode (Doc. # 010212).

Prior to mounting the SHELF and the FRONT ACCESS ASSEMBLY:

C-4. Pre-wire cables and pairs in Cabinet or RT.

C-5. Mount the FRONT ACCESS PANEL with the pre-wired STUB.

C-6. Route the pre-wired STUB from FRONT ACCESS panel to CarrierNode location.

C-7. Remove & Save the plastic SAFETY COVER from back of CarrierNode Shelf.

C-8. Chassis Ground: Attach the CarrierNode Shelf CHASSIS GROUND to the Rack.

C-9. Connect FRONT ACCESS STUB cable connections to rear of CarrierNode Shelf

C-9.1 **Connect longest STUB connector to SYSTEM 1–2–-3 wire wrap terminals**

C-9.2 **Connect shortest STUB connector to DS1 & ALARMS wire wrap terminals.**

C-9.3 **Attach single wire Power and CO ground conductors per STUB labeling:**

- **Attach STUB "GND" conductor, to the CarrierNode Shelf "CO GND".**
- **Attach STUB "BATT A" conductor, to the CarrierNode Shelf "–48V Batt A".**
- **Attach STUB "RET A" conductor, to the CarrierNode Shelf "Batt Ret A".**
- **Attach STUB "BATT B" conductor, to the CarrierNode Shelf "–48V Batt B".**
- **Attach STUB "RET B" conductor, to the CarrierNode Shelf "Batt Ret B".**

C-10. Secure HARNESS CABLE CLAMP to post on rear of CarrierNode Shelf.

C-11. Mount CarrierNode Shelf in the desired cabinet/rack using the screws provided.

Items C-12 to C-17, assume Front Access location is pre-wired per Step C.4.

C-12. XCel System DSL Pairs: Wire wrap three each (3 ea.) DSL pairs to FRONT ACCESS ASSY.

C-13. DS1 Pairs: Wire wrap one DS1 (four wires) to FRONT ACCESS ASSY.

C-14. Contact Alarms: Wire wrap alarm pairs to FRONT ACCESS ASSY.

C-15. By-pass Pair: Wire wrap one or two By-pass Pair(s) to FRONT ACCESS ASSY.

C-16. Install TIE-WRAPS as required on front of FRONT ACCESS ASSEMBLY

C-17. –48Vdc Power Connection: Attach CO Battery and Battery Return to the shelf.

- **Attach "C.O. ground, to the FRONT ACCESS ASSY "CO GND".**
- **Attach –48Vdc battery A, to the FRONT ACCESS ASSY "–48V Batt A".**
- **Attach battery return A, to the FRONT ACCESS ASSY "Batt Ret A".**

Optional: Attach –48Vdc battery B, to the FRONT ACCESS ASSY "–48V Batt B".

- **Optional: Attach battery return B, to the FRONT ACCESS ASSY "Batt Ret B".**

C-18. Install plastic SAFETY COVER onto the FRONT of the FRONT ACCESS ASSY.

C-19. Fusing: Fuse the A (and optional B) power with 5 Amp fuses.

C-20. Attach label for SHELF NUMBER and POS CIRCUIT ASSIGNMENT.

C-21. Shelf Installation is Complete

18. CarrierNode Module SUMMARY:

Ref: - Inst. Note 010213, shipped with each CarrierNode Nodule, and included in Appendix to System Practice

1. Verify that the CarrierNode Shelf has been properly installed and grounded
2. Verify that XCel loops have been designed in accordance with the Configur8r™ design tool,
3. Unpack and inspect the CarrierNode Module.
4. Verify and/or adjust the CarrierNode Module provisioning settings: Switches SW1 – SW10.
5. Verify or install the proper MDF or station-type protectors.
6. Apply –48 Vdc power to the CarrierNode Shelf.
7. Install / Verify DS1 is Active from the Switch to the CarrierNode Shelf.
8. Insert the CarrierNode Module into the CarrierNode Shelf.
9. Confirm CarrierNode Settings
10. Turn-up and Link-up the XCel Loops
11. Confirm/verify proper loop operation at CarrierNode and at the remote elements.